

# final report

July 24, 2023

## Traffic Impact Study

6805 Beulah Church Road (KY 864)  
Louisville, KY

Prepared for

Louisville Metro Planning Commission  
Kentucky Transportation Cabinet



I, Diane Bridwell Zimmerman, certify that this Traffic Impact Study has been prepared under my direct supervision, that I am a Professional Engineer registered in the State of Kentucky and have successfully completed the Traffic Impact Study Requirements training course required by KYTC. Furthermore, I certify that this study has been completed in accordance with the KYTC Traffic Impact Study Requirements and in accordance with engineering standards of practice. The results presented have been determined to be accurate representations of existing and anticipated conditions based on the assumptions and methodologies presented in this report.

Diane Bridwell Zimmerman, Professional Engineer License #16462



 <b>College of Engineering</b> <small>Kentucky Transportation Center</small>	<b>TECHNOLOGY TRANSFER PROGRAM</b>
<b>TRAFFIC IMPACT STUDY COURSE Certificate of Completion (3.5 PDH)</b>	
<b>Diane Zimmerman</b> KY PE License No. 16462	<b>TIM THARPE</b> _____ Tim Tharpe, KYTC Director of Traffic Operations
Completed: 02/18/2022 Expires: 02/18/2026 Company: University of Kentucky	 _____ Adam Kirk, Instructor
<b>The official status of this certificate can be verified with the KYTC Division of Traffic Operations</b>	

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## INTRODUCTION

The development plan for 6805 Beulah Church Road (KY 864) in Louisville, KY shows a mix of commercial and residential units. **Figure 1** displays a map of the site. Access to the site will be from two full entrances on Beulah Church Road (one is the Cedar Creek Road extension) and a right-in/right-out, and three connections to adjacent stub streets – Sardis Way, Black Powder Lane, and Fox Chase Road. 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 Beulah Church Road with I 265 ramps, Arbor Creek Drive/Rocky Lane, Arbor Manor Way, and Adams Run Road; Adams Run Road with Fox Chase Road, and Cedar Creek Road with Black Powder Lane.

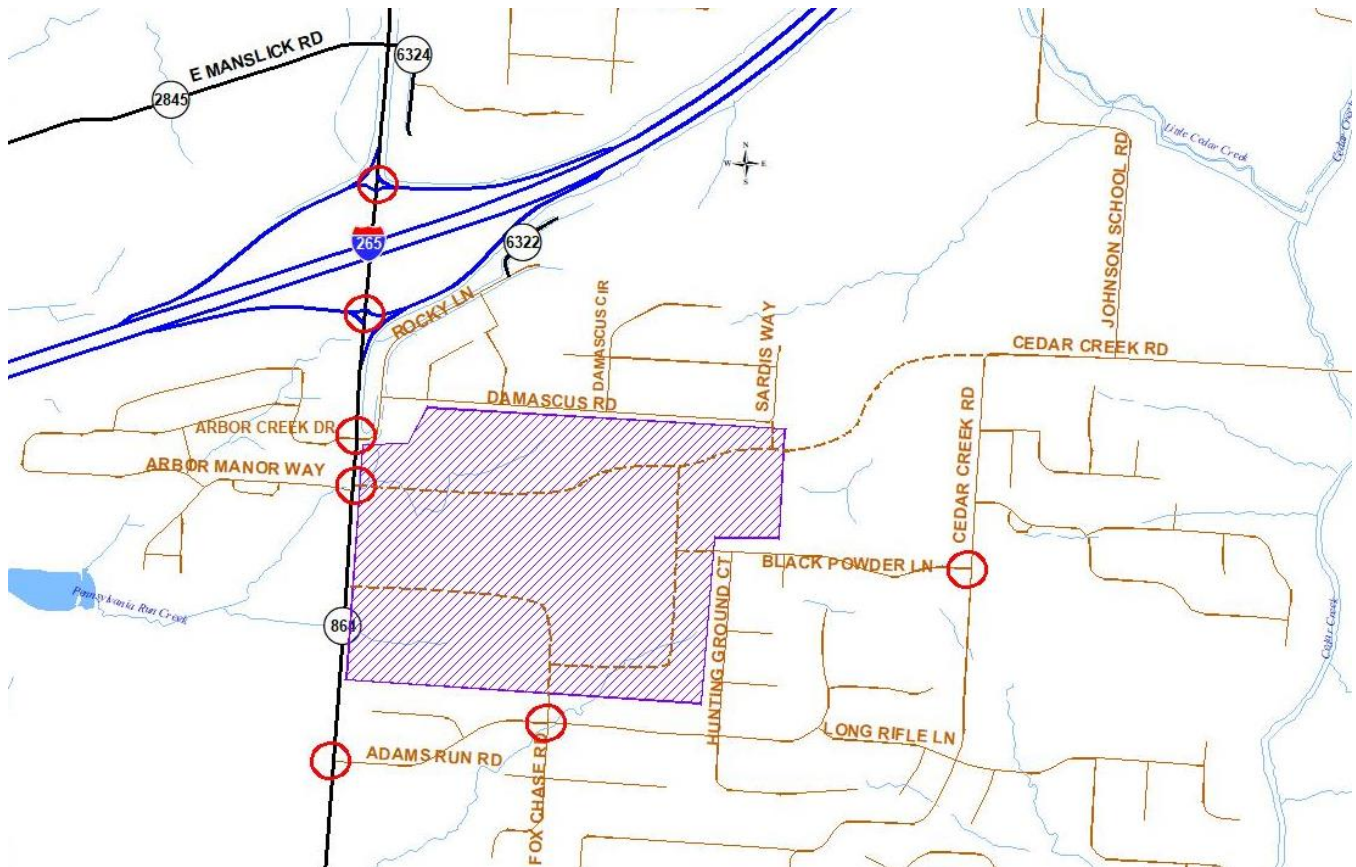


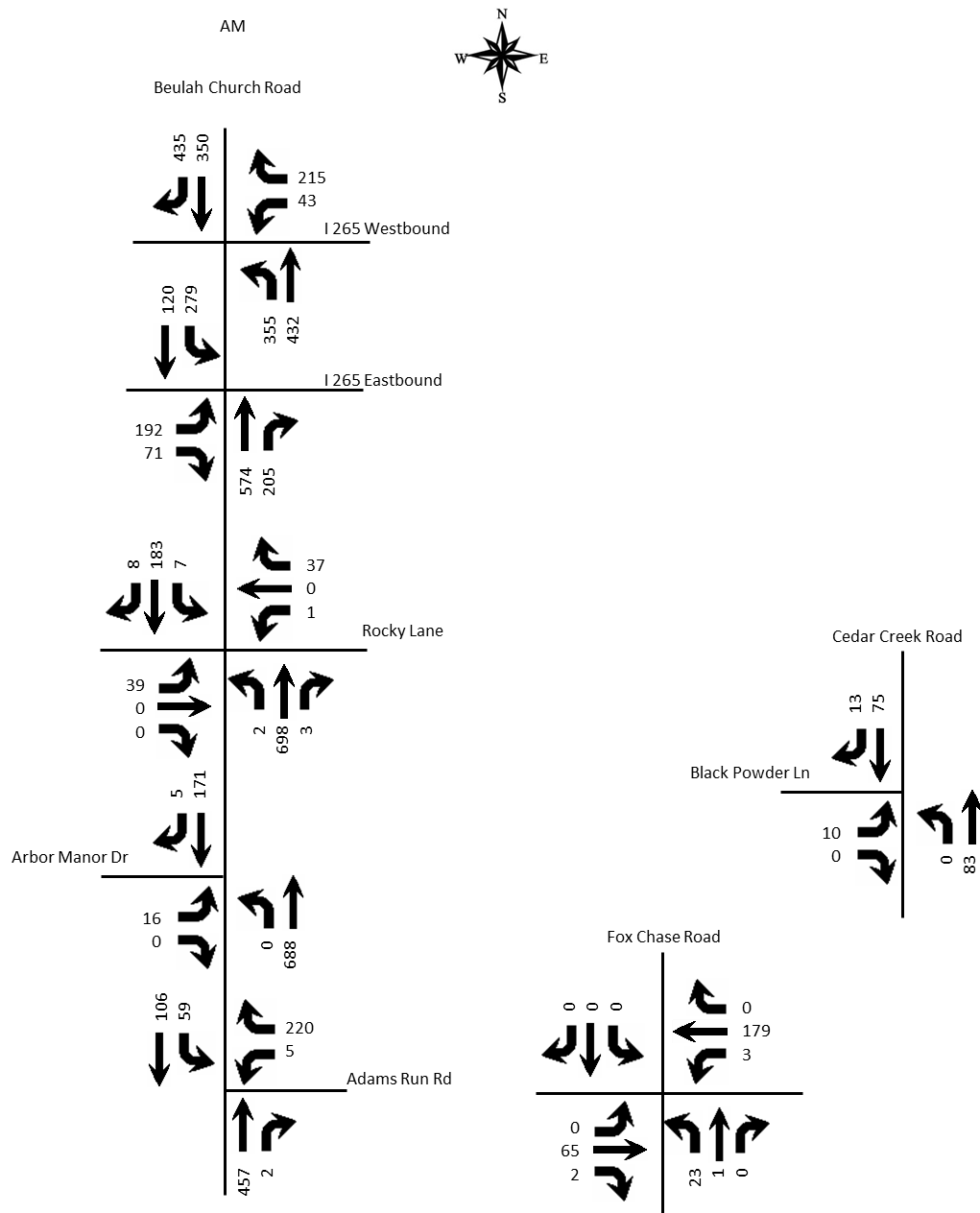
Figure 1. Site Map

## EXISTING CONDITIONS

Beulah Church Road, KY 864, is maintained by the Kentucky Transportation Cabinet (KYTC) with an estimated 2022 ADT of 10,000 vehicles per day south of I 265 as estimated from a 2019 count at KYTC station 269. The road is a two-lane highway with ten-foot lanes with three-foot shoulders through the study area (provided by the Kentucky Transportation Cabinet). The speed limit is 35 mph. There is a sidewalk on the west side between Arbor Manor Way and Arbor Creek Drive. The intersections with I 265 ramps are controlled with a traffic signal. At both intersections Beulah Church Road has a left lane and the right turn lanes are free flow. A two-way left turn lane begins south of I 265 and ends at Arbor Manor Drive. The intersections of Arbor Creek Drive/Rocky Lane, Arbor Manor Way and Adams Run Road are controlled with a stop sign on the minor street approach.

The intersections of Fox Chase Road and Black Powder Lane are all controlled with stop signs and there are no turn lanes present.

Peak hour traffic count for the intersections were obtained on Wednesday, November 16, 2022. The a.m. peak was 7:00 to 8:00 and the p.m. peak hour varied. **Figure 2** illustrates the existing a.m. and p.m. peak hour traffic volumes. The Appendix contains the full count data.



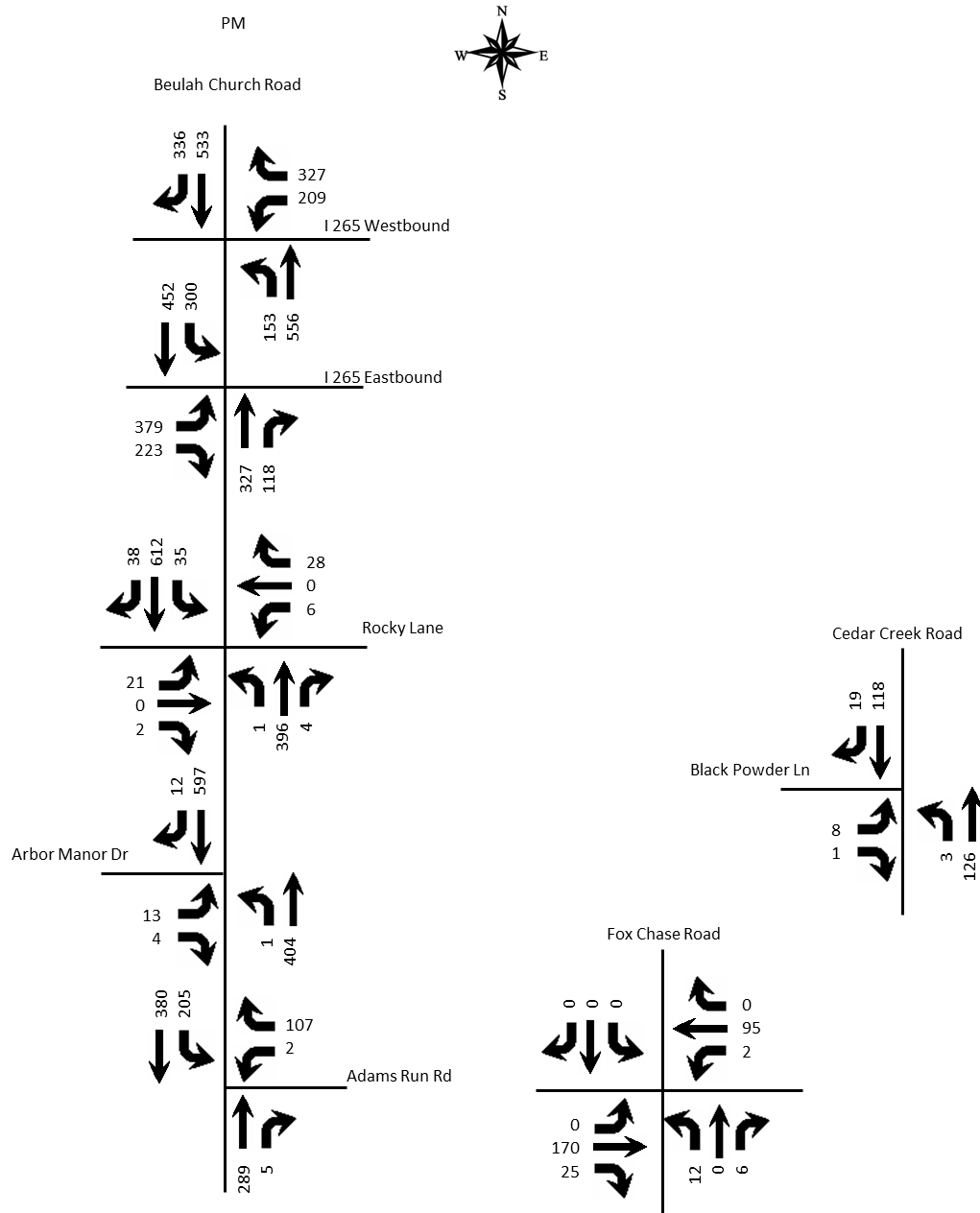
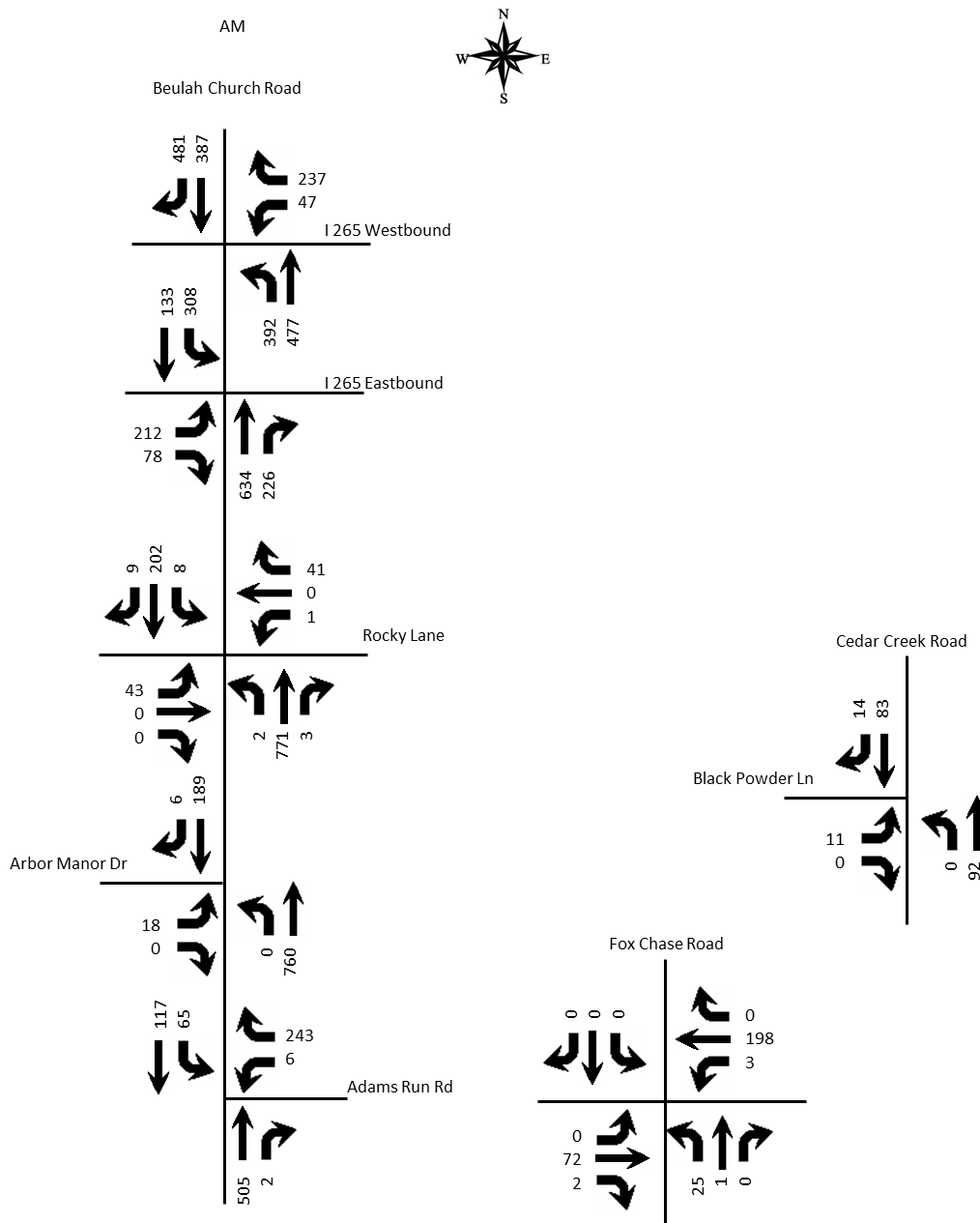


Figure 2. Existing Peak Hour Volumes

## FUTURE CONDITIONS

The projected completion year for this development is 2033. To predict traffic conditions in 2033, 1.0 percent annual growth in traffic was applied to Beulah Church Road south of I 265. This growth is based upon a review of the historical count data at the KYTC count stations 269, 279, and 271 (see page 25). The Kentucky Transportation Cabinet has a project to improve the Beulah Church Road from I 265 to Cedar Creek Road. This project is scheduled to be completed in 2025. **Figure 3** illustrates the 2033 traffic volumes without the development.



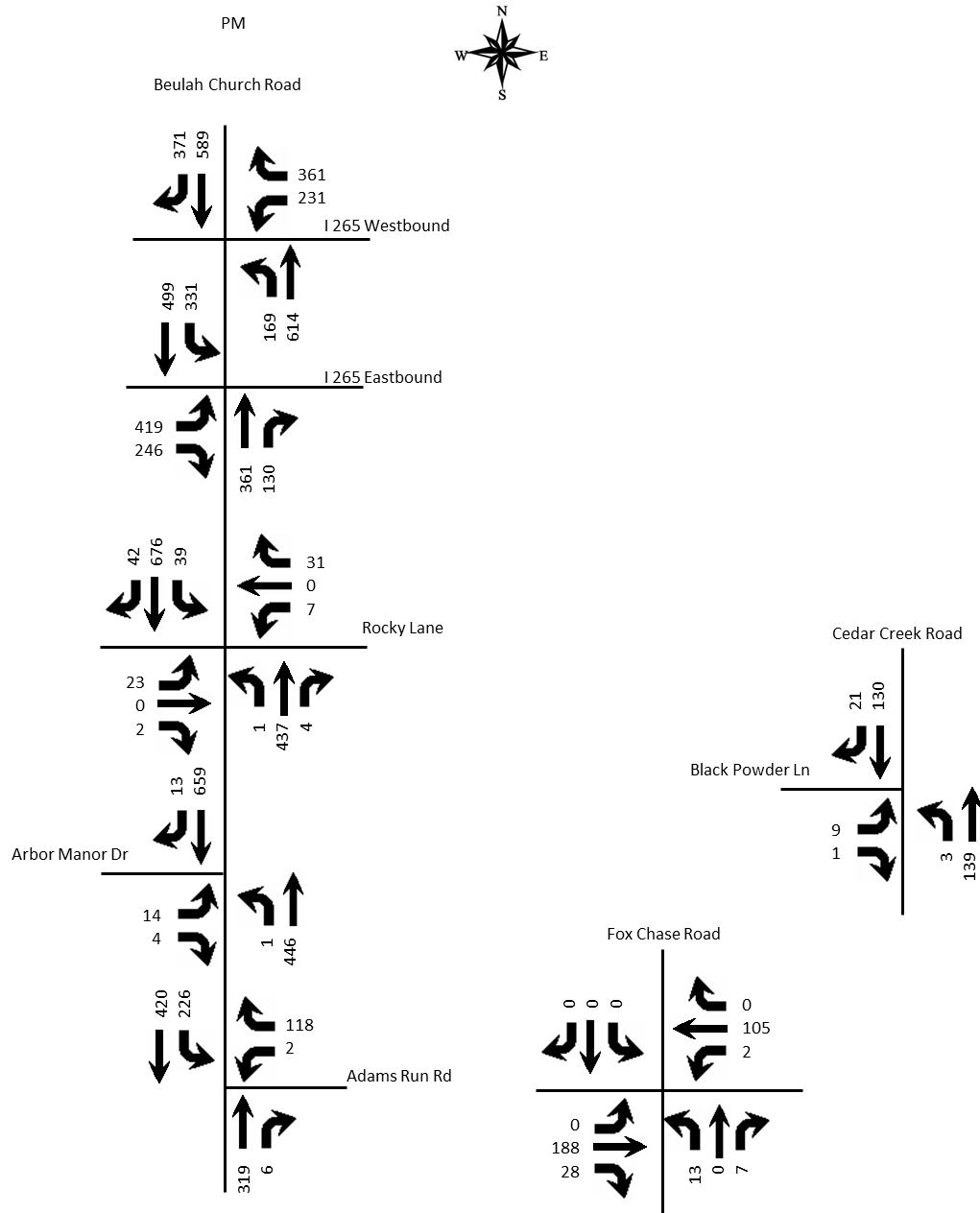


Figure 3. 2033 Peak Hour No Build Volumes



## TRIP GENERATION

The Institute of Transportation Engineers Trip Generation Manual, 11<sup>th</sup> Edition contains trip generation rates for a wide range of developments. The land uses listed in **Table 1** 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**. These percentages reflect the origins of primary trips to the site. Trips were assigned to the access points on Beulah Church Road relative to percentage of trips generated at each access point. Pass-by trips were assigned according the directional traffic flow on Beulah Church Road. **Figure 5** shows 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**

**AM Peak Hour**

Land use	ITE Code	Intensity	Total Trips			Internal Trips				External Trips			Pass-by Trips		New Trips		
			In	Out	Total	In	Out	Total	%	In	Out	Total	%	Volume	In	Out	Total
Grocery	850	122,000 sf	206	143	349	21	23	44	12.6%	185	120	305	0%	0	185	120	305
Strip Retail	822	30,500 sf	36	24	60	0	0	0	0.0%	36	24	60	0%	0	36	24	60
High Turnover	932	8,000 sf	42	35	77	11	4	15	20.0%	31	31	62	0%	0	31	31	62
Fast Food w drive	934	7,400 sf	168	162	330	48	18	66	19.9%	120	144	264	50%	132	60	72	132
Gas Only	944	14 pumps	72	72	144	0	0	0	0.0%	72	72	144	63%	91	27	27	53
Single Family	210	50 units	10	30	40	0	0	0	0.0%	10	30	40	0%	0	10	30	40
SF Attached	215	184 units	22	68	90	4	39	43	47.8%	18	29	47	0%	0	18	29	47
Multi-Family (1-3)	220	288 units	27	85	112	0	0	0	0.0%	27	85	112	0%	0	27	85	112
Total			583	619	1,202	84	84	168	14.0%	499	535	1,034	21.6%	223	394	418	811

**PM Peak Hour**

Land use	ITE Code	Intensity	Total Trips			Internal Trips				External Trips			Pass-by Trips		New Trips		
			In	Out	Total	In	Out	Total	%	In	Out	Total	%	Volume	In	Out	Total
Grocery	850	122,000 sf	454	454	908	107	136	243	26.8%	347	318	665	24%	160	264	242	505
Strip Retail	822	30,500 sf	86	86	172	0	0	0	0.0%	86	86	172	40%	69	52	52	103
High Turnover	932	8,000 sf	44	28	72	17	20	37	50.8%	27	8	35	43%	15	15	5	20
Fast Food w drive	934	7,400 sf	127	117	244	57	65	122	50.2%	70	52	122	55%	67	32	23	55
Gas Only	944	14 pumps	98	97	195	0	0	0	0.0%	98	97	195	57%	111	42	42	84
Single Family	210	50 units	33	19	52	0	0	0	0.0%	33	19	52	0%	0	33	19	52
SF Attached	215	184 units	63	43	106	47	30	77	72.9%	16	13	29	0%	0	16	13	29
Multi-Family (1-3)	220	288 units	91	53	144	65	42	107	74.1%	26	11	37	0%	0	26	11	37
Total			996	897	1,893	293	293	586	31.0%	703	604	1,307	32.3%	422	479	406	885

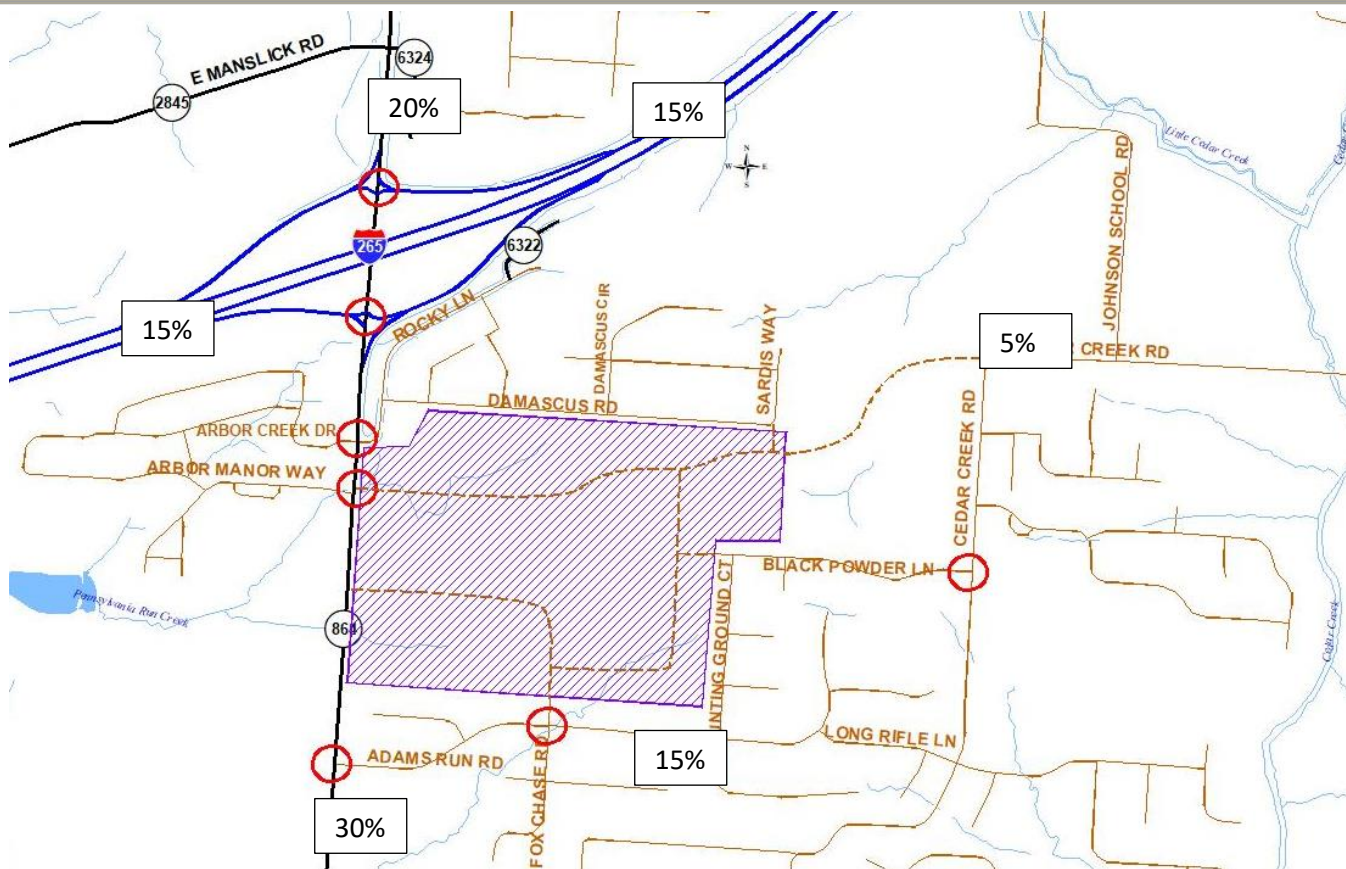
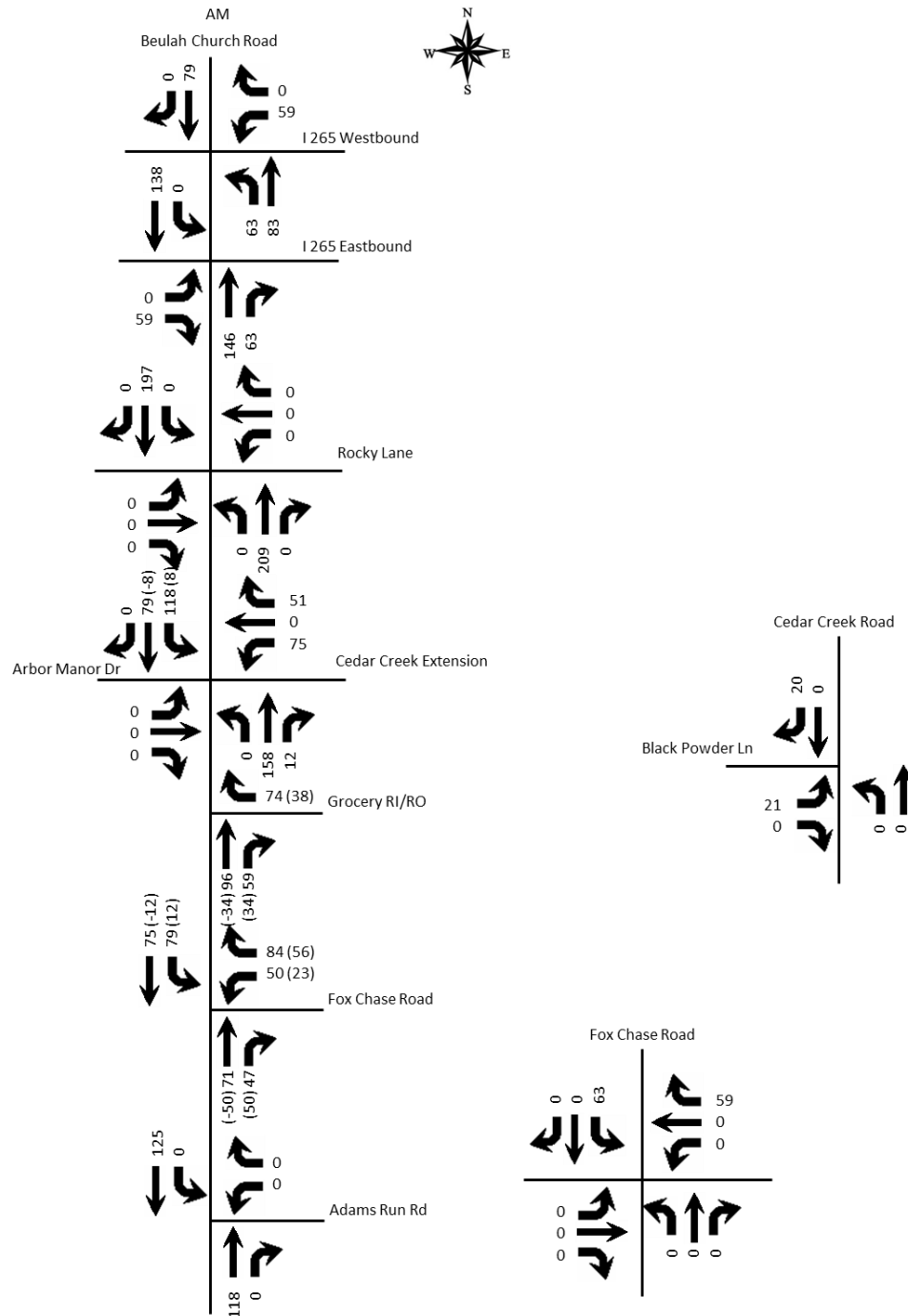


Figure 4. Trip Distribution Percentages

# Beulah Church Road Traffic Impact Study



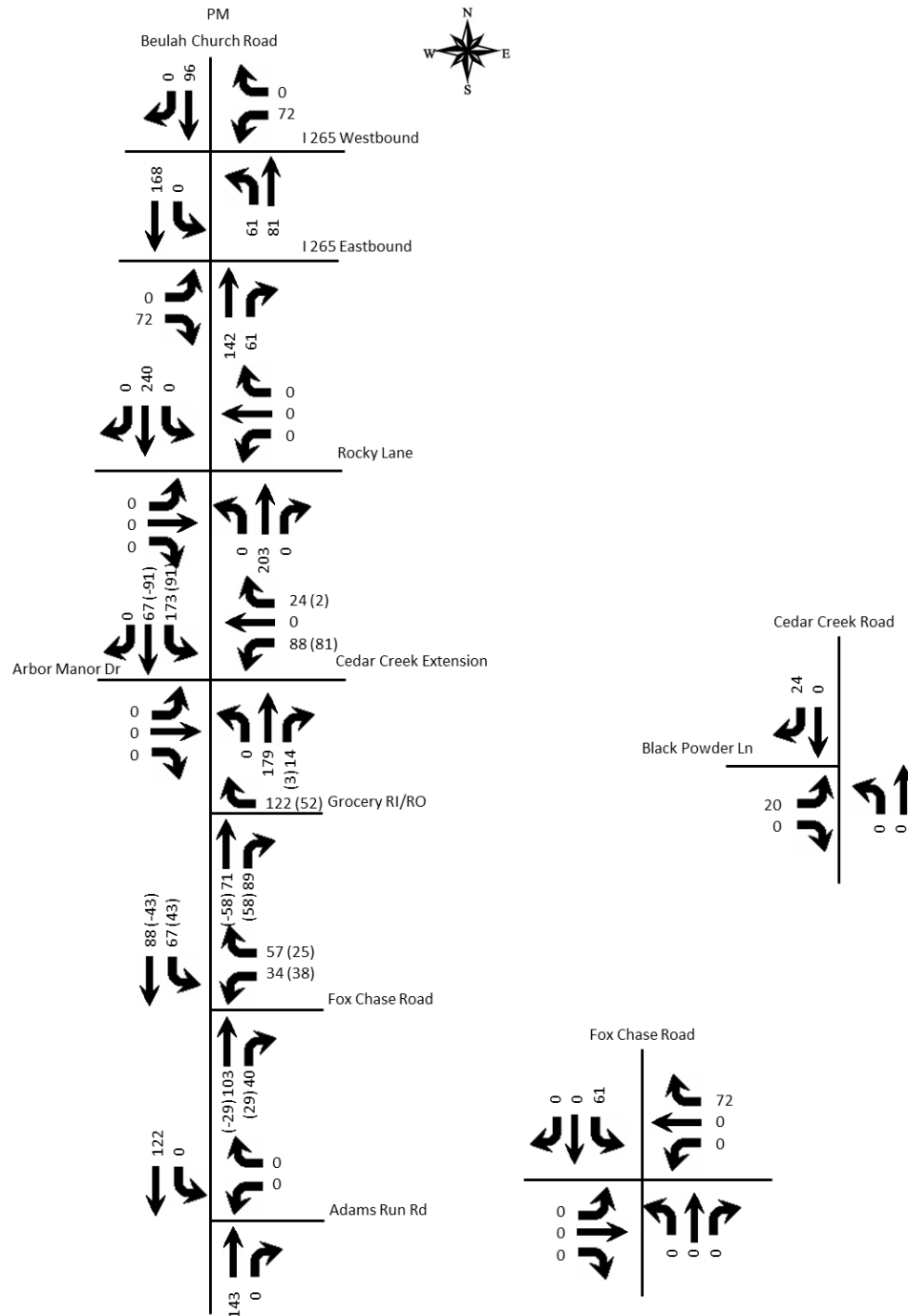
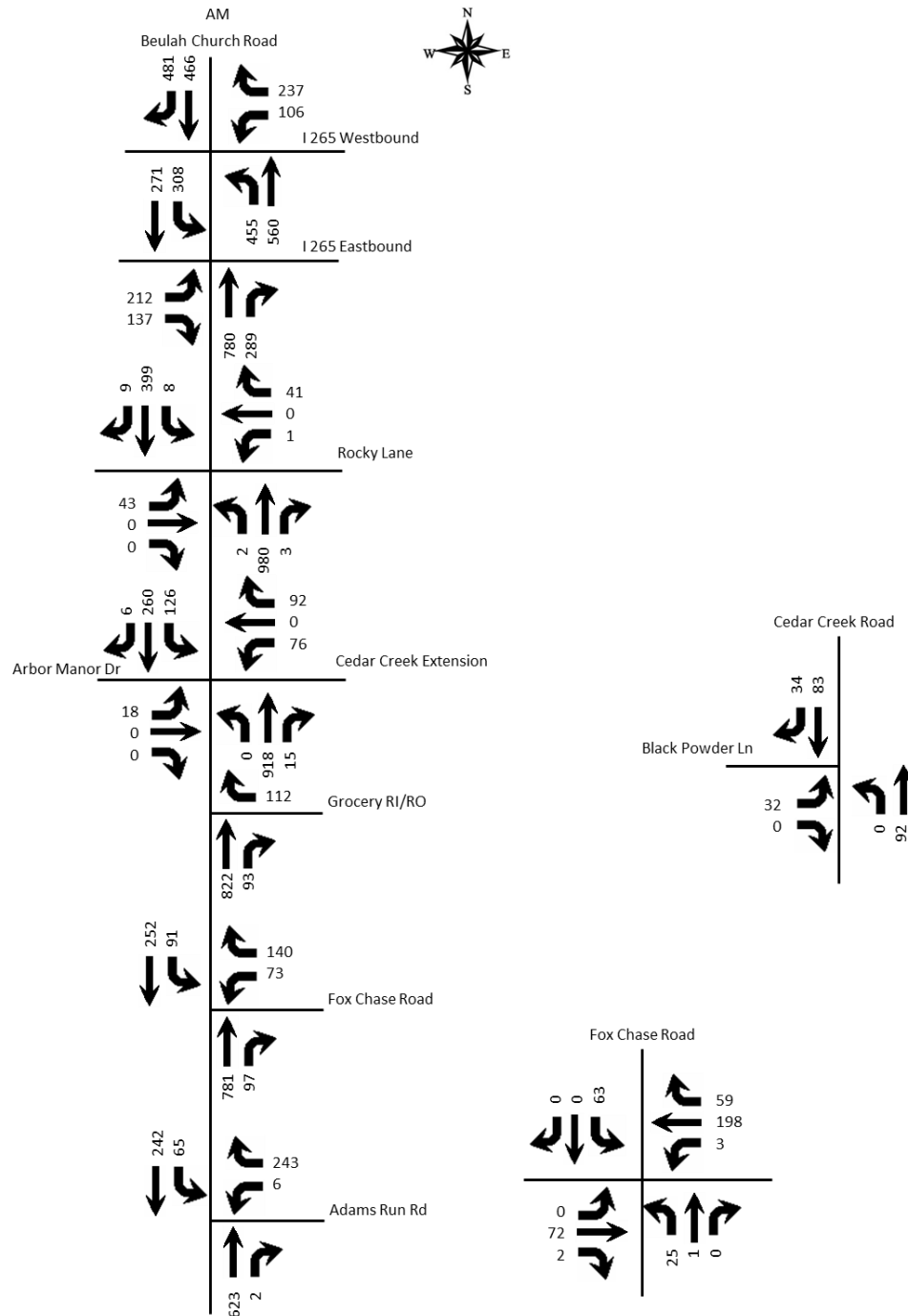
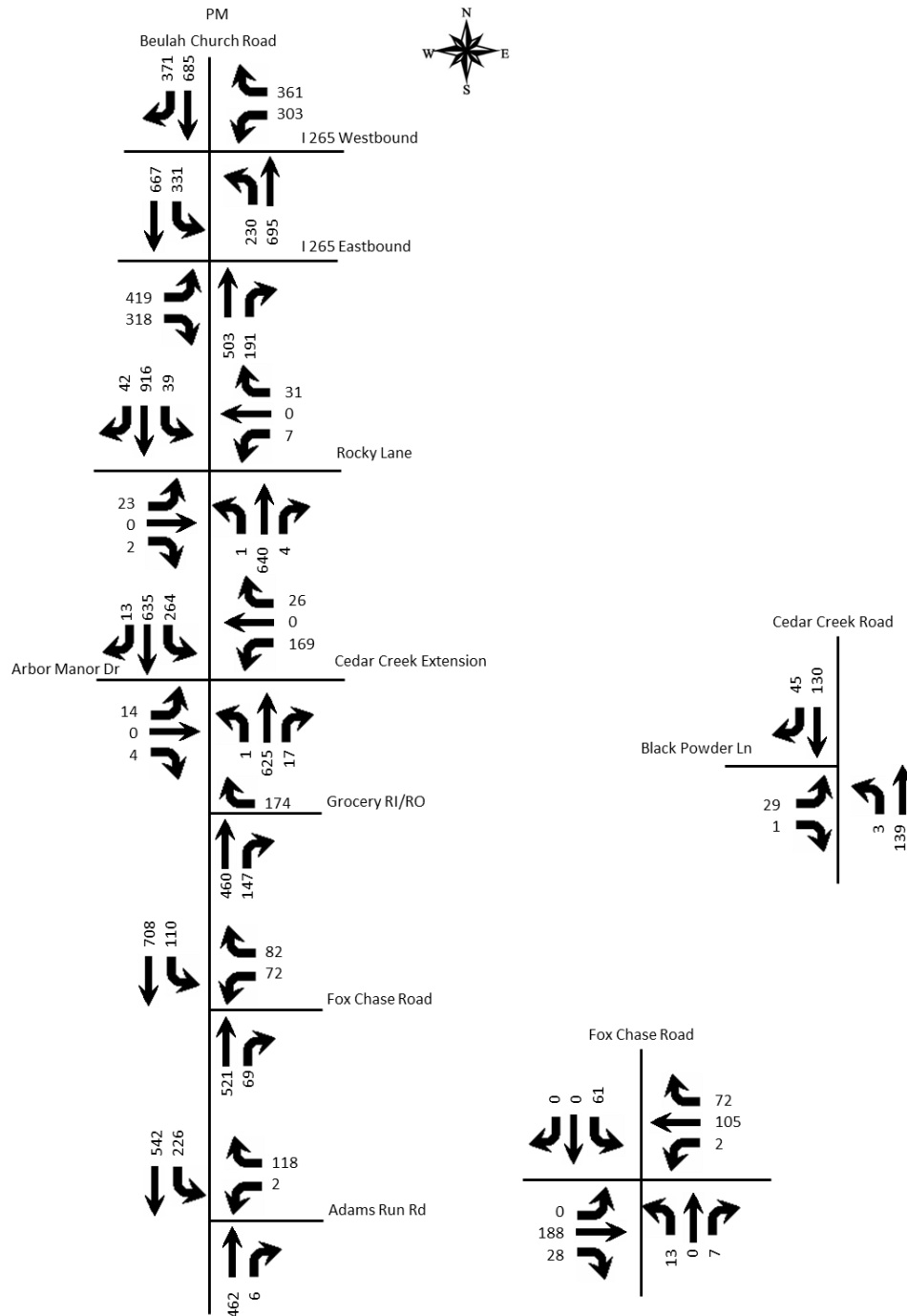


Figure 5. Peak Hour Trips Generated by Site

# Beulah Church Road Traffic Impact Study





## 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, 7<sup>th</sup> edition. Future delays and Level of Service were determined for the intersections using the HCS Streets and TWSC (version 2023) software. The delays and Level of Service are summarized in **Table 2**. The analysis for 2033 Build traffic signals includes optimization of the signal timing and the installation of a traffic signal at the entrance/Cedar Creek Road Extension intersection. The hourly trip generation is included in the appendix on page 26. These calculations demonstrate Warrant 1A will be satisfied for 10 hours at completion.

**Table 2. Peak Hour Level of Service**

Approach	A.M.			P.M.		
	2022 Existing	2033 No Build	2033 Build	2022 Existing	2033 No Build	2033 Build
<b>Beulah Church Road at I 265 Westbound</b>	<b>B</b> <b>19.9</b>	<b>B</b> <b>17.7</b>	<b>B</b> <b>19.3</b>	<b>C</b> <b>27.5</b>	<b>C</b> <b>34.4</b>	<b>C</b> <b>25.6</b>
I 265 Westbound	D 37.8	D 43.7	D 47.3	D 41.7	D 54.1	D 43.8
Beulah Church Road Northbound	B 14.4	A 8.0	A 9.7	B 10.6	B 10.4	A 7.2
Beulah Church Road Southbound	B 19.1	C 20.2	C 20.2	D 35.1	D 44.8	C 33.6
<b>Beulah Church Road at I 265 Eastbound</b>	<b>C</b> <b>30.5</b>	<b>D</b> <b>39.2</b>	<b>C</b> <b>25.0</b>	<b>C</b> <b>30.1</b>	<b>D</b> <b>36.9</b>	<b>C</b> <b>28.9</b>
I 265 Eastbound	C 31.1	C 32.6	D 49.7	D 49.0	E 66.4	D 43.0
Beulah Church Road Northbound	D 39.7	D 53.6	C 21.2	C 26.6	C 28.2	C 38.6
Beulah Church Road Southbound	B 16.3	C 22.1	B 17.2	B 16.8	B 17.4	B 11.1
<b>Beulah Church Road at Rocky Lane</b>						
Arbor Creek Eastbound	C 19.7	C 22.7	E 47.5	C 18.7	C 20.8	E 36.7
Rocky Lane Westbound	B 15.0	C 16.4	C 24.0	B 12.5	B 13.3	C 17.7
Beulah Church Road Northbound	A 7.6	A 7.7	A 8.2	A 9.0	A 9.2	B 11.5
Beulah Church Road Southbound	A 9.9	B 10.3	B 13.6	A 8.3	A 8.5	A 9.5
<b>Beulah Church at Arbor Manor Drive</b>			<b>B</b> <b>17.7</b>			<b>B</b> <b>17.7</b>
Arbor Manor Drive Eastbound	C 17.8	C 19.9	D 47.7	C 18.5	C 21.0	D 43.7

	A.M.			P.M.		
Approach	2022 Existing	2033 No Build	2033 Build	2022 Existing	2033 No Build	2033 Build
Cedar Creek Road Ext Westbound			D 47.7			D 49.6
Beulah Church Road Northbound	A 7.6	A 7.6	B 15.6	A 8.8	A 9.0	B 17.0
Beulah Church Road Southbound			A 8.2			B 10.7
<b>Beulah Church at Fox Chase Road Ext.</b>						
Fox Chase Road Ext Westbound			C 22.0			C 20.6
Beulah Church Road Southbound			B 10.7			A 9.3
<b>Beulah Church at Adams Run Road</b>						
Adams Run Road Westbound	C 16.1	C 18.5	C 24.3	B 11.4	B 11.7	B 13.7
Beulah Church Road Southbound	A 8.6	A 8.8	A 9.3	A 8.5	A 8.8	A 9.5
<b>Adams Run Road at Fox Chase Road</b>						
Adams Run Road Eastbound	A 7.6	A 7.6	A 7.8	A 7.4	A 7.4	A 7.6
Adams Run Road Eastbound	A 7.3	A 7.4	A 7.4	A 7.6	A 7.7	A 7.7
Fox Chase Road Northbound	B 10.5	B 10.8	B 11.1	B 10.3	B 10.5	B 10.7
Fox Chase Road Southbound			B 11.5			B 12.1
<b>Cedar Creek Road at Black Powder Lane</b>						
Black Powder Lane Eastbound	A 9.7	A 9.8	B 10.1	A 9.9	B 10.1	B 10.5
Cedar Creek Road Northbound	A 7.4	A 7.4	A 7.5	A 7.5	A 7.5	A 7.6

Key: Level of Service, Delay in seconds per vehicle

The entrance were evaluated for turn lanes using the Kentucky Transportation Cabinet Highway Design Guidance Manual dated July, 2020. The volumes in Figure 6 were utilized to determine turn lane requirements. Both entrances on Beulah Church Road meet the volume warrants for installing a left lane, should the construction project start after the development. Only the right-in/right-out entrance on Beulah Church Road meets the volume warrant for a right turn lane.

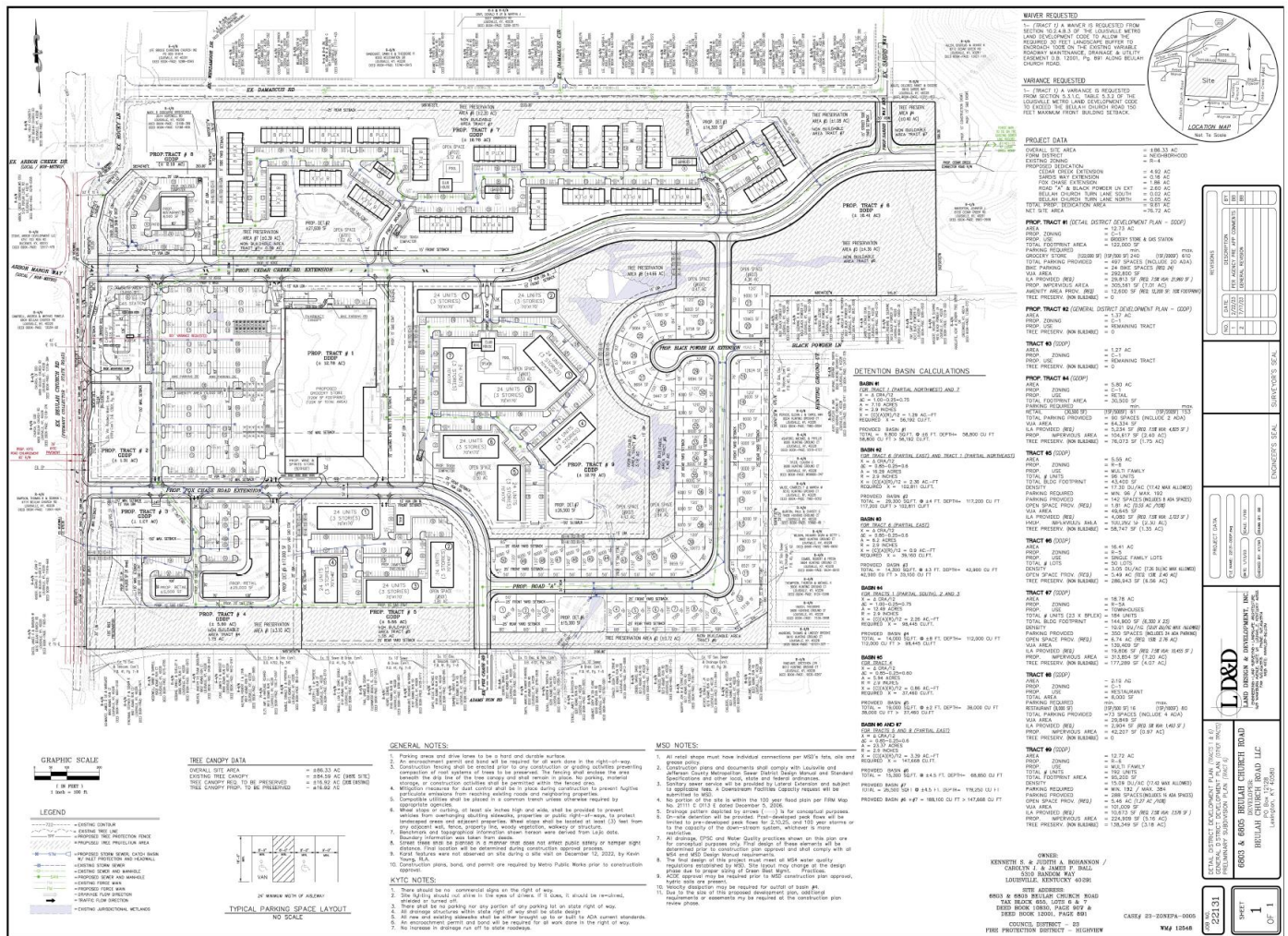
## CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2033, there will be an impact to the existing highway network, with Levels of Service remaining within acceptable



ranges. Left turn lanes will be required at the entrances on Beulah Church Road (KY 864), and a right turn lane will be required at the right-in/right out. No other improvements are needed to maintain satisfactory levels of service.

## APPENDIX



Beulah Church Road  
Traffic Impact Study

Traffic Counts

Classified Turn Movement Count || All vehicles



Louisville, KY

www.marrtraffic.com

Site 2 of 9

KY-864 Beulah Church Rd (South)  
KY-864 Beulah Church Rd (North)  
KY-841 Gene Snyder Fwy On-Ramp  
KY-841 Gene Snyder Fwy Off-Ramp

Date

Wednesday, November 16, 2022

Weather

Cloudy  
37°F

Lat/Long

38.125812°, -85.614545°

0700 - 0900 (Weekday 2h Session) (11-16-2022)

All vehicles

TIME	Northbound				Southbound				Eastbound		Westbound			
	KY-864 Beulah Church Rd (South)				KY-864 Beulah Church Rd (North)				KY-841 Gene Snyder Fwy On-Ramp		KY-841 Gene Snyder Fwy Off-Ramp			
	Left 2.1	Thru 2.2	U-Turn 2.3	App Total	Thru 2.4	Right 2.5	U-Turn 2.6	App Total			Left 2.7	Right 2.8	App Total	Int Total
0700 - 0715	103	100	0	203	68	104	0	172			5	40	45	420
0715 - 0730	89	113	0	202	77	109	0	186			9	72	81	469
0730 - 0745	87	102	0	189	97	101	0	198			14	56	70	457
0745 - 0800	56	117	0	173	108	121	0	229			15	47	62	464
Hourly Total	335	432	0	767	350	435	0	785			43	215	258	1810
0800 - 0815	54	92	0	146	84	94	0	178			20	50	70	394
0815 - 0830	54	83	0	137	61	82	0	143			9	34	43	323
0830 - 0845	42	93	0	135	79	66	0	145			11	31	42	322
0845 - 0900	53	90	0	143	80	62	0	142			22	34	56	341
Hourly Total	203	358	0	561	304	304	0	608			62	149	211	1380
Grand Total	538	790	0	1328	654	739	0	1393			105	364	469	3190
Approach %	40.51	59.49	0.00	-	46.95	53.05	0.00	-			22.39	77.61	-	-
Intersection %	16.87	24.76	0.00	41.63	20.50	23.17	0.00	43.67			3.29	11.41	14.70	-
PHF	0.81	0.92	0.00	0.94	0.81	0.90	0.00	0.86			0.72	0.75	0.80	0.96

1600 - 1800 (Weekday 2h Session) (11-16-2022)

All vehicles

TIME	Northbound				Southbound				Eastbound		Westbound			
	KY-864 Beulah Church Rd (South)				KY-864 Beulah Church Rd (North)				KY-841 Gene Snyder Fwy On-Ramp		KY-841 Gene Snyder Fwy Off-Ramp			
	Left 2.1	Thru 2.2	U-Turn 2.3	App Total	Thru 2.4	Right 2.5	U-Turn 2.6	App Total			Left 2.7	Right 2.8	App Total	Int Total
1600 - 1615	30	113	0	143	124	80	0	204			55	77	132	479
1615 - 1630	26	145	0	171	148	78	0	226			49	80	129	526
1630 - 1645	40	118	0	158	119	99	0	218			48	72	120	496
1645 - 1700	27	137	0	164	146	87	0	233			39	77	116	513
Hourly Total	123	513	0	636	537	344	0	881			191	306	497	2014
1700 - 1715	63	129	0	192	138	112	0	250			40	90	130	572
1715 - 1730	31	138	0	169	138	87	1	226			52	88	140	535
1730 - 1745	29	143	0	172	134	75	0	209			56	75	131	512
1745 - 1800	30	146	0	176	123	62	0	185			61	74	135	496
Hourly Total	153	556	0	709	533	336	1	870			209	327	536	2115
Grand Total	276	1069	0	1345	1070	680	1	1751			400	633	1033	4129
Approach %	20.52	79.48	0.00	-	61.11	38.83	0.06	-			38.72	61.28	-	-
Intersection %	6.68	25.89	0.00	32.57	25.91	16.47	0.02	42.41			9.69	15.33	25.02	-
PHF	0.60	0.96	0.00	0.91	0.95	0.81	0.25	0.92			0.83	0.92	0.92	0.93

Beulah Church Road  
Traffic Impact Study

Classified Turn Movement Count | All vehicles

Louisville, KY



Site 1 of 9

KY-864 Beulah Church Rd (South)  
KY-864 Beulah Church Rd (North)  
KY-841 Gene Snyder Fwy Off-Ramp  
KY-841 Gene Snyder Fwy On-Ramp

Date

Wednesday, November 16, 2022

Weather

Cloudy  
37°F

Lat/Long

38.123468°, -85.614750°

0700 - 0900 (Weekday 2h Session) (11-16-2022)

All vehicles

	Northbound				Southbound				Eastbound				Westbound		
	KY-864 Beulah Church Rd (South)				KY-864 Beulah Church Rd (North)				KY-841 Gene Snyder Fwy Off-Ramp				KY-841 Gene Snyder Fwy On-Ramp		
TIME	Thru 1.1	Right 1.2	U-Turn 1.3	App Total	Left 1.4	Thru 1.5	U-Turn 1.6	App Total	Left 1.7	Right 1.8	App Total	Int Total			
0700 - 0715	163	49	0	212	46	18	0	64	39	10	49	325			
0715 - 0730	170	57	0	227	72	19	0	91	33	11	44	362			
0730 - 0745	132	53	0	185	81	31	0	112	55	24	79	376			
0745 - 0800	109	46	0	155	80	52	0	132	65	26	91	378			
Hourly Total	574	205	0	779	279	120	0	399	192	71	263	1441			
0800 - 0815	108	38	0	146	56	47	0	103	39	19	58	307			
0815 - 0830	95	42	0	137	37	31	0	68	47	10	57	262			
0830 - 0845	86	41	0	127	58	28	0	86	44	12	56	269			
0845 - 0900	93	36	0	129	59	45	0	104	51	18	69	302			
Hourly Total	382	157	0	539	210	151	0	361	181	59	240	1140			
Grand Total	956	362	0	1318	489	271	0	760	373	130	503	2581			
Approach %	72.53	27.47	0.00	-	64.34	35.66	0.00	-	74.16	25.84	-				
Intersection %	37.04	14.03	0.00	51.07	18.95	10.50	0.00	29.45	14.45	5.04	19.49				
PHF	0.84	0.90	0.00	0.86	0.86	0.58	0.00	0.76	0.74	0.68	0.72	0.95			

1600 - 1800 (Weekday 2h Session) (11-16-2022)

All vehicles

	Northbound					Southbound					Eastbound					Westbound		
	KY-864 Beulah Church Rd (South)					KY-864 Beulah Church Rd (North)					KY-841 Gene Snyder Fwy Off-Ramp					KY-841 Gene Snyder Fwy On-Ramp		
TIME	Thru 1.1	Right 1.2	U-Turn 1.3	App Total	Left 1.4	Thru 1.5	U-Turn 1.6	App Total	Left 1.7	Right 1.8	App Total					Int Total		
1600 - 1615	68	28	0	96	78	110	0	188	75	52	127					411		
1615 - 1630	58	21	0	79	74	113	0	187	113	52	165					431		
1630 - 1645	77	23	0	100	73	104	0	177	82	47	129					406		
1645 - 1700	65	34	0	99	65	102	0	167	100	56	156					422		
Hourly Total	268	106	0	374	290	429	0	719	370	207	577					1670		
1700 - 1715	114	35	0	149	92	111	0	203	78	44	122					474		
1715 - 1730	75	29	0	104	68	108	0	176	95	52	147					427		
1730 - 1745	76	28	0	104	77	118	0	195	93	77	170					469		
1745 - 1800	62	26	0	88	63	115	0	178	113	50	163					429		
Hourly Total	327	118	0	445	300	452	0	752	379	223	602					1799		
Grand Total	595	224	0	819	590	881	0	1471	749	430	1179					3469		
Approach %	72.65	27.35	0.00	-	40.11	59.89	0.00	-	63.53	36.47	-							
Intersection %	17.15	6.46	0.00	23.61	17.01	25.40	0.00	42.40	21.59	12.40	33.99							
PHF	0.72	0.84	0.00	0.75	0.82	0.96	0.00	0.93	0.84	0.72	0.89					0.95		

Beulah Church Road  
Traffic Impact Study

Classified Turn Movement Count | All vehicles

Louisville, KY



Site 3 of 9

KY-864 Beulah Church Rd (South)  
KY-864 Beulah Church Rd (North)  
Arbor Creek Dr  
Rocky Ln

Date

Wednesday, November 16, 2022

Weather

Cloudy  
37°F

Lat/Long

38.121617°, -85.614957°

0700 - 0900 (Weekday 2h Session) (11-16-2022)

All vehicles

	Northbound					Southbound					Eastbound					Westbound					
	KY-864 Beulah Church Rd (South)					KY-864 Beulah Church Rd (North)					Arbor Creek Dr					Rocky Ln					
TIME	Left 3.1	Thru 3.2	Right 3.3	U-Turn 3.4	App Total	Left 3.5	Thru 3.6	Right 3.7	U-Turn 3.8	App Total	Left 3.9	Thru 3.10	Right 3.11	U-Turn 3.12	App Total	Left 3.13	Thru 3.14	Right 3.15	U-Turn 3.16	App Total	Int Total
0700 - 0715	0	191	2	0	193	2	24	2	0	28	12	0	0	0	12	0	0	12	0	12	245
0715 - 0730	0	215	0	0	215	1	30	0	0	31	7	0	0	0	7	0	0	13	0	13	266
0730 - 0745	0	163	1	0	164	0	55	4	0	59	7	0	0	0	7	1	0	4	0	5	235
0745 - 0800	2	129	0	0	131	4	74	2	0	80	13	0	0	0	13	0	0	8	0	8	232
Hourly Total	2	698	3	0	703	7	183	8	0	198	39	0	0	0	39	1	0	37	0	38	978
0800 - 0815	0	132	1	0	133	4	59	3	0	66	4	0	1	0	5	1	0	9	0	10	214
0815 - 0830	0	122	1	0	123	3	38	0	0	41	6	0	1	0	7	0	0	5	0	5	176
0830 - 0845	0	112	0	0	112	2	35	3	0	40	7	0	0	0	7	0	0	7	0	7	166
0845 - 0900	0	115	2	0	117	4	57	3	0	64	4	0	0	0	4	0	0	7	0	7	192
Hourly Total	0	481	4	0	485	13	189	9	0	211	21	0	2	0	23	1	0	28	0	29	748
Grand Total	2	1179	7	0	1188	20	372	17	0	409	60	0	2	0	62	2	0	65	0	67	1726
Approach %	0.17	99.24	0.59	0.00	-	4.89	90.95	4.16	0.00	-	96.77	0.00	3.23	0.00	-	2.99	0.00	97.01	0.00	-	
Intersection %	0.12	68.31	0.41	0.00	68.83	1.16	21.55	0.98	0.00	23.70	3.48	0.00	0.12	0.00	3.59	0.12	0.00	3.77	0.00	3.88	
PHF	0.25	0.81	0.38	0.00	0.82	0.44	0.62	0.50	0.00	0.62	0.75	0.00	0.00	0.00	0.75	0.25	0.00	0.71	0.00	0.73	0.92

1600 - 1800 (Weekday 2h Session) (11-16-2022)

All vehicles

	Northbound					Southbound					Eastbound					Westbound					Int Total
	KY-864 Beulah Church Rd (South)					KY-864 Beulah Church Rd (North)					Arbor Creek Dr					Rocky Ln					
TIME	Left 3.1	Thru 3.2	Right 3.3	U-Turn 3.4	App Total	Left 3.5	Thru 3.6	Right 3.7	U-Turn 3.8	App Total	Left 3.9	Thru 3.10	Right 3.11	U-Turn 3.12	App Total	Left 3.13	Thru 3.14	Right 3.15	U-Turn 3.16	App Total	
1600 - 1615	0	76	1	0	77	16	145	4	1	166	7	0	0	0	7	1	0	9	0	10	
1615 - 1630	0	67	1	0	68	12	151	6	0	169	7	0	1	0	8	0	0	7	0	7	
1630 - 1645	1	86	2	0	89	15	132	4	0	151	5	0	0	0	5	2	1	4	0	7	
1645 - 1700	1	92	1	0	94	14	136	6	0	156	4	0	0	0	4	1	0	5	0	6	
Hourly Total	2	321	5	0	328	57	564	20	1	642	23	0	1	0	24	4	1	25	0	30	
1700 - 1715	0	129	3	0	132	5	144	7	0	156	6	0	1	0	7	1	0	11	0	12	
1715 - 1730	0	98	1	0	99	12	143	6	0	161	5	0	1	0	6	2	0	6	0	8	
1730 - 1745	0	89	0	0	89	12	175	12	0	199	3	0	0	0	3	3	0	4	0	7	
1745 - 1800	1	80	0	0	81	6	150	13	0	169	7	0	0	0	7	0	0	7	0	7	
Hourly Total	1	396	4	0	401	35	612	38	0	685	21	0	2	0	23	6	0	28	0	34	
Grand Total	3	717	9	0	729	92	1176	58	1	1327	44	0	3	0	47	10	1	53	0	64	
Approach %	0.41	98.35	1.23	0.00	-	6.93	88.62	4.37	0.08	-	93.62	0.00	6.38	0.00	-	15.63	1.56	82.81	0.00	-	
Intersection %	0.14	33.09	0.42	0.00	33.64	4.25	54.27	2.68	0.05	61.24	2.03	0.00	0.14	0.00	2.17	0.46	0.05	2.45	0.00	2.95	
PHF	0.25	0.77	0.33	0.00	0.76	0.73	0.87	0.73	0.00	0.86	0.75	0.00	0.50	0.00	0.82	0.50	0.00	0.64	0.00	0.71	

Beulah Church Road  
Traffic Impact Study

Classified Turn Movement Count | Passenger Vehicles (1-3)

Louisville, KY



**Marr Traffic**  
DATA COLLECTION

www.marrtraffic.com

Site 4 of 9

KY-864 Beulah Church Rd (South)  
KY-864 Beulah Church Rd (North)  
Arbor Manor Way

Date

Wednesday, November 16, 2022

Weather

Cloudy  
37°F

Lat/Long

38.120791°, -85.615071°

0700 - 0900 (Weekday 2h Session) (11-16-2022)

Passenger Vehicles (1-3)

TIME	Northbound				Southbound				Eastbound				Int Total
	KY-864 Beulah Church Rd (South)				KY-864 Beulah Church Rd (North)				Arbor Manor Way				
	Left 4.1	Thru 4.2	U-Turn 4.3	App Total	Thru 4.4	Right 4.5	U-Turn 4.6	App Total	Left 4.7	Right 4.8	U-Turn 4.9	App Total	
0700 - 0715	0	190	0	190	22	0	0	22	5	0	0	5	217
0715 - 0730	0	209	0	209	27	1	0	28	2	0	0	2	239
0730 - 0745	0	162	0	162	48	3	0	51	5	0	0	5	218
0745 - 0800	0	122	0	122	63	1	0	64	4	0	0	4	190
Hourly Total	0	683	0	683	160	5	0	165	16	0	0	16	864
0800 - 0815	0	129	0	129	60	2	0	62	1	0	0	1	192
0815 - 0830	1	120	1	122	35	0	0	35	1	0	0	1	158
0830 - 0845	0	105	0	105	31	1	0	32	3	0	0	3	140
0845 - 0900	0	109	0	109	55	2	0	57	4	0	0	4	170
Hourly Total	1	463	1	465	181	5	0	186	9	0	0	9	660
Grand Total	1	1146	1	1148	341	10	0	351	25	0	0	25	1524
Approach %	0.09	99.83	0.09	-	97.15	2.85	0.00	-	100.00	0.00	0.00	-	
Intersection %	0.07	75.20	0.07	75.33	22.38	0.66	0.00	23.03	1.64	0.00	0.00	1.64	

1600 - 1800 (Weekday 2h Session) (11-16-2022)

Passenger Vehicles (1-3)

TIME	Northbound				Southbound				Eastbound				Int Total
	KY-864 Beulah Church Rd (South)				KY-864 Beulah Church Rd (North)				Arbor Manor Way				
	Left 4.1	Thru 4.2	U-Turn 4.3	App Total	Thru 4.4	Right 4.5	U-Turn 4.6	App Total	Left 4.7	Right 4.8	U-Turn 4.9	App Total	
1600 - 1615	1	74	0	75	136	3	0	139	1	0	0	1	215
1615 - 1630	0	66	0	66	151	4	0	155	2	0	0	2	223
1630 - 1645	0	78	0	78	116	5	0	121	6	0	0	6	205
1645 - 1700	0	85	0	85	141	2	0	143	3	1	0	4	232
Hourly Total	1	303	0	304	544	14	0	558	12	1	0	13	875
1700 - 1715	0	127	0	127	138	2	0	140	2	0	0	2	269
1715 - 1730	1	99	0	100	145	3	0	148	4	0	0	4	252
1730 - 1745	0	89	0	89	167	5	0	172	4	3	0	7	268
1745 - 1800	0	75	0	75	147	5	0	152	2	1	0	3	230
Hourly Total	1	390	0	391	597	15	0	612	12	4	0	16	1019
Grand Total	2	693	0	695	1141	29	0	1170	24	5	0	29	1894
Approach %	0.29	99.71	0.00	-	97.52	2.48	0.00	-	82.76	17.24	0.00	-	
Intersection %	0.11	36.59	0.00	36.69	60.24	1.53	0.00	61.77	1.27	0.26	0.00	1.53	



Beulah Church Road  
Traffic Impact Study

Classified Turn Movement Count | All vehicles

Louisville, KY



Site 5 of 9

KY-864 Beulah Church Rd (South)  
KY-864 Beulah Church Rd (North)

Adams Run Rd

Date

Wednesday, November 16, 2022

Weather

Cloudy  
37°F

Lat/Long

38.116347°, -85.615370°

0700 - 0900 (Weekday 2h Session) (11-16-2022)

All vehicles

TIME	Northbound				Southbound			
	KY-864 Beulah Church Rd (South)				KY-864 Beulah Church Rd (North)			
	Thru 5.1	Right 5.2	U-Turn 5.3	App Total	Left 5.4	Thru 5.5	U-Turn 5.6	App Total
0700 - 0715	138	0	0	138	6	16	0	22
0715 - 0730	138	1	0	139	7	18	0	25
0730 - 0745	102	1	0	103	17	34	0	51
0745 - 0800	79	0	0	79	29	38	0	67
Hourly Total	457	2	0	459	59	106	0	165
0800 - 0815	75	3	0	78	22	41	0	63
0815 - 0830	73	0	0	73	15	23	0	38
0830 - 0845	83	0	0	83	11	20	0	31
0845 - 0900	76	0	0	76	11	42	0	53
Hourly Total	307	3	0	310	59	126	0	185
Grand Total	764	5	0	769	118	232	0	350
Approach %	99.35	0.65	0.00	-	33.71	66.29	0.00	-
Intersection %	50.60	0.33	0.00	50.93	7.81	15.36	0.00	23.18
PHF	0.83	0.50	0.00	0.83	0.51	0.70	0.00	0.62

Westbound				
Adams Run Rd				
Left 5.7	Right 5.8	U-Turn 5.9	App Total	Int Total
0	53	0	53	213
0	68	0	68	232
3	58	0	61	215
2	41	0	43	189
5	220	0	225	849
4	50	0	54	195
3	45	1	49	160
2	27	0	29	143
1	33	0	34	163
10	155	1	166	661
15	375	1	391	1510
3.84	95.91	0.26	-	
0.99	24.83	0.07	25.89	
0.42	0.81	0.00	0.83	0.91

1600 - 1800 (Weekday 2h Session) (11-16-2022)

All vehicles

TIME	Northbound				Southbound			
	KY-864 Beulah Church Rd (South)				KY-864 Beulah Church Rd (North)			
	Thru 5.1	Right 5.2	U-Turn 5.3	App Total	Left 5.4	Thru 5.5	U-Turn 5.6	App Total
1600 - 1615	46	6	0	52	50	92	0	142
1615 - 1630	49	3	0	52	54	97	0	151
1630 - 1645	46	3	0	49	38	84	0	122
1645 - 1700	65	2	0	67	41	96	0	137
Hourly Total	206	14	0	220	183	369	0	552
1700 - 1715	105	1	0	106	40	101	0	141
1715 - 1730	58	1	0	59	61	76	0	137
1730 - 1745	61	1	0	62	63	107	0	170
1745 - 1800	37	2	0	39	46	101	0	147
Hourly Total	261	5	0	266	210	385	0	595
Grand Total	467	19	0	486	393	754	0	1147
Approach %	96.09	3.91	0.00	-	34.26	65.74	0.00	-
Intersection %	25.19	1.02	0.00	26.21	21.20	40.67	0.00	61.87
PHF	0.69	0.63	0.00	0.69	0.81	0.89	0.00	0.86

Westbound				
Adams Run Rd				
Left 5.7	Right 5.8	U-Turn 5.9	App Total	Int Total
1	22	0	23	217
1	22	0	23	226
0	33	0	33	204
2	26	0	28	232
4	103	0	107	879
0	25	0	25	272
0	29	0	29	225
0	27	0	27	259
0	33	0	33	219
0	114	0	114	975
4	217	0	221	1854
1.81	98.19	0.00	-	
0.22	11.70	0.00	11.92	
0.25	0.92	0.00	0.94	0.91



## Classified Turn Movement Count | All vehicles

Louisville, KY

### Site 9 of 9

Fox Chase Rd  
Driveway  
Adams Run Rd (West)  
Adams Run Rd (East)

### Date

Wednesday, November 16, 2022

### Weather

Cloudy  
37°F

### Lat/Long

38.116970°, -85.610966°

### 0700 - 0900 (Weekday 2h Session) (11-16-2022)

All vehicles

TIME	Northbound					Southbound					Eastbound					Westbound					Int Total
	Fox Chase Rd					Driveway					Adams Run Rd (West)					Adams Run Rd (East)					
	Left 9.1	Thru 9.2	Right 9.3	U-Turn 9.4	App Total	Left 9.5	Thru 9.6	Right 9.7	U-Turn 9.8	App Total	Left 9.9	Thru 9.10	Right 9.11	U-Turn 9.12	App Total	Left 9.13	Thru 9.14	Right 9.15	U-Turn 9.16	App Total	
0700 - 0715	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8	0	50	0	0	50	58
0715 - 0730	6	0	0	0	6	0	0	0	0	0	0	9	0	0	9	1	55	0	0	56	71
0730 - 0745	5	0	0	0	5	0	0	0	0	0	0	13	0	0	13	1	47	0	0	48	66
0745 - 0800	5	0	0	1	6	0	0	0	0	0	0	22	2	0	24	0	32	0	0	32	62
Hourly Total	16	0	0	1	17	0	0	0	0	0	0	52	2	0	54	2	184	0	0	186	257
0800 - 0815	6	1	0	0	7	0	0	0	0	0	0	21	0	0	21	1	45	0	0	46	74
0815 - 0830	3	0	1	1	5	0	1	0	0	1	0	11	2	0	13	0	35	0	0	35	54
0830 - 0845	4	0	0	0	4	0	0	0	0	0	0	8	2	0	10	0	23	0	0	23	37
0845 - 0900	4	0	1	0	5	0	0	0	0	0	0	9	3	0	12	1	29	0	0	30	47
Hourly Total	17	1	2	1	21	0	1	0	0	1	0	49	7	0	56	2	132	0	0	134	212
Grand Total	33	1	2	2	38	0	1	0	0	1	0	101	9	0	110	4	316	0	0	320	469
Approach %	86.84	2.63	5.26	5.26	-	0.00	100.00	0.00	0.00	-	0.00	91.82	8.18	0.00	-	1.25	98.75	0.00	0.00	-	
Intersection %	7.04	0.21	0.43	0.43	8.10	0.00	0.21	0.00	0.00	0.21	0.00	21.54	1.92	0.00	23.45	0.85	67.38	0.00	0.00	68.23	
PHF	0.92	0.25	0.00	0.25	0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.74	0.25	0.00	0.70	0.75	0.81	0.00	0.00	0.81	0.92

### 1600 - 1800 (Weekday 2h Session) (11-16-2022)

All vehicles

TIME	Northbound					Southbound					Eastbound					Westbound					Int Total
	Fox Chase Rd					Driveway					Adams Run Rd (West)					Adams Run Rd (East)					
	Left 9.1	Thru 9.2	Right 9.3	U-Turn 9.4	App Total	Left 9.5	Thru 9.6	Right 9.7	U-Turn 9.8	App Total	Left 9.9	Thru 9.10	Right 9.11	U-Turn 9.12	App Total	Left 9.13	Thru 9.14	Right 9.15	U-Turn 9.16	App Total	
1600 - 1615	2	0	0	0	2	1	0	0	0	1	1	41	9	0	51	1	24	0	0	25	79
1615 - 1630	1	0	1	1	3	0	1	0	0	1	0	43	7	0	50	1	19	0	0	20	74
1630 - 1645	3	1	0	0	4	0	0	0	0	0	0	35	2	0	37	0	30	0	0	30	71
1645 - 1700	2	0	0	0	2	0	0	0	0	0	0	36	3	0	39	0	24	0	0	24	65
Hourly Total	8	1	1	1	11	1	1	0	0	2	1	155	21	0	177	2	97	0	0	99	289
1700 - 1715	2	0	2	0	4	0	0	1	0	1	0	34	5	0	39	1	25	0	0	26	70
1715 - 1730	5	0	0	0	5	0	0	0	0	0	0	50	11	0	61	0	19	0	0	19	85
1730 - 1745	2	0	1	0	3	0	0	0	0	0	1	49	4	0	54	0	24	0	0	24	81
1745 - 1800	3	0	3	0	6	0	0	1	0	1	1	37	5	0	43	1	27	0	0	28	78
Hourly Total	12	0	6	0	18	0	0	2	0	2	2	170	25	0	197	2	95	0	0	97	314
Grand Total	20	1	7	1	29	1	1	2	0	4	3	325	46	0	374	4	192	0	0	196	603
Approach %	68.97	3.45	24.14	3.45	-	25.00	25.00	50.00	0.00	-	0.80	86.90	12.30	0.00	-	2.04	97.96	0.00	0.00	-	
Intersection %	3.32	0.17	1.16	0.17	4.81	0.17	0.17	0.33	0.00	0.66	0.50	53.90	7.63	0.00	62.02	0.66	31.84	0.00	0.00	32.50	
PHF	0.60	0.00	0.50	0.00	0.75	0.00	0.00	0.50	0.00	0.50	0.50	0.85	0.57	0.00	0.81	0.50	0.88	0.00	0.00	0.87	0.92

## Classified Turn Movement Count | All vehicles

Louisville, KY

### Site 8 of 9

Cedar Creek Rd (South)  
Cedar Creek Rd (North)  
Black Powder Ln  
Driveway

### Date

Wednesday, November 16, 2022

### Weather

Cloudy  
37°F

### Lat/Long

38.119501°, -85.602159°

### 0700 - 0900 (Weekday 2h Session) (11-16-2022)

All vehicles

TIME	Northbound					Southbound					Eastbound					Westbound					Int Total
	Cedar Creek Rd (South)					Cedar Creek Rd (North)					Black Powder Ln					Driveway					
	Left 8.1	Thru 8.2	Right 8.3	U-Turn 8.4	App Total	Left 8.5	Thru 8.6	Right 8.7	U-Turn 8.8	App Total	Left 8.9	Thru 8.10	Right 8.11	U-Turn 8.12	App Total	Left 8.13	Thru 8.14	Right 8.15	U-Turn 8.16	App Total	
0700 - 0715	0	20	0	0	20	0	13	3	0	16	3	0	0	0	3	0	0	0	0	0	39
0715 - 0730	0	28	0	0	28	0	21	5	0	26	4	0	0	0	4	0	0	0	0	0	58
0730 - 0745	0	14	0	0	14	0	21	2	0	23	2	0	0	0	2	0	0	0	0	0	39
0745 - 0800	0	21	0	0	21	0	20	3	0	23	1	0	0	0	1	0	0	0	0	0	45
Hourly Total	0	83	0	0	83	0	75	13	0	88	10	0	0	0	10	0	0	0	0	0	181
0800 - 0815	0	19	0	0	19	0	15	2	0	17	3	0	0	0	3	0	0	0	0	0	39
0815 - 0830	1	17	0	0	18	0	15	2	0	17	1	0	0	0	1	0	0	0	0	0	36
0830 - 0845	0	22	0	0	22	0	17	4	0	21	3	0	0	1	4	0	0	0	0	0	47
0845 - 0900	0	16	0	0	16	0	12	4	0	16	0	0	0	0	0	0	0	0	0	0	32
Hourly Total	1	74	0	0	75	0	59	12	0	71	7	0	0	1	8	0	0	0	0	0	154
Grand Total	1	157	0	0	158	0	134	25	0	159	17	0	0	1	18	0	0	0	0	0	335
Approach %	0.63	99.37	0.00	0.00	-	0.00	84.28	15.72	0.00	-	94.44	0.00	0.00	5.56	-	0.00	0.00	0.00	0.00	-	
Intersection %	0.30	46.87	0.00	0.00	47.16	0.00	40.00	7.46	0.00	47.46	5.07	0.00	0.00	0.30	5.37	0.00	0.00	0.00	0.00	0.00	
PHF	0.00	0.74	0.00	0.00	0.74	0.00	0.89	0.65	0.00	0.85	0.63	0.00	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.00	0.78

### 1600 - 1800 (Weekday 2h Session) (11-16-2022)

All vehicles

TIME	Northbound					Southbound					Eastbound					Westbound					Int Total
	Cedar Creek Rd (South)					Cedar Creek Rd (North)					Black Powder Ln					Driveway					
	Left 8.1	Thru 8.2	Right 8.3	U-Turn 8.4	App Total	Left 8.5	Thru 8.6	Right 8.7	U-Turn 8.8	App Total	Left 8.9	Thru 8.10	Right 8.11	U-Turn 8.12	App Total	Left 8.13	Thru 8.14	Right 8.15	U-Turn 8.16	App Total	
1600 - 1615	0	15	0	0	15	0	23	1	0	24	3	0	2	0	5	0	0	0	0	0	44
1615 - 1630	0	29	0	0	29	0	25	1	0	26	2	0	0	0	2	0	0	0	0	0	57
1630 - 1645	1	25	0	0	26	0	25	4	0	29	1	0	0	0	1	0	0	0	0	0	56
1645 - 1700	1	30	0	0	31	0	24	1	0	25	2	0	1	0	3	0	0	0	0	0	59
Hourly Total	2	99	0	0	101	0	97	7	0	104	8	0	3	0	11	0	0	0	0	0	216
1700 - 1715	1	24	0	0	25	0	33	9	0	42	1	0	0	0	1	0	0	0	0	0	68
1715 - 1730	1	37	0	0	38	0	27	4	0	31	2	0	1	0	3	0	0	0	0	0	72
1730 - 1745	1	36	0	0	37	0	30	3	0	33	1	0	0	0	1	0	0	0	0	0	71
1745 - 1800	0	29	0	0	29	0	28	3	0	31	4	0	0	0	4	0	0	0	0	0	64
Hourly Total	3	126	0	0	129	0	118	19	0	137	8	0	1	0	9	0	0	0	0	0	275
Grand Total	5	225	0	0	230	0	215	26	0	241	16	0	4	0	20	0	0	0	0	0	491
Approach %	2.17	97.83	0.00	0.00	-	0.00	89.21	10.79	0.00	-	80.00	0.00	20.00	0.00	-	0.00	0.00	0.00	0.00	-	
Intersection %	1.02	45.82	0.00	0.00	46.84	0.00	43.79	5.30	0.00	49.08	3.26	0.00	0.81	0.00	4.07	0.00	0.00	0.00	0.00	0.00	
PHF	0.75	0.85	0.00	0.00	0.85	0.00	0.89	0.53	0.00	0.82	0.50	0.00	0.25	0.00	0.56	0.00	0.00	0.00	0.00	0.00	0.95



## TIS Simplified Traffic Forecast

Count Year	2022	Number of Counts	12
Opening Year	2033		
Design Year	2033	Growth Rate	0.92%
Years Back	15		

KYTC Traffic Count Station #1	
STA ID	056269
Paste Count Data Here	
2023	
2022	
2021	
2020	
2019	8908
2018	
2017	
2016	7674
2015	
2014	
2013	7594
2012	
2011	
2010	7020
2009	
2008	
2007	6850
2006	6660
2005	6760
2004	6290
2003	
2002	
2001	2760
2000	
1999	
1998	
1997	
1996	
1995	2060
1994	

KYTC Traffic Count Station #2	
STA ID	056279
Paste Count Data Here	
2023	
2022	
2021	
2020	
2019	
2018	2338
2017	
2016	
2015	3298
2014	
2013	
2012	1876
2011	
2010	
2009	1950
2008	
2007	
2006	1810
2005	
2004	
2003	1970
2002	
2001	
2000	1370
1999	
1998	
1997	
1996	
1995	
1994	1110

KYTC Traffic Count Station #3	
STA ID	056271
Paste Count Data Here	
2023	
2022	
2021	
2020	
2019	
2018	792
2017	
2016	
2015	824
2014	
2013	
2012	984
2011	
2010	
2009	944
2008	
2007	
2006	1360
2005	
2004	
2003	769
2002	
2001	
2000	853
1999	
1998	
1997	
1996	805
1995	
1994	

Beulah Church Road  
Traffic Impact Study

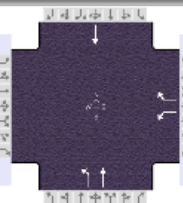
Signal Warrant Hourly Calculation using 11th Edition ITE

Land Use	ITE	Size	Daily Trips	Daily Exit Trips
Grocery	850	122,000 sf	10,713	5,357
Strip Retail	822	30,500 sf	1,496	748
High Turnover	932	8,000 sf	858	429
Fast Food w drive	934	7,400 sf	3,459	1,730
Gas Only	944	14 pumps	4,114	2,057
Single Family	210	50 units	533	267
SF Attached	215	184 units	1,352	676
Multi-Family (1-3)	220	288 units	1,921	961
			24,446	12,223

Using PM % of total turning left  
Main Entrance  
28%

Time	710	850	822	932	934	944	937	210	215	220	Hour Exit	Left exit
7:00	2.0%	1.4%	2.2%	1.8%	3.1%	4.9%	9.8%	10.0%	13.2%	10.8%	476	133
8:00	3.4%	3.3%	4.5%	3.1%	3.4%	5.5%	10.1%	8.5%	9.3%	8.5%	561	157
9:00	4.4%	4.4%	5.8%	3.4%	3.3%	4.8%	8.5%	5.8%	6.9%	4.9%	560	157
10:00	6.0%	5.4%	6.5%	4.4%	3.7%	4.4%	7.6%	5.6%	4.3%	4.8%	601	168
11:00	10.3%	7.3%	6.3%	6.9%	7.7%	6.0%	7.2%	5.1%	5.7%	4.7%	821	230
12:00	10.1%	9.9%	6.1%	12.3%	12.0%	6.6%	6.1%	5.7%	5.1%	4.1%	1062	297
1:00	6.6%	7.5%	6.9%	11.2%	8.7%	5.9%	5.7%	6.0%	4.8%	4.4%	863	242
2:00	6.5%	9.2%	6.1%	5.1%	6.5%	6.1%	5.6%	6.1%	6.0%	4.9%	901	252
3:00	8.4%	8.5%	7.4%	4.0%	5.7%	7.0%	5.3%	6.2%	4.8%	5.3%	869	243
4:00	15.2%	9.7%	8.0%	3.9%	5.6%	7.4%	4.2%	7.4%	5.1%	5.6%	950	266
5:00	15.8%	9.5%	8.0%	6.8%	6.5%	7.6%	3.4%	7.3%	6.8%	7.6%	1005	281
6:00	2.6%	9.3%	8.0%	8.7%	7.4%	7.7%	3.0%	5.9%	6.6%	6.7%	1003	281
7:00	2.3%	6.6%	8.5%	9.2%	6.6%	6.3%	2.2%	4.2%	4.5%	4.7%	790	221

## HCS Reports

HCS Signalized Intersection Results Summary															
General Information							Intersection Information								
Agency		Diane B. Zimmerman Traffic Engineering LLC					Duration, h		0.250						
Analyst		DBZ		Analysis Date		2/20/2023	Area Type		Other						
Jurisdiction				Time Period		AM Peak	PHF		0.97						
Urban Street		Beulah Church Road		Analysis Year		2022	Analysis Period		1> 7:00						
Intersection		I 265 Westbound ramps		File Name		AM 22.xus									
Project Description		6805 Beulah Church Road													
															
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand ( v ), veh/h							43		215	355	432			350	
Signal Information															
Cycle, s	80.0	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	No	Simult. Gap E/W	On	Green	15.0	33.5	15.0	0.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0	0.0				
				Red	1.5	1.5	1.5	0.0	0.0	0.0	0.0				
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase							8	5	2		6				
Case Number							9.0	1.0	4.0		8.3				
Phase Duration, s							20.5	20.5	59.5		39.0				
Change Period, ( Y+R ), s							5.5	5.5	5.5		5.5				
Max Allow Headway ( MAH ), s							4.3	4.1	0.0		0.0				
Queue Clearance Time ( g s ), s							13.4	9.5							
Green Extension Time ( g e ), s							0.5	1.2	0.0		0.0				
Phase Call Probability							1.00	1.00							
Max Out Probability							0.36	0.01							
Movement Group Results				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement							3		18	5	2			6	
Adjusted Flow Rate ( v ), veh/h							44		222	364	443			361	
Adjusted Saturation Flow Rate ( s ), veh/h/ln							1739		1491	1795	1830			1785	
Queue Service Time ( g s ), s							1.7		11.4	7.5	17.5			11.8	
Cycle Queue Clearance Time ( g c ), s							1.7		11.4	7.5	17.5			11.8	
Green Ratio ( g/C )							0.19		0.19	0.63	0.51			0.42	
Capacity ( c ), veh/h							325		279	707	931			749	
Volume-to-Capacity Ratio ( X )							0.136		0.795	0.515	0.476			0.482	
Back of Queue ( Q ), ft/ln ( 95 th percentile)							32.7		208.8	103.4	303.4			219.8	
Back of Queue ( Q ), veh/ln ( 95 th percentile)							1.3		8.1	4.1	11.9			8.5	
Queue Storage Ratio ( RQ ) ( 95 th percentile)							0.00		0.00	0.00	0.00			0.00	
Uniform Delay ( d 1 ), s/veh							27.1		31.1	8.7	18.0			16.9	
Incremental Delay ( d 2 ), s/veh							0.2		8.9	0.3	0.8			2.2	
Initial Queue Delay ( d 3 ), s/veh							0.0		0.0	0.0	0.0			0.0	
Control Delay ( d ), s/veh							27.3		39.9	9.0	18.8			19.1	
Level of Service ( LOS )							C		D	A	B			B	
Approach Delay, s/veh / LOS				0.0		37.8		D		14.4		B		19.1	
Intersection Delay, s/veh / LOS						19.9						B			
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS				1.95			B			1.72			B		
Bicycle LOS Score / LOS							F			1.83			B		

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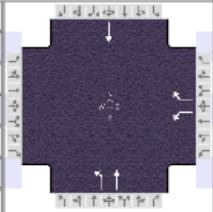
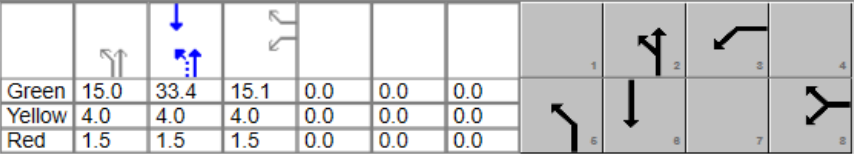
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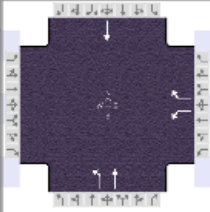












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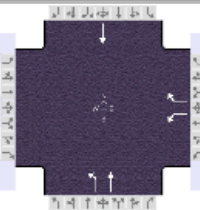
## HCS Signalized Intersection Results Summary

General Information						Intersection Information										
Agency		Diane B. Zimmerman Traffic Engineering LLC				Duration, h		0.250								
Analyst		DBZ		Analysis Date		Jul 21, 2023		Area Type		Other						
Jurisdiction				Time Period		AM Peak		PHF		0.97						
Urban Street		Beulah Church Road		Analysis Year		2033 No Build		Analysis Period		1> 7:00						
Intersection		I 265 Westbound ramps		File Name		AM 33 NB.xus										
Project Description		6805 Beulah Church Road														
Demand Information				EB			WB			NB			SB			
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R	
Demand ( v ), veh/h							47		237	392	477			387		
Signal Information																
Cycle, s	80.0	Reference Phase	2													
Offset, s	0	Reference Point	End													
Uncoordinated	No	Simult. Gap E/W	On		Green	15.0	33.4	15.1	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On		Yellow	4.0	4.0	4.0	0.0	0.0	0.0					
				Red	1.5	1.5	1.5	0.0	0.0	0.0						
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT					
Assigned Phase							8	5	2		6					
Case Number							9.0	1.0	4.0		8.3					
Phase Duration, s							20.6	20.5	59.4		38.9					
Change Period, ( Y+R ), s							5.5	5.5	5.5		5.5					
Max Allow Headway ( MAH ), s							4.3	4.1	0.0		0.0					
Queue Clearance Time ( g s ), s							14.7	10.5								
Green Extension Time ( g e ), s							0.5	1.3	0.0		0.0					
Phase Call Probability							1.00	1.00								
Max Out Probability							0.77	0.02								
Movement Group Results				EB			WB			NB			SB			
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R	
Assigned Movement							3		18	5	2			6		
Adjusted Flow Rate ( v ), veh/h							48		244	402	489			399		
Adjusted Saturation Flow Rate ( s ), veh/h/ln							1739		1495	1795	1839			1792		
Queue Service Time ( g s ), s							1.9		12.7	8.5	9.9			13.4		
Cycle Queue Clearance Time ( g c ), s							1.9		12.7	8.5	9.9			13.4		
Green Ratio ( g/C )							0.19		0.19	0.63	0.67			0.42		
Capacity ( c ), veh/h							329		283	675	1238			748		
Volume-to-Capacity Ratio ( X )							0.147		0.864	0.595	0.395			0.534		
Back of Queue ( Q ), ft/ln ( 95 th percentile)							35.6		243.7	106.2	118.8			245.3		
Back of Queue ( Q ), veh/ln ( 95 th percentile)							1.4		9.4	4.2	4.7			9.5		
Queue Storage Ratio ( RQ ) ( 95 th percentile)							0.00		0.00	0.00	0.00			0.00		
Uniform Delay ( d 1 ), s/veh							27.0		31.4	9.6	6.2			17.5		
Incremental Delay ( d 2 ), s/veh							0.2		15.6	0.3	0.3			2.7		
Initial Queue Delay ( d 3 ), s/veh							0.0		0.0	0.0	0.0			0.0		
Control Delay ( d ), s/veh							27.3		47.0	9.9	6.5			20.2		
Level of Service (LOS)							C		D	A	A			C		
Approach Delay, s/veh / LOS				0.0			43.7		D	8.0		A	20.2		C	
Intersection Delay, s/veh / LOS				17.7						B						
Multimodal Results				EB			WB			NB			SB			
Pedestrian LOS Score / LOS				1.95		B	1.72		B	1.63		B	1.39		A	
Bicycle LOS Score / LOS									F	1.97		B	1.15		A	

## HCS Signalized Intersection Results Summary

General Information					Intersection Information															
Agency	Diane B. Zimmerman Traffic Engineering LLC				Duration, h	0.250														
Analyst	DBZ	Analysis Date	Jul 24, 2023		Area Type	Other														
Jurisdiction		Time Period	AM Peak		PHF	0.97														
Urban Street	Beulah Church Road	Analysis Year	2033 Build		Analysis Period	1> 7:00														
Intersection	I 265 Westbound ramps	File Name	AM 33 B.xus																	
Project Description	6805 Beulah Church Road																			
Demand Information					EB			WB			NB			SB						
Approach Movement					L	T	R	L	T	R	L	T	R	L	T	R				
Demand ( v ), veh/h								106		237	455	560			466					
Signal Information																				
Cycle, s	110.0	Reference Phase	2																	
Offset, s	86	Reference Point	End																	
Uncoordinated	No	Simult. Gap E/W	On																	
Force Mode	Fixed	Simult. Gap N/S	On																	
					Green	17.1	55.7	20.7	0.0	0.0	0.0									
					Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
					Red	1.5	1.5	1.5	0.0	0.0	0.0									
Timer Results					EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase											8		5		2				6	
Case Number											9.0		1.0		4.0				8.3	
Phase Duration, s											26.2		22.6		83.8				61.2	
Change Period, ( Y+R ), s											5.5		5.5		5.5				5.5	
Max Allow Headway ( MAH ), s											4.3		4.1		0.0				0.0	
Queue Clearance Time ( g s ), s											19.3		15.2							
Green Extension Time ( g e ), s											1.4		2.0		0.0				0.0	
Phase Call Probability											1.00		1.00							
Max Out Probability											0.00		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								3		18	5	2			6					
Adjusted Flow Rate ( v ), veh/h								109		244	483	594			480					
Adjusted Saturation Flow Rate ( s ), veh/h/ln								1739		1509	1795	1905			1843					
Queue Service Time ( g s ), s								6.0		17.3	13.2	14.8			19.1					
Cycle Queue Clearance Time ( g c ), s								6.0		17.3	13.2	14.8			19.1					
Green Ratio ( g/C )								0.19		0.19	0.68	0.71			0.51					
Capacity ( c ), veh/h								327		284	651	1357			933					
Volume-to-Capacity Ratio ( X )								0.334		0.862	0.741	0.438			0.515					
Back of Queue ( Q ), ft/ln ( 95 th percentile)								121		290.2	172.2	205			336.7					
Back of Queue ( Q ), veh/ln ( 95 th percentile)								4.7		11.2	6.8	8.1			13.0					
Queue Storage Ratio ( RQ ) ( 95 th percentile)								0.00		0.00	0.00	0.00			0.00					
Uniform Delay ( d 1 ), s/veh								38.7		43.3	11.7	7.0			18.1					
Incremental Delay ( d 2 ), s/veh								0.6		7.6	0.8	0.5			2.0					
Initial Queue Delay ( d 3 ), s/veh								0.0		0.0	0.0	0.0			0.0					
Control Delay ( d ), s/veh								39.3		50.9	12.5	7.5			20.2					
Level of Service (LOS)								D		D	B	A			C					
Approach Delay, s/veh / LOS					0.0				47.3		D		9.7		A		20.2		C	
Intersection Delay, s/veh / LOS									19.3						B					
Multimodal Results					EB			WB			NB			SB						
Pedestrian LOS Score / LOS					1.96		B		1.73		B		1.63		B		1.38		A	
Bicycle LOS Score / LOS									F		2.21		B		1.28		A			



HCS Signalized Intersection Results Summary																					
General Information							Intersection Information														
Agency		Diane B. Zimmerman Traffic Engineering LLC					Duration, h		0.250												
Analyst		DBZ		Analysis Date		2/20/2023		Area Type		Other											
Jurisdiction				Time Period		PM Peak		PHF		0.92											
Urban Street		Beulah Church Road		Analysis Year		2022		Analysis Period		1> 5:00											
Intersection		I 265 Westbound ramps		File Name		PM 22.xus															
Project Description		6805 Beulah Church Road																			
Demand Information				EB			WB			NB			SB								
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R						
Demand ( v ), veh/h							209		327	153	556			533							
Signal Information																					
Cycle, s	80.0	Reference Phase	2																		
Offset, s	0	Reference Point	End	Green	14.6	29.4	19.5	0.0	0.0	0.0											
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0											
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.5	1.5	1.5	0.0	0.0	0.0											
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT			
Assigned Phase										8		5		2				6			
Case Number										9.0		1.0		4.0				8.3			
Phase Duration, s										25.0		20.1		55.0				34.9			
Change Period, ( Y+R ), s										5.5		5.5		5.5				5.5			
Max Allow Headway ( MAH ), s										4.3		4.1		0.0				0.0			
Queue Clearance Time ( g s ), s										19.7		5.1									
Green Extension Time ( g e ), s										0.0		0.4		0.0				0.0			
Phase Call Probability										1.00		0.97									
Max Out Probability										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							3		18	5	2			6							
Adjusted Flow Rate ( v ), veh/h							227		355	160	583			579							
Adjusted Saturation Flow Rate ( s ), veh/h/ln							1795		1549	1795	1872			1871							
Queue Service Time ( g s ), s							8.8		17.7	3.1	14.8			22.7							
Cycle Queue Clearance Time ( g c ), s							8.8		17.7	3.1	14.8			22.7							
Green Ratio ( g/C )							0.24		0.24	0.57	0.62			0.37							
Capacity ( c ), veh/h							438		397	488	1158			688							
Volume-to-Capacity Ratio ( X )							0.519		0.896	0.329	0.503			0.842							
Back of Queue ( Q ), ft/ln ( 95 th percentile)							167.4		338.6	45.2	210.6			428.4							
Back of Queue ( Q ), veh/ln ( 95 th percentile)							6.6		13.4	1.8	8.4			17.0							
Queue Storage Ratio ( RQ ) ( 95 th percentile)							0.00		0.00	0.00	0.00			0.00							
Uniform Delay ( d 1 ), s/veh							26.2		28.7	11.0	9.5			23.2							
Incremental Delay ( d 2 ), s/veh							1.1		22.1	0.2	0.9			11.9							
Initial Queue Delay ( d 3 ), s/veh							0.0		0.0	0.0	0.0			0.0							
Control Delay ( d ), s/veh							27.3		50.9	11.2	10.4			35.1							
Level of Service (LOS)							C		D	B	B			D							
Approach Delay, s/veh / LOS				0.0				41.7		D		10.6		B		35.1		D			
Intersection Delay, s/veh / LOS				27.5						C											
Multimodal Results				EB			WB			NB			SB								
Pedestrian LOS Score / LOS				1.95		B		1.72		B		1.64		B		1.39		A			
Bicycle LOS Score / LOS								F		1.76		B		1.44		A					
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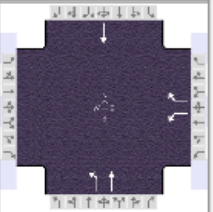
### HCS Signalized Intersection Results Summary

#### General Information

Agency	Diane B. Zimmerman Traffic Engineering LLC		
Analyst	DBZ	Analysis Date	Jul 24, 2023
Jurisdiction		Time Period	PM Peak
Urban Street	Beulah Church Road	Analysis Year	2033 No Build
Intersection	I 265 Westbound ramps	File Name	PM 33 NB.xus
Project Description	6805 Beulah Church Road		

#### Intersection Information

Duration, h	0.250
Area Type	Other
PHF	0.92
Analysis Period	1> 5:00



#### Demand Information

Approach Movement	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				231		361	169	614			589	

#### Signal Information

Cycle, s	80.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On	Green	14.7	29.3	19.5	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0		
				Red	1.5	1.5	1.5	0.0	0.0	0.0		

#### Timer Results

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8	5	2		6
Case Number				9.0	1.0	4.0		8.3
Phase Duration, s				25.0	20.2	55.0		34.8
Change Period, (Y+R), s				5.5	5.5	5.5		5.5
Max Allow Headway (MAH), s				4.3	4.1	0.0		0.0
Queue Clearance Time (g <sub>s</sub> ), s				22.1	5.4			
Green Extension Time (g <sub>e</sub> ), s				0.0	0.4	0.0		0.0
Phase Call Probability				1.00	0.98			
Max Out Probability				1.00	0.00			

#### Movement Group Results

Approach Movement	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	5	2			6	
Adjusted Flow Rate (v), veh/h				251		392	174	632			640	
Adjusted Saturation Flow Rate (s), veh/h/ln				1795		1555	1795	1882			1884	
Queue Service Time (g <sub>s</sub> ), s				9.8		20.1	3.4	15.8			26.1	
Cycle Queue Clearance Time (g <sub>c</sub> ), s				9.8		20.1	3.4	15.8			26.1	
Green Ratio (g/C)				0.24		0.24	0.57	0.62			0.37	
Capacity (c), veh/h				438		398	452	1164			690	
Volume-to-Capacity Ratio (X)				0.574		0.985	0.385	0.543			0.928	
Back of Queue (Q), ft/ln (95 th percentile)				191.2		432.3	49	205			524.8	
Back of Queue (Q), veh/ln (95 th percentile)				7.6		17.2	1.9	8.1			20.8	
Queue Storage Ratio (RQ) (95 th percentile)				0.00		0.00	0.00	0.00			0.00	
Uniform Delay (d <sub>1</sub> ), s/veh				26.6		29.6	12.0	9.2			24.3	
Incremental Delay (d <sub>2</sub> ), s/veh				1.8		41.0	0.2	0.7			20.5	
Initial Queue Delay (d <sub>3</sub> ), s/veh				0.0		0.0	0.0	0.0			0.0	
Control Delay (d), s/veh				28.4		70.6	12.3	9.9			44.8	
Level of Service (LOS)				C		E	B	A			D	
Approach Delay, s/veh / LOS	0.0			54.1		D	10.4	B		44.8		D
Intersection Delay, s/veh / LOS	34.4						C					

#### Multimodal Results

	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	1.95		B	1.72		B	1.64		B	1.39		A
Bicycle LOS Score / LOS						F	1.89		B	1.54		B

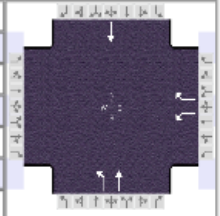
## HCS Signalized Intersection Results Summary

### General Information

Agency	Diane B. Zimmerman Traffic Engineering LLC
Analyst	DBZ
Jurisdiction	
Urban Street	Beulah Church Road
Intersection	I 265 Westbound ramps
Project Description	6805 Beulah Church Road

### Intersection Information

Duration, h	0.250
Area Type	Other
PHF	0.97
Analysis Period	1> 5:00
File Name	PM 33 B.xus



### Demand Information

	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				303		361	230	695			685	

### Signal Information

Cycle, s	120.0	Reference Phase	2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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### Timer Results

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8	5	2		6
Case Number				9.0	1.0	4.0		8.3
Phase Duration, s				37.9	20.5	82.1		61.6
Change Period, (Y+R), s				5.5	5.5	5.5		5.5
Max Allow Headway (MAH), s				4.3	4.1	0.0		0.0
Queue Clearance Time (g <sub>s</sub> ), s				29.5	9.4			
Green Extension Time (g <sub>e</sub> ), s				2.9	0.9	0.0		0.0
Phase Call Probability				1.00	1.00			
Max Out Probability				0.00	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				3		18	5	2		6		
Adjusted Flow Rate (v), veh/h				312		372	245	741		706		
Adjusted Saturation Flow Rate (s), veh/h/ln				1739		1545	1795	1969		1926		
Queue Service Time (g <sub>s</sub> ), s				19.2		27.5	7.4	5.8		37.0		
Cycle Queue Clearance Time (g <sub>c</sub> ), s				19.2		27.5	7.4	5.8		37.0		
Green Ratio (g/C)				0.27		0.27	0.61	0.60		0.47		
Capacity (c), veh/h				470		430	403	1185		901		
Volume-to-Capacity Ratio (X)				0.665		0.865	0.608	0.626		0.784		
Back of Queue (Q), ft/ln (95 th percentile)				338.3		421	126.3	68.5		644.5		
Back of Queue (Q), veh/ln (95 th percentile)				13.0		16.3	5.0	2.7		25.0		
Queue Storage Ratio (RQ) (95 th percentile)				0.00		0.00	0.00	0.00		0.00		
Uniform Delay (d <sub>1</sub> ), s/veh				39.0		41.2	20.2	1.3		26.9		
Incremental Delay (d <sub>2</sub> ), s/veh				1.6		5.3	0.8	1.4		6.8		
Initial Queue Delay (d <sub>3</sub> ), s/veh				0.0		0.0	0.0	0.0		0.0		
Control Delay (d), s/veh				40.6		46.5	21.0	2.7		33.6		
Level of Service (LOS)				D		D	C	A		C		
Approach Delay, s/veh / LOS	0.0			43.8		D	7.2	A		33.6		C
Intersection Delay, s/veh / LOS				25.6				C				

### Multimodal Results

	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	1.96		B	1.74		B	1.65		B	1.39		A
Bicycle LOS Score / LOS						F	2.06		B	1.65		B

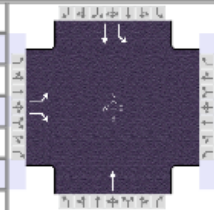
## HCS Signalized Intersection Results Summary

### General Information

Agency	Diane B. Zimmerman Traffic Engineering LLC
Analyst	DBZ
Jurisdiction	
Urban Street	Beulah Church Road
Intersection	I 265 Eastbound ramps
Project Description	6805 Beulah Church Road

### Intersection Information

Duration, h	0.250
Area Type	Other
PHF	0.95
Analysis Period	1> 7:00
File Name	AM 22.xus



### Demand Information

	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	192		71						574		279	120

### Signal Information

Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

### Timer Results

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		9.0				8.3	1.0	4.0
Phase Duration, s		22.0				36.1	22.0	58.0
Change Period, (Y+R), s		7.0				7.0	7.0	7.0
Max Allow Headway (MAH), s		4.2				0.0	4.1	0.0
Queue Clearance Time (g <sub>s</sub> ), s		10.6					8.6	
Green Extension Time (g <sub>e</sub> ), s		0.6				0.0	0.8	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.15					0.01	

### Movement Group Results

	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				2			1	6	
Adjusted Flow Rate (v), veh/h	202		75				604			283	122	
Adjusted Saturation Flow Rate (s), veh/h/ln	1739		1481				1876			1781	1672	
Queue Service Time (g <sub>s</sub> ), s	8.6		3.5				24.2			6.6	4.1	
Cycle Queue Clearance Time (g <sub>c</sub> ), s	8.6		3.5				24.2			6.6	4.1	
Green Ratio (g/C)	0.19		0.19				0.36			0.58	0.49	
Capacity (c), veh/h	325		277				682			473	816	
Volume-to-Capacity Ratio (X)	0.621		0.270				0.887			0.599	0.149	
Back of Queue (Q), ft/ln (95 th percentile)	169.2		56.1				471.6			128.8	74.6	
Back of Queue (Q), veh/ln (95 th percentile)	6.5		2.2				18.7			5.1	2.8	
Queue Storage Ratio (RQ) (95 th percentile)	0.00		0.00				0.00			0.00	0.00	
Uniform Delay (d <sub>1</sub> ), s/veh	29.9		27.8				23.9			17.3	11.2	
Incremental Delay (d <sub>2</sub> ), s/veh	2.2		0.5				15.8			1.1	0.3	
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0		0.0				0.0			0.0	0.0	
Control Delay (d), s/veh	32.1		28.4				39.7			18.4	11.5	
Level of Service (LOS)	C		C				D			B	B	
Approach Delay, s/veh / LOS	31.1		C	0.0			39.7		D	16.3		B
Intersection Delay, s/veh / LOS	30.5						C					

### Multimodal Results

	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	1.72		B	1.95		B	1.39		A	1.64		B
Bicycle LOS Score / LOS			F				1.48		A	1.18		A

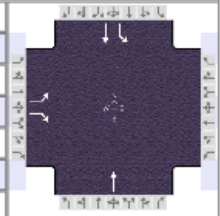
## HCS Signalized Intersection Results Summary

### General Information

Agency	Diane B. Zimmerman Traffic Engineering LLC
Analyst	DBZ
Jurisdiction	
Urban Street	Beulah Church Road
Intersection	I 265 Eastbound ramps
Project Description	6805 Beulah Church Road

### Intersection Information

Duration, h	0.250
Area Type	Other
PHF	0.95
Analysis Period	1> 7:00
File Name	AM 33 NB.xus



### Demand Information

	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	212		78						634		308	133

### Signal Information

Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

### Timer Results

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		9.0				8.3	1.0	4.0
Phase Duration, s		22.0				36.0	22.0	58.0
Change Period, (Y+R), s		7.0				7.0	7.0	7.0
Max Allow Headway (MAH), s		4.2				0.0	4.1	0.0
Queue Clearance Time (g <sub>s</sub> ), s		11.6					11.4	
Green Extension Time (g <sub>e</sub> ), s		0.6				0.0	0.8	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.30					0.05	

### Movement Group Results

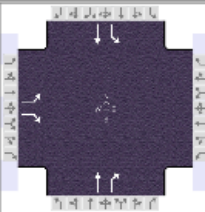
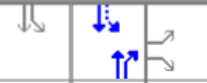
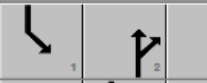
	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				2			1	6	
Adjusted Flow Rate (v), veh/h	223		82				667			312	135	
Adjusted Saturation Flow Rate (s), veh/h/ln	1739		1482				1889			1781	1674	
Queue Service Time (g <sub>s</sub> ), s	9.6		3.8				27.8			9.4	4.6	
Cycle Queue Clearance Time (g <sub>c</sub> ), s	9.6		3.8				27.8			9.4	4.6	
Green Ratio (g/C)	0.19		0.19				0.36			0.58	0.49	
Capacity (c), veh/h	326		278				686			435	813	
Volume-to-Capacity Ratio (X)	0.685		0.296				0.974			0.718	0.166	
Back of Queue (Q), ft/ln (95 th percentile)	195.5		62				593.4			199.9	84.4	
Back of Queue (Q), veh/ln (95 th percentile)	7.5		2.4				23.5			7.9	3.2	
Queue Storage Ratio (RQ) (95 th percentile)	0.00		0.00				0.00			0.00	0.00	
Uniform Delay (d <sub>1</sub> ), s/veh	30.3		28.0				25.1			23.9	11.4	
Incremental Delay (d <sub>2</sub> ), s/veh	3.8		0.6				28.5			2.6	0.4	
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0		0.0				0.0			0.0	0.0	
Control Delay (d), s/veh	34.1		28.6				53.6			26.5	11.8	
Level of Service (LOS)	C		C				D			C	B	
Approach Delay, s/veh / LOS	32.6	C	0.0				53.6	D		22.1	C	
Intersection Delay, s/veh / LOS	39.2						D					

### Multimodal Results

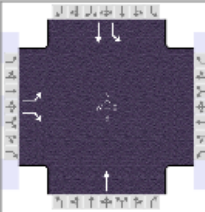








	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.72	B	1.95	B	1.39	A	1.64	B
Bicycle LOS Score / LOS		F			1.59	B	1.25	A



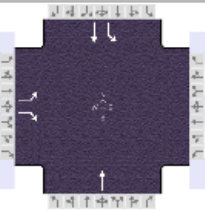
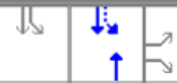


## HCS Signalized Intersection Results Summary

General Information				Intersection Information															
Agency	Diane B. Zimmerman Traffic Engineering LLC						Duration, h	0.250											
Analyst	DBZ		Analysis Date	Jul 24, 2023		Area Type	Other												
Jurisdiction			Time Period	AM Peak		PHF	0.95												
Urban Street	Beulah Church Road		Analysis Year	2033 Build		Analysis Period	1> 7:00												
Intersection	I 265 Eastbound ramps		File Name	AM 33 B.xus															
Project Description	6805 Beulah Church Road																		
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand ( v ), veh/h				212		137					780	289	308	271					
Signal Information																			
Cycle, s	110.0	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	No	Simult. Gap E/W	On	Green	15.0	57.5	16.5	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
Force Mode	Fixed	Simult. Gap N/S	On	Red	3.0	3.0	3.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4								2		1		6	
Case Number						9.0								7.3		1.0		4.0	
Phase Duration, s						23.5								64.5		22.0		86.5	
Change Period, ( Y+R ), s						7.0								7.0		7.0		7.0	
Max Allow Headway ( MAH ), s						4.2								0.0		4.1		0.0	
Queue Clearance Time ( g_s ), s						15.6										9.9			
Green Extension Time ( g_e ), s						0.9								0.0		1.1		0.0	
Phase Call Probability						1.00										1.00			
Max Out Probability						0.14										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				7		14					2	12		1	6				
Adjusted Flow Rate ( v ), veh/h				223		144					853	316		314	276				
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1739		1500					1999			1781	1717				
Queue Service Time ( g_s ), s				13.6		9.8					37.2			7.9	7.0				
Cycle Queue Clearance Time ( g_c ), s				13.6		9.8					37.2			7.9	7.0				
Green Ratio ( g/C )				0.15		0.15					0.53			0.68	0.72				
Capacity ( c ), veh/h				277		239					1063			427	1241				
Volume-to-Capacity Ratio ( X )				0.806		0.604					0.803			0.734	0.222				
Back of Queue ( Q ), ft/ln ( 95 th percentile)				273.7		173.4					553.6			217.6	114.5				
Back of Queue ( Q ), veh/ln ( 95 th percentile)				10.5		6.8					22.0			8.6	4.3				
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.00		0.00					0.00			0.00	0.00				
Uniform Delay ( d_1 ), s/veh				44.6		43.0					19.4			24.2	6.3				
Incremental Delay ( d_2 ), s/veh				7.9		2.5					4.1			2.2	0.4				
Initial Queue Delay ( d_3 ), s/veh				0.0		0.0					0.0			0.0	0.0				
Control Delay ( d ), s/veh				52.5		45.5					23.5	15.0		26.4	6.7				
Level of Service (LOS)				D		D					C	B		C	A				
Approach Delay, s/veh / LOS				49.7		D		0.0			21.2		C		17.2		B		
Intersection Delay, s/veh / LOS				25.0						C									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS				1.96		B	1.96		B	1.38		A	1.63		B				
Bicycle LOS Score / LOS						F				2.34		B	1.49		A				

## HCS Signalized Intersection Results Summary

General Information				Intersection Information															
Agency	Diane B. Zimmerman Traffic Engineering LLC			Duration, h	0.250														
Analyst	DBZ	Analysis Date	2/20/2023	Area Type	Other														
Jurisdiction		Time Period	PM Peak	PHF	0.95														
Urban Street	Beulah Church Road	Analysis Year	2022	Analysis Period	1> 5:00														
Intersection	I 265 Eastbound ramps	File Name	PM 22.xus																
Project Description	6805 Beulah Church Road																		
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand ( v ), veh/h				379		223					327		300	452					
Signal Information																			
Cycle, s	80.0	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	No	Simult. Gap E/W	On	Green	15.0	26.0	18.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
Force Mode	Fixed	Simult. Gap N/S	On	Red	3.0	3.0	3.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4								2		1		6	
Case Number						9.0								8.3		1.0		4.0	
Phase Duration, s						25.0								33.0		22.0		55.0	
Change Period, ( Y+R ), s						7.0								7.0		7.0		7.0	
Max Allow Headway ( MAH ), s						4.2								0.0		4.1		0.0	
Queue Clearance Time ( g_s ), s						19.4										10.1			
Green Extension Time ( g_e ), s						0.0								0.0		0.7		0.0	
Phase Call Probability						1.00										1.00			
Max Out Probability						1.00										0.14			
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7		14					2			1	6				
Adjusted Flow Rate ( v ), veh/h				399		235					344			322	485				
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1795		1529					1825			1795	1852				
Queue Service Time ( g_s ), s				17.4		11.2					12.5			8.1	17.0				
Cycle Queue Clearance Time ( g_c ), s				17.4		11.2					12.5			8.1	17.0				
Green Ratio ( g/C )				0.22		0.22					0.33			0.54	0.60				
Capacity ( c ), veh/h				426		344					593			602	1111				
Volume-to-Capacity Ratio ( X )				0.936		0.682					0.580			0.534	0.436				
Back of Queue ( Q ), ft/ln ( 95 th percentile)				395.7		198.7					242.8			145.2	294				
Back of Queue ( Q ), veh/ln ( 95 th percentile)				15.7		7.9					9.6			5.8	11.7				
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.00		0.00					0.00			0.00	0.00				
Uniform Delay ( d_1 ), s/veh				29.9		28.4					22.5			14.6	17.3				
Incremental Delay ( d_2 ), s/veh				28.0		5.4					4.1			0.4	0.7				
Initial Queue Delay ( d_3 ), s/veh				0.0		0.0					0.0			0.0	0.0				
Control Delay ( d ), s/veh				57.9		33.8					26.6			15.0	18.1				
Level of Service (LOS)				E		C					C			B	B				
Approach Delay, s/veh / LOS				49.0		D		0.0			26.6		C	16.8		B			
Intersection Delay, s/veh / LOS				30.1						C									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS				1.72		B	1.95		B	1.40		A	1.65		B				
Bicycle LOS Score / LOS						F				1.06		A	1.79		B				

## HCS Signalized Intersection Results Summary

General Information				Intersection Information															
Agency	Diane B. Zimmerman Traffic Engineering LLC						Duration, h		0.250										
Analyst	DBZ		Analysis Date		Jul 24, 2023		Area Type		Other										
Jurisdiction			Time Period		PM Peak		PHF		0.95										
Urban Street	Beulah Church Road		Analysis Year		2033 No Build		Analysis Period		1> 5:00										
Intersection	I 265 Eastbound ramps		File Name		PM 33 NB.xus														
Project Description	6805 Beulah Church Road																		
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand ( v ), veh/h				419		246					361		331	499					
Signal Information																			
Cycle, s	80.0	Reference Phase	2																
Offset, s	0	Reference Point	End	Green	15.0	26.0	18.0	0.0	0.0	0.0									
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
Force Mode	Fixed	Simult. Gap N/S	On	Red	3.0	3.0	3.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4								2		1		6	
Case Number						9.0								8.3		1.0		4.0	
Phase Duration, s						25.0								33.0		22.0		55.0	
Change Period, ( Y+R ), s						7.0								7.0		7.0		7.0	
Max Allow Headway ( MAH ), s						4.2								0.0		4.1		0.0	
Queue Clearance Time ( g s ), s						21.0										11.0			
Green Extension Time ( g e ), s						0.0								0.0		0.8		0.0	
Phase Call Probability						1.00										1.00			
Max Out Probability						1.00										0.25			
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7		14					2			1	6				
Adjusted Flow Rate ( v ), veh/h				441		259					380			355	536				
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1795		1533					1832			1795	1863				
Queue Service Time ( g s ), s				19.0		12.6					14.1			9.0	18.7				
Cycle Queue Clearance Time ( g c ), s				19.0		12.6					14.1			9.0	18.7				
Green Ratio ( g/C )				0.22		0.22					0.33			0.54	0.60				
Capacity ( c ), veh/h				426		345					596			577	1118				
Volume-to-Capacity Ratio ( X )				1.034		0.751					0.638			0.616	0.479				
Back of Queue ( Q ), ft/ln ( 95 th percentile)				516.6		226.8					271			153.8	306.6				
Back of Queue ( Q ), veh/ln ( 95 th percentile)				20.5		9.0					10.8			6.1	12.2				
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.00		0.00					0.00			0.00	0.00				
Uniform Delay ( d 1 ), s/veh				30.5		28.9					23.0			15.5	17.6				
Incremental Delay ( d 2 ), s/veh				52.7		8.9					5.2			0.7	0.7				
Initial Queue Delay ( d 3 ), s/veh				0.0		0.0					0.0			0.0	0.0				
Control Delay ( d ), s/veh				83.2		37.8					28.2			16.2	18.2				
Level of Service (LOS)				F		D					C			B	B				
Approach Delay, s/veh / LOS				66.4		E		0.0			28.2		C	17.4		B			
Intersection Delay, s/veh / LOS				36.9						D									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS				1.72		B	1.95		B	1.40		A	1.65		B				
Bicycle LOS Score / LOS						F				1.11		A	1.93		B				

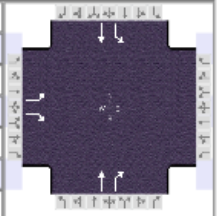
## HCS Signalized Intersection Results Summary

### General Information

Agency	Diane B. Zimmerman Traffic Engineering LLC
Analyst	DBZ
Jurisdiction	
Urban Street	Beulah Church Road
Intersection	I 265 Eastbound ramps
Project Description	6805 Beulah Church Road

### Intersection Information

Duration, h	0.250
Area Type	Other
PHF	0.95
Analysis Period	1> 5:00

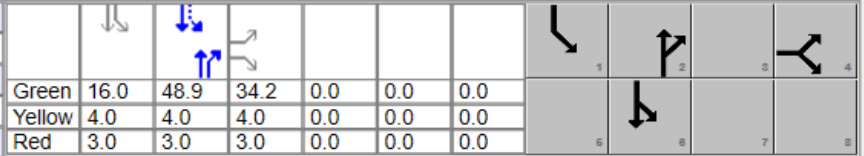


### Demand Information

	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	419		318				503	191		331	667	

### Signal Information

Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



### Timer Results

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		9.0				7.3	1.0	4.0
Phase Duration, s		41.2				55.9	23.0	78.8
Change Period, (Y+R), s		7.0				7.0	7.0	7.0
Max Allow Headway (MAH), s		4.2				0.0	4.1	0.0
Queue Clearance Time (g <sub>s</sub> ), s		30.8					14.7	
Green Extension Time (g <sub>e</sub> ), s		3.3				0.0	1.3	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.00					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	7		14				2	12		1	6	
Adjusted Flow Rate (v), veh/h	441		335				545	207		338	681	
Adjusted Saturation Flow Rate (s), veh/h/ln	1739		1548				1920			1781	1841	
Queue Service Time (g <sub>s</sub> ), s	28.8		23.4				32.6			12.7	14.6	
Cycle Queue Clearance Time (g <sub>c</sub> ), s	28.8		23.4				32.6			12.7	14.6	
Green Ratio (g/C)	0.28		0.28				0.41			0.57	0.60	
Capacity (c), veh/h	510		454				782			435	1102	
Volume-to-Capacity Ratio (X)	0.865		0.738				0.697			0.776	0.618	
Back of Queue (Q), ft/ln (95 th percentile)	483.4		357.6				604.2			171.1	163.5	
Back of Queue (Q), veh/ln (95 th percentile)	18.6		14.0				24.0			6.7	6.1	
Queue Storage Ratio (RQ) (95 th percentile)	0.00		0.00				0.00			0.00	0.00	
Uniform Delay (d <sub>1</sub> ), s/veh	40.2		38.3				45.2			18.7	5.0	
Incremental Delay (d <sub>2</sub> ), s/veh	4.6		2.4				4.2			1.8	1.5	
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0		0.0				0.0			0.0	0.0	
Control Delay (d), s/veh	44.7		40.6				49.4	10.0		20.5	6.5	
Level of Service (LOS)	D		D				D	A		C	A	
Approach Delay, s/veh / LOS	43.0		D			0.0	38.6		D	11.1		B
Intersection Delay, s/veh / LOS	28.9						C					

### Multimodal Results

	EB	WB	NB	SB
Pedestrian LOS Score / LOS	1.96	B	1.96	B
Bicycle LOS Score / LOS		F		B



HCS Two-Way Stop-Control Report																		
General Information								Site Information										
Analyst	DBZ							Intersection				Beulah Church at Rocky Ln						
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction										
Date Performed	3/6/2023							East/West Street				Rocky Lane/Arbor Creek						
Analysis Year	2022							North/South Street				Beulah Church						
Time Analyzed	AM Peak							Peak Hour Factor				0.92						
Intersection Orientation	North-South							Analysis Time Period (hrs)				0.25						
Project Description	6805 Beulah Church Rd																	
<b>Lanes</b>																		
<p>Major Street: North-South</p>																		
<b>Vehicle Volumes and Adjustments</b>																		
Approach	Eastbound				Westbound				Northbound				Southbound					
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R		
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6		
Number of Lanes		0	1	0		0	1	0		0	1	1	0	0	1	1		
Configuration			LTR				LTR			L		TR		L	T	R		
Volume (veh/h)		39	0	0		1	0	37		2	698	3		7	183	8		
Percent Heavy Vehicles (%)		0	0	0		0	0	3		0				29				
Proportion Time Blocked																		
Percent Grade (%)		0				0												
Right Turn Channelized											No							
Median Type   Storage		Left Only									1							
<b>Critical and Follow-up Headways</b>																		
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1				
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.23		4.10				4.39				
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2				
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.33		2.20				2.46				
<b>Delay, Queue Length, and Level of Service</b>																		
Flow Rate, v (veh/h)			42				41			2				8				
Capacity, c (veh/h)			287				402			1375				741				
v/c Ratio			0.15				0.10			0.00				0.01				
95% Queue Length, Q <sub>95</sub> (veh)			0.5				0.3			0.0				0.0				
Control Delay (s/veh)			19.7				15.0			7.6				9.9				
Level of Service (LOS)			C				B			A				A				
Approach Delay (s/veh)		19.7				15.0					0.0				0.4			
Approach LOS		C				B					A				A			

HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Beulah Church at Rocky Ln							
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction								
Date Performed	7/24/2023							East/West Street	Rocky Lane/Arbor Creek							
Analysis Year	2033							North/South Street	Beulah Church							
Time Analyzed	AM Peak No Build							Peak Hour Factor	0.92							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	6805 Beulah Church Rd															
<b>Lanes</b>																
<b>Vehicle Volumes and Adjustments</b>																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	1	1	0	0	1	1	1
Configuration			LTR				LTR			L		TR		L	T	R
Volume (veh/h)		43	0	0		1	0	41		2	771	3		8	202	9
Percent Heavy Vehicles (%)		0	0	0		0	0	3		0				29		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized													No			
Median Type   Storage	Left Only								1							
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.23		4.10				4.39		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.33		2.20				2.46		
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)			47				46			2				9		
Capacity, c (veh/h)			250				362			1351				690		
v/c Ratio			0.19				0.13			0.00				0.01		
95% Queue Length, Q <sub>95</sub> (veh)			0.7				0.4			0.0				0.0		
Control Delay (s/veh)			22.7				16.4			7.7				10.3		
Level of Service (LOS)			C				C			A				B		
Approach Delay (s/veh)	22.7				16.4				0.0				0.4			
Approach LOS	C				C				A				A			

HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Beulah Church at Rocky Ln							
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction								
Date Performed	7/24/2023							East/West Street	Rocky Lane/Arbor Creek							
Analysis Year	2033							North/South Street	Beulah Church							
Time Analyzed	AM Peak Build							Peak Hour Factor	0.92							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	6805 Beulah Church Rd															
<b>Lanes</b>																
<p>Major Street: North-South</p>																
<b>Vehicle Volumes and Adjustments</b>																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	1	0	0	1	1
Configuration			LTR				LTR			L		TR			L	T
Volume (veh/h)		43	0	0		1	0	41		2	980	3		8	399	9
Percent Heavy Vehicles (%)		0	0	0		0	0	3		0				29		
Proportion Time Blocked		0.580	0.580	0.130		0.580	0.580	0.450		0.130				0.450		
Percent Grade (%)	0				0											
Right Turn Channelized													No			
Median Type   Storage					Left Only								1			
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.23		4.10				4.39		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.33		2.20				2.46		
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)			47				46			2				9		
Capacity, c (veh/h)			130				234			1121				425		
v/c Ratio			0.36				0.19			0.00				0.02		
95% Queue Length, Q <sub>95</sub> (veh)			1.5				0.7			0.0				0.1		
Control Delay (s/veh)			47.5				24.0			8.2				13.6		
Level of Service (LOS)			E				C			A				B		
Approach Delay (s/veh)	47.5				24.0				0.0				0.3			
Approach LOS	E				C				A				A			

HCS Two-Way Stop-Control Report																	
General Information									Site Information								
Analyst	D8Z								Intersection	Beulah Church at Rocky Ln							
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC								Jurisdiction								
Date Performed	3/6/2023								East/West Street	Rocky Lane/Arbor Creek							
Analysis Year	2022								North/South Street	Beulah Church							
Time Analyzed	PM Peak								Peak Hour Factor	0.93							
Intersection Orientation	North-South								Analysis Time Period (hrs)	0.25							
Project Description	6805 Beulah Church Rd																
<b>Lanes</b>																	
<p>Major Street: North-South</p>																	
<b>Vehicle Volumes and Adjustments</b>																	
Approach	Eastbound				Westbound				Northbound				Southbound				
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Priority		10	11	12		7	8	9	10	1	2	3	4	5	6		
Number of Lanes		0	1	0		0	1	0		0	1	1	0	0	1	1	
Configuration			LTR				LTR				L		TR		L	T	
Volume (veh/h)		21	0	2		6	0	28		1	396	4		35	612	38	
Percent Heavy Vehicles (%)		0	0	0		0	0	4		0				3			
Proportion Time Blocked																	
Percent Grade (%)	0				0												
Right Turn Channelized									No								
Median Type   Storage	Left Only								1								
<b>Critical and Follow-up Headways</b>																	
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1			
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.24		4.10				4.13			
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2			
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.34		2.20				2.23			
<b>Delay, Queue Length, and Level of Service</b>																	
Flow Rate, v (veh/h)			25				37			1				38			
Capacity, c (veh/h)			287				514			907				1124			
v/c Ratio			0.09				0.07			0.00				0.03			
95% Queue Length, Q <sub>95</sub> (veh)			0.3				0.2			0.0				0.1			
Control Delay (s/veh)			18.7				12.5			9.0				8.3			
Level of Service (LOS)			C				B			A				A			
Approach Delay (s/veh)	18.7				12.5				0.0				0.4				
Approach LOS	C				B				A				A				

HCS Two-Way Stop-Control Report																		
General Information								Site Information										
Analyst	DBZ							Intersection	Beulah Church at Rocky Ln									
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction										
Date Performed	7/24/2023							East/West Street	Rocky Lane/Arbor Creek									
Analysis Year	2033							North/South Street	Beulah Church									
Time Analyzed	PM Peak No Build							Peak Hour Factor	0.93									
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25									
Project Description	6805 Beulah Church Rd																	
<b>Lanes</b>																		
<p>Major Street: North-South</p>																		
<b>Vehicle Volumes and Adjustments</b>																		
Approach	Eastbound				Westbound				Northbound				Southbound					
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R		
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6		
Number of Lanes		0	1	0		0	1	0		0	1	1	0	0	1	1		
Configuration			LTR				LTR			L		TR			L	T		
Volume (veh/h)		23	0	2		7	0	31		1	437	4		39	676	42		
Percent Heavy Vehicles (%)		0	0	0		0	0	4		0				3				
Proportion Time Blocked																		
Percent Grade (%)		0				0												
Right Turn Channelized											No							
Median Type   Storage		Left Only									1							
<b>Critical and Follow-up Headways</b>																		
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1				
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.24		4.10				4.13				
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2				
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.34		2.20				2.23				
<b>Delay, Queue Length, and Level of Service</b>																		
Flow Rate, v (veh/h)			27				41			1				42				
Capacity, c (veh/h)			254				472			852				1083				
v/c Ratio			0.11				0.09			0.00				0.04				
95% Queue Length, Q <sub>95</sub> (veh)			0.4				0.3			0.0				0.1				
Control Delay (s/veh)			20.8				13.3			9.2				8.5				
Level of Service (LOS)			C				B			A				A				
Approach Delay (s/veh)		20.8				13.3					0.0				0.4			
Approach LOS		C				B					A				A			

HCS Two-Way Stop-Control Report																	
General Information								Site Information									
Analyst	DBZ							Intersection	Beulah Church at Rocky Ln								
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction									
Date Performed	7/24/2023							East/West Street	Rocky Lane/Arbor Creek								
Analysis Year	2033							North/South Street	Beulah Church								
Time Analyzed	PM Peak Build							Peak Hour Factor	0.93								
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25								
Project Description	6805 Beulah Church Rd																
<b>Lanes</b>																	
<b>Vehicle Volumes and Adjustments</b>																	
Approach	Eastbound				Westbound				Northbound				Southbound				
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	1	0		0	1	0		0	1	1	0	0	1	1	1
Configuration			LTR				LTR			L		TR			L	T	R
Volume (veh/h)		23	0	2		7	0	31		1	640	4		39	916	42	
Percent Heavy Vehicles (%)		0	0	0		0	0	4		0				3			
Proportion Time Blocked		0.560	0.560	0.330		0.560	0.500	0.230		0.330				0.230			
Percent Grade (%)	0				0												
Right Turn Channelized													No				
Median Type   Storage					Left Only								1				
<b>Critical and Follow-up Headways</b>																	
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1			
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.24		4.10				4.13			
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2			
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.34		2.20				2.23			
<b>Delay, Queue Length, and Level of Service</b>																	
Flow Rate, v (veh/h)			27				41			1				42			
Capacity, c (veh/h)			140				325			558				850			
v/c Ratio			0.19				0.13			0.00				0.05			
95% Queue Length, Q <sub>95</sub> (veh)			0.7				0.4			0.0				0.2			
Control Delay (s/veh)			36.7				17.7			11.5				9.5			
Level of Service (LOS)			E				C			B				A			
Approach Delay (s/veh)	36.7				17.7				0.0				0.4				
Approach LOS	E				C				A				A				

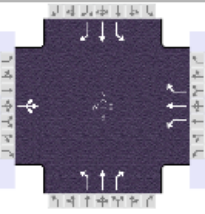
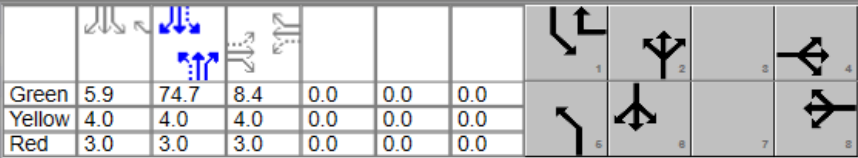


HCS Two-Way Stop-Control Report																
General Information									Site Information							
Analyst	DBZ								Intersection				Beulah Ch at Arbor Manor			
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC								Jurisdiction							
Date Performed	3/6/2023								East/West Street				Arbor Manor			
Analysis Year	2022								North/South Street				Beulah Church Road			
Time Analyzed	AM Peak								Peak Hour Factor				0.92			
Intersection Orientation	North-South								Analysis Time Period (hrs)				0.25			
Project Description	6805 Beulah Church Road															
<b>Lanes</b>																
<p>Major Street: North-South</p>																
<b>Vehicle Volumes and Adjustments</b>																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	1
Configuration			LR							LT					T	R
Volume (veh/h)		16		0						0	688				171	5
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized													No			
Median Type   Storage	Undivided															
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)			17							0						
Capacity, c (veh/h)			298							1394						
v/c Ratio			0.06							0.00						
95% Queue Length, Q <sub>95</sub> (veh)			0.2							0.0						
Control Delay (s/veh)			17.8							7.6	0.0					
Level of Service (LOS)			C							A	A					
Approach Delay (s/veh)	17.8								0.0							
Approach LOS	C								A							

HCS Two-Way Stop-Control Report																
General Information									Site Information							
Analyst	DBZ								Intersection				Beulah Ch at Arbor Manor			
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC								Jurisdiction							
Date Performed	7/24/2023								East/West Street				Arbor Manor			
Analysis Year	2033								North/South Street				Beulah Church Road			
Time Analyzed	AM Peak No Build								Peak Hour Factor				0.92			
Intersection Orientation	North-South								Analysis Time Period (hrs)				0.25			
Project Description	6805 Beulah Church Road															
<b>Lanes</b>																
<b>Vehicle Volumes and Adjustments</b>																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	10	1	2	3	4	5	6	
Number of Lanes		0	1	0		0	0	0		0	1	0		0	1	1
Configuration			LR								LT				T	R
Volume (veh/h)		18		0						0	760				189	6
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized													No			
Median Type   Storage					Undivided											
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)			20							0						
Capacity, c (veh/h)			260							1370						
v/c Ratio			0.08							0.00						
95% Queue Length, Q <sub>95</sub> (veh)			0.2							0.0						
Control Delay (s/veh)			19.9							7.6	0.0					
Level of Service (LOS)			C							A	A					
Approach Delay (s/veh)	19.9								0.0							
Approach LOS	C								A							



## HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		Diane B. Zimmerman Traffic Engineering LLC				Duration, h		0.250											
Analyst		DBZ		Analysis Date		Jul 24, 2023		Area Type		Other									
Jurisdiction				Time Period		AM Peak		PHF		0.95									
Urban Street		Beulah Church Road		Analysis Year		2033 Build		Analysis Period		1> 7:00									
Intersection		Arbor Manor/Cedar Cre...		File Name		AM 33 B.xus													
Project Description		6805 Beulah Church Road																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand ( v ), veh/h				18	0	0	76	0	92	0	918	15	126	260	6				
Signal Information																			
Cycle, s	110.0	Reference Phase	2																
Offset, s	18	Reference Point	End																
Uncoordinated	No	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	5.9	74.7	8.4	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	3.0	3.0	3.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8		5		2		1		6	
Case Number						8.0				5.0		1.1		3.0		1.1		3.0	
Phase Duration, s						15.4				15.4		0.0		81.7		12.9		94.6	
Change Period, ( Y+R ), s						7.0				7.0		7.0		7.0		7.0		7.0	
Max Allow Headway ( MAH ), s						3.2				3.2		0.0		0.0		3.1		0.0	
Queue Clearance Time ( g_s ), s						3.4				8.1						4.1			
Green Extension Time ( g_e ), s						0.3				0.3		0.0		0.0		0.2		0.0	
Phase Call Probability						1.00				1.00						0.98			
Max Out Probability						0.00				0.00						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				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate ( v ), veh/h					19		80	0	97	0	966	16	130	269	6				
Adjusted Saturation Flow Rate ( s ), veh/h/ln					1440		1810	1900	1610	1810	1885	1610	1810	1826	1610				
Queue Service Time ( g_s ), s					1.4		4.8	0.0	6.1	0.0	37.1	0.3	2.1	7.0	0.1				
Cycle Queue Clearance Time ( g_c ), s					1.4		6.1	0.0	6.1	0.0	37.1	0.3	2.1	7.0	0.1				
Green Ratio ( g/C )					0.08		0.08	0.08	0.13	0.62	0.68	0.68	0.75	0.80	0.80				
Capacity ( c ), veh/h					175		181	145	209	833	1280	1094	364	1454	1282				
Volume-to-Capacity Ratio ( X )					0.108		0.441	0.000	0.463	0.000	0.755	0.014	0.358	0.185	0.005				
Back of Queue ( Q ), ft/ln ( 95 th percentile)					21.9		97.4	0	110.4	0	530.2	5.1	61.8	106.2	0.6				
Back of Queue ( Q ), veh/ln ( 95 th percentile)					0.9		3.9	0.0	4.4	0.0	21.0	0.2	2.5	4.1	0.0				
Queue Storage Ratio ( RQ ) ( 95 th percentile)					0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Uniform Delay ( d_1 ), s/veh					47.6		50.4	0.0	44.3	0.0	11.6	5.7	13.1	5.6	1.3				
Incremental Delay ( d_2 ), s/veh					0.1		0.6	0.0	0.6	0.0	4.2	0.0	0.2	0.3	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					47.7		51.0	0.0	44.9	0.0	15.8	5.7	13.3	5.9	1.3				
Level of Service (LOS)					D		D		D		B	A	B	A	A				
Approach Delay, s/veh / LOS				47.7		D	47.7		D	15.6		B	8.2		A				
Intersection Delay, s/veh / LOS				17.7						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS				2.14		B	2.14		B	2.06		B	1.61		B				
Bicycle LOS Score / LOS				0.52		A	0.78		A	2.11		B	1.17		A				

HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	D8Z							Intersection	Beulah Ch at Arbor Manor							
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction								
Date Performed	3/6/2023							East/West Street	Arbor Manor							
Analysis Year	2022							North/South Street	Beulah Church Road							
Time Analyzed	PM Peak							Peak Hour Factor	0.95							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	6805 Beulah Church Road															
<b>Lanes</b>																
<p>Major Street: North-South</p>																
<b>Vehicle Volumes and Adjustments</b>																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	1
Configuration			LR							LT					T	R
Volume (veh/h)		13		4						1	404				597	12
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized													No			
Median Type   Storage					Undivided											
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)			18							1						
Capacity, c (veh/h)			284							953						
v/c Ratio			0.06							0.00						
95% Queue Length, Q <sub>95</sub> (veh)			0.2							0.0						
Control Delay (s/veh)			18.5							8.8	0.0					
Level of Service (LOS)			C							A	A					
Approach Delay (s/veh)	18.5								0.0							
Approach LOS	C								A							

HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Beulah Ch at Arbor Manor							
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction								
Date Performed	7/24/2023							East/West Street	Arbor Manor							
Analysis Year	2033							North/South Street	Beulah Church Road							
Time Analyzed	PM Peak							Peak Hour Factor	0.95							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	6805 Beulah Church Road															
<b>Lanes</b>																
<p>Major Street: North-South</p>																
<b>Vehicle Volumes and Adjustments</b>																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	1
Configuration			LR							LT					T	R
Volume (veh/h)		14		4						1	446				659	13
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No															
Median Type   Storage	Undivided															
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)			19							1						
Capacity, c (veh/h)			244							901						
v/c Ratio			0.08							0.00						
95% Queue Length, Q <sub>95</sub> (veh)			0.3							0.0						
Control Delay (s/veh)			21.0							9.0	0.0					
Level of Service (LOS)			C							A	A					
Approach Delay (s/veh)	21.0								0.0							
Approach LOS	C								A							

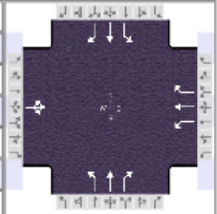
## HCS Signalized Intersection Results Summary

### General Information

Agency	Diane B. Zimmerman Traffic Engineering LLC
Analyst	DBZ
Jurisdiction	
Urban Street	Beulah Church Road
Intersection	Arbor Manor/Cedar Cre...
Project Description	6805 Beulah Church Road

### Intersection Information








Duration, h	0.250
Area Type	Other
PHF	0.95
Analysis Period	1> 5:00
File Name	PM 33 B.xus



### Demand Information

	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	14	0	4	169	0	26	1	625	17	264	635	13

### Signal Information

Cycle, s	120.0	Reference Phase	2											
Offset, s	53	Reference Point	End											
Uncoordinated	No	Simult. Gap E/W	On	Green	0.2	2.0	71.6	18.1	0.0	0.0				
				Yellow	4.0	4.0	4.0	4.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Red	3.0	3.0	3.0	3.0	0.0	0.0				

### Timer Results

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		8.0		5.0	1.1	3.0	1.1	3.0
Phase Duration, s		25.1		25.1	7.2	78.6	16.2	87.6
Change Period, (Y+R), s		7.0		7.0	7.0	7.0	7.0	7.0
Max Allow Headway (MAH), s		3.1		3.1	3.1	0.0	3.1	0.0
Queue Clearance Time (g <sub>s</sub> ), s		3.2		17.8	2.0		8.7	
Green Extension Time (g <sub>e</sub> ), s		0.4		0.4	0.0	0.0	0.5	0.0
Phase Call Probability		1.00		1.00	0.03		1.00	
Max Out Probability		0.00		0.00	0.00		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	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h		19		178	0	27	1	658	18	273	656	13
Adjusted Saturation Flow Rate (s), veh/h/ln		1486		1435	1900	1610	1810	1885	1610	1810	1885	1610
Queue Service Time (g <sub>s</sub> ), s		0.6		14.6	0.0	1.6	0.0	26.0	0.5	6.7	19.8	0.4
Cycle Queue Clearance Time (g <sub>c</sub> ), s		1.2		15.8	0.0	1.6	0.0	26.0	0.5	6.7	19.8	0.4
Green Ratio (g/C)		0.15		0.15	0.15	0.23	0.60	0.60	0.60	0.69	0.67	0.67
Capacity (c), veh/h		278		263	288	368	450	1124	960	499	1266	1082
Volume-to-Capacity Ratio (X)		0.068		0.676	0.000	0.074	0.002	0.585	0.019	0.547	0.518	0.012
Back of Queue (Q), ft/ln (95 th percentile)		21.9		225.4	0	28.4	0.5	419	8.9	103.9	291.1	5.9
Back of Queue (Q), veh/ln (95 th percentile)		0.9		9.0	0.0	1.1	0.0	16.6	0.4	4.2	11.6	0.2
Queue Storage Ratio (RQ) (95 th percentile)		0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh		43.7		50.5	0.0	36.3	10.4	15.0	9.9	11.6	9.0	7.8
Incremental Delay (d <sub>2</sub> ), s/veh		0.0		1.1	0.0	0.0	0.0	2.2	0.0	0.3	1.3	0.0
Initial Queue Delay (d <sub>3</sub> ), 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		43.7		51.6	0.0	36.4	10.4	17.2	9.9	11.9	10.2	7.8
Level of Service (LOS)		D		D		D	B	B	A	B	B	A
Approach Delay, s/veh / LOS	43.7	D		49.6	D		17.0	B		10.7	B	
Intersection Delay, s/veh / LOS	17.7						B					

### Multimodal Results

	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.14	B		2.14	B		2.08	B		1.65	B	
Bicycle LOS Score / LOS	0.52	A		0.83	A		1.60	B		2.07	B	

HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection				Beulah Church at Fox Chase				
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction								
Date Performed	7/24/2023							East/West Street				Fox Chase Rd Extension				
Analysis Year	2033							North/South Street				Beulah Church Rd				
Time Analyzed	AM Peak Build							Peak Hour Factor				0.92				
Intersection Orientation	North-South							Analysis Time Period (hrs)				0.25				
Project Description	6805 Beulah Church															
<b>Lanes</b>																
<p>Major Street: North-South</p>																
<b>Vehicle Volumes and Adjustments</b>																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	1	0	1	1	0
Configuration						L		R			T	R		L	T	
Volume (veh/h)						73		140			781	97		91	252	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized					No				No							
Median Type   Storage					Left Only								1			
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.40		6.20						4.10		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.50		3.30						2.20		
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)						79		152						99		
Capacity, c (veh/h)						285		364						728		
v/c Ratio						0.28		0.42						0.14		
95% Queue Length, Q <sub>95</sub> (veh)						1.1		2.0						0.5		
Control Delay (s/veh)						22.5		21.8						10.7		
Level of Service (LOS)						C		C						B		
Approach Delay (s/veh)					22.0								2.8			
Approach LOS					C								A			



HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Beulah Church at Fox Chase							
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction								
Date Performed	7/24/2023							East/West Street	Fox Chase Rd Extension							
Analysis Year	2033							North/South Street	Beulah Church Rd							
Time Analyzed	PM Peak Build							Peak Hour Factor	0.92							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	6805 Beulah Church															
<b>Lanes</b>																
<p>Major Street: North-South</p>																
<b>Vehicle Volumes and Adjustments</b>																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	1	0	1	1	0
Configuration						L		R			T	R		L	T	
Volume (veh/h)						72		82			521	69		110	708	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized					No				No							
Median Type   Storage					Left Only								1			
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.40		6.20						4.10		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.50		3.30						2.20		
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)						78		89						120		
Capacity, c (veh/h)						227		527						953		
v/c Ratio						0.34		0.17						0.13		
95% Queue Length, Q <sub>95</sub> (veh)						1.5		0.6						0.4		
Control Delay (s/veh)						29.0		13.2						9.3		
Level of Service (LOS)						D		B						A		
Approach Delay (s/veh)					20.6								1.3			
Approach LOS					C								A			

HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Beulah Church at Adams Road							
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction								
Date Performed	3/6/2023							East/West Street	Adams Run							
Analysis Year	2022							North/South Street	Beulah Church Rd							
Time Analyzed	AM Peak							Peak Hour Factor	0.92							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	6805 Beulah Ch															
<b>Lanes</b>																
<p>Major Street: North-South</p>																
<b>Vehicle Volumes and Adjustments</b>																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						5		220			457	2		59	106	
Percent Heavy Vehicles (%)						0		1						2		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type   Storage					Undivided											
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.40		6.21						4.12		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.50		3.31						2.22		
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)						245								64		
Capacity, c (veh/h)						567								1065		
v/c Ratio						0.43								0.06		
95% Queue Length, Q <sub>95</sub> (veh)						2.2								0.2		
Control Delay (s/veh)						16.1								8.6	0.6	
Level of Service (LOS)						C								A	A	
Approach Delay (s/veh)					16.1								3.4			
Approach LOS					C								A			

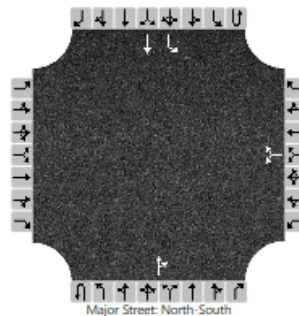
HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Beulah Church at Adams Road							
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction								
Date Performed	7/24/2023							East/West Street	Adams Run							
Analysis Year	2033							North/South Street	Beulah Church Rd							
Time Analyzed	AM Peak No Build							Peak Hour Factor	0.92							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	6805 Beulah Ch															
<b>Lanes</b>																
<p>Major Street: North-South</p>																
<b>Vehicle Volumes and Adjustments</b>																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume (veh/h)						6		243				505	2		65	117
Percent Heavy Vehicles (%)						0		1						2		
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type   Storage	Left Only								1							
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.40		6.21						4.12		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.50		3.31						2.22		
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)						271								71		
Capacity, c (veh/h)						534								1019		
v/c Ratio						0.51								0.07		
95% Queue Length, Q <sub>95</sub> (veh)						2.8								0.2		
Control Delay (s/veh)						18.5								8.8		
Level of Service (LOS)						C								A		
Approach Delay (s/veh)					18.5								3.1			
Approach LOS					C								A			



## HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Beulah Church at Adams Road
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC	Jurisdiction	
Date Performed	7/24/2023	East/West Street	Adams Run
Analysis Year	2033	North/South Street	Beulah Church Rd
Time Analyzed	AM Peak Build	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	6805 Beulah Ch		

### Lanes



### 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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume (veh/h)						6		243			623	2		65	242	
Percent Heavy Vehicles (%)						0		1						2		
Proportion Time Blocked																
Percent Grade (%)							0									
Right Turn Channelized																
Median Type   Storage							Left Only								1	

### Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2							4.1	
Critical Headway (sec)						6.40		6.21							4.12	
Base Follow-Up Headway (sec)						3.5		3.3							2.2	
Follow-Up Headway (sec)						3.50		3.31							2.22	

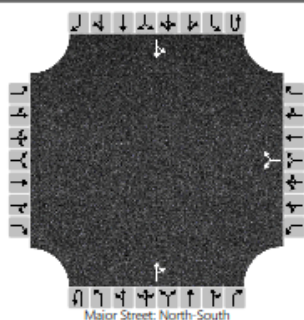
### Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							271								71	
Capacity, c (veh/h)							451								913	
v/c Ratio							0.60								0.08	
95% Queue Length, Q <sub>95</sub> (veh)							3.8								0.3	
Control Delay (s/veh)							24.3								9.3	
Level of Service (LOS)							C								A	
Approach Delay (s/veh)							24.3								2.0	
Approach LOS							C								A	

## HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Beulah Church at Adams Road
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC	Jurisdiction	
Date Performed	3/6/2023	East/West Street	Adams Run
Analysis Year	2022	North/South Street	Beulah Church Rd
Time Analyzed	PM Peak	Peak Hour Factor	0.91
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	6805 Beulah Ch		

### Lanes



### 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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						2		107			284	5		205	380	
Percent Heavy Vehicles (%)						0		1						2		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type   Storage	Undivided															

### Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.40		6.21						4.12		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.50		3.31						2.22		

### Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						120								225		
Capacity, c (veh/h)						684								1242		
v/c Ratio						0.18								0.18		
95% Queue Length, Q <sub>95</sub> (veh)						0.6								0.7		
Control Delay (s/veh)						11.4								8.5	2.0	
Level of Service (LOS)						B								A	A	
Approach Delay (s/veh)						11.4								4.3		
Approach LOS						B								A		

HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection				Beulah Church at Adams Road				
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction								
Date Performed	7/24/2023							East/West Street				Adams Run				
Analysis Year	2033							North/South Street				Beulah Church Rd				
Time Analyzed	PM Peak No Build							Peak Hour Factor				0.91				
Intersection Orientation	North-South							Analysis Time Period (hrs)				0.25				
Project Description	6805 Beulah Ch															
<b>Lanes</b>																
<b>Vehicle Volumes and Adjustments</b>																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume (veh/h)						2		118				319	6		226	420
Percent Heavy Vehicles (%)						0		1						2		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type   Storage					Left Only								1			
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.40		6.21						4.12		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.50		3.31						2.22		
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)							132							248		
Capacity, c (veh/h)							671							1202		
v/c Ratio							0.20							0.21		
95% Queue Length, Q <sub>95</sub> (veh)							0.7							0.8		
Control Delay (s/veh)							11.7							8.8		
Level of Service (LOS)							B							A		
Approach Delay (s/veh)					11.7								3.1			
Approach LOS					B								A			

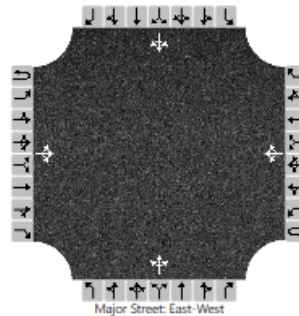
HCS Two-Way Stop-Control Report																	
General Information									Site Information								
Analyst	DBZ								Intersection				Beulah Church at Adams Road				
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC								Jurisdiction								
Date Performed	7/24/2023								East/West Street				Adams Run				
Analysis Year	2033								North/South Street				Beulah Church Rd				
Time Analyzed	PM Peak Build								Peak Hour Factor				0.91				
Intersection Orientation	North-South								Analysis Time Period (hrs)				0.25				
Project Description	6805 Beulah Ch																
<b>Lanes</b>																	
<p>Major Street: North-South</p>																	
<b>Vehicle Volumes and Adjustments</b>																	
Approach	Eastbound				Westbound				Northbound				Southbound				
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Priority		10	11	12		7	8	9	10	1	2	3	4	5	6		
Number of Lanes		0	0	0		0	1	0		0	1	0		1	1	0	
Configuration							LR					TR		L	T		
Volume (veh/h)						2		118				462		226	542		
Percent Heavy Vehicles (%)						0		1						2			
Proportion Time Blocked																	
Percent Grade (%)						0											
Right Turn Channelized																	
Median Type   Storage		Left Only					1										
<b>Critical and Follow-up Headways</b>																	
Base Critical Headway (sec)						7.1		6.2						4.1			
Critical Headway (sec)						6.40		6.21						4.12			
Base Follow-Up Headway (sec)						3.5		3.3						2.2			
Follow-Up Headway (sec)						3.50		3.31						2.22			
<b>Delay, Queue Length, and Level of Service</b>																	
Flow Rate, v (veh/h)							132							248			
Capacity, c (veh/h)							547							1051			
v/c Ratio							0.24							0.24			
95% Queue Length, Q <sub>95</sub> (veh)							0.9							0.9			
Control Delay (s/veh)							13.7							9.5			
Level of Service (LOS)							B							A			
Approach Delay (s/veh)						13.7								2.8			
Approach LOS						B								A			

HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Adams Run at Fox Chase							
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction								
Date Performed	3/6/2023							East/West Street	Adams Run Road							
Analysis Year	2022							North/South Street	Fox Chase Road							
Time Analyzed	AM Peak							Peak Hour Factor	0.92							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	6805 Beulah Church															
<b>Lanes</b>																
<p>Major Street: East-West</p>																
<b>Vehicle Volumes and Adjustments</b>																
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	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	65	2		3	179	0		23	1	0		0	0	0
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type   Storage	Undivided															
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
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)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)		0				3					26				0	
Capacity, c (veh/h)		1391				1540					680				0	
v/c Ratio		0.00				0.00					0.04					
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.0					0.1					
Control Delay (s/veh)		7.6	0.0	0.0		7.3	0.0	0.0			10.5					
Level of Service (LOS)		A	A	A		A	A	A			B					
Approach Delay (s/veh)	0.0				0.1				10.5							
Approach LOS	A				A				B							

## HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Adams Run at Fox Chase
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC	Jurisdiction	
Date Performed	7/24/2023	East/West Street	Adams Run Road
Analysis Year	2033	North/South Street	Fox Chase Road
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	6805 Beulah Church		

### Lanes



### 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	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	72	2		3	198	0		25	1	0		0	0	0
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type   Storage	Undivided															

### Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
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)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

### Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				3					28				0	
Capacity, c (veh/h)		1367				1530					652				0	
v/c Ratio		0.00				0.00					0.04					
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.0					0.1					
Control Delay (s/veh)		7.6	0.0	0.0		7.4	0.0	0.0			10.8					
Level of Service (LOS)		A	A	A		A	A	A			B					
Approach Delay (s/veh)	0.0				0.1				10.8							
Approach LOS	A				A				B							



HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Adams Run at Fox Chase							
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction								
Date Performed	7/24/2023							East/West Street	Adams Run Road							
Analysis Year	2033							North/South Street	Fox Chase Road							
Time Analyzed	AM Peak Build							Peak Hour Factor	0.92							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	6805 Beulah Church															
<b>Lanes</b>																
<p>Major Street: East-West</p>																
<b>Vehicle Volumes and Adjustments</b>																
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	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	72	2		3	198	59		25	1	0		63	0	0
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type   Storage	Undivided															
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
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)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)		0				3					28				68	
Capacity, c (veh/h)		1295				1530					620				621	
v/c Ratio		0.00				0.00					0.05				0.11	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.0					0.1				0.4	
Control Delay (s/veh)		7.8	0.0	0.0		7.4	0.0	0.0			11.1				11.5	
Level of Service (LOS)		A	A	A		A	A	A			B				B	
Approach Delay (s/veh)	0.0				0.1				11.1				11.5			
Approach LOS	A				A				B				B			

## HCS Two-Way Stop-Control Report

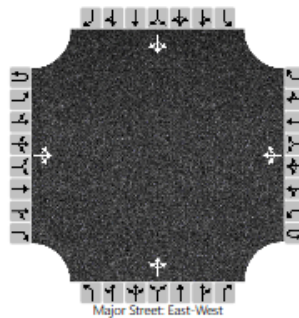
### General Information

Analyst	DBZ
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC
Date Performed	3/6/2023
Analysis Year	2022
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	6805 Beulah Church

### Site Information

Intersection	Adams Run at Fox Chase
Jurisdiction	
East/West Street	Adams Run Road
North/South Street	Fox Chase Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

### Lanes



### 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	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	170	25		2	95	0		12	0	6		0	0	0
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type   Storage	Undivided															

### Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
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)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

### Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				2					20				0	
Capacity, c (veh/h)		1501				1370					704				0	
v/c Ratio		0.00				0.00					0.03					
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.0					0.1					
Control Delay (s/veh)		7.4	0.0	0.0		7.6	0.0	0.0			10.3					
Level of Service (LOS)		A	A	A		A	A	A			B					
Approach Delay (s/veh)		0.0				0.2				10.3						
Approach LOS		A				A				B						



HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Adams Run at Fox Chase							
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction								
Date Performed	7/24/2023							East/West Street	Adams Run Road							
Analysis Year	2033							North/South Street	Fox Chase Road							
Time Analyzed	PM Peak							Peak Hour Factor	0.92							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	6805 Beulah Church															
<b>Lanes</b>																
<p>Major Street: East-West</p>																
<b>Vehicle Volumes and Adjustments</b>																
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	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	188	28		2	105	0		13	0	7		0	0	0
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type   Storage	Undivided															
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
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)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)		0				2					22				0	
Capacity, c (veh/h)		1488				1344					678				0	
v/c Ratio		0.00				0.00					0.03					
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.0					0.1					
Control Delay (s/veh)		7.4	0.0	0.0		7.7	0.0	0.0			10.5					
Level of Service (LOS)		A	A	A		A	A	A			B					
Approach Delay (s/veh)	0.0				0.2				10.5							
Approach LOS	A				A				B							

HCS Two-Way Stop-Control Report																	
General Information									Site Information								
Analyst	DBZ								Intersection	Adams Run at Fox Chase							
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC								Jurisdiction								
Date Performed	7/24/2023								East/West Street	Adams Run Road							
Analysis Year	2033								North/South Street	Fox Chase Road							
Time Analyzed	PM Peak Build								Peak Hour Factor	0.92							
Intersection Orientation	East-West								Analysis Time Period (hrs)	0.25							
Project Description	6805 Beulah Church																
<b>Lanes</b>																	
<p>Major Street: East-West</p>																	
<b>Vehicle Volumes and Adjustments</b>																	
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	0	1	0	0	0	1	0		0	1	0		0	1	0	
Configuration			LTR				LTR				LTR				LTR		
Volume (veh/h)		0	188	28		2	105	72		13	0	7		61	0	0	
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0	
Proportion Time Blocked																	
Percent Grade (%)									0				0				
Right Turn Channelized																	
Median Type   Storage	Undivided																
<b>Critical and Follow-up Headways</b>																	
Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2	
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20	
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)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30	
<b>Delay, Queue Length, and Level of Service</b>																	
Flow Rate, v (veh/h)		0				2					22				66		
Capacity, c (veh/h)		1393				1344					650				574		
v/c Ratio		0.00				0.00					0.03				0.12		
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.0					0.1				0.4		
Control Delay (s/veh)		7.6	0.0	0.0		7.7	0.0	0.0			10.7				12.1		
Level of Service (LOS)		A	A	A		A	A	A			B				B		
Approach Delay (s/veh)	0.0				0.1				10.7				12.1				
Approach LOS	A				A				B				B				

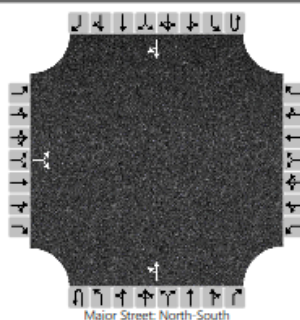
HCS Two-Way Stop-Control Report																
General Information									Site Information							
Analyst	D8Z								Intersection				Cedar Creek at Black Powder Ln			
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC								Jurisdiction							
Date Performed	3/6/2023								East/West Street				Black Powder Lane			
Analysis Year	2022								North/South Street				Cedar Creek Road			
Time Analyzed	AM Peak								Peak Hour Factor				0.78			
Intersection Orientation	North-South								Analysis Time Period (hrs)				0.25			
Project Description	6805 Beulah Church															
<b>Lanes</b>																
<b>Vehicle Volumes and Adjustments</b>																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	10	1	2	3	4	5	6	
Number of Lanes		0	1	0		0	0	0		0	1	0		0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		10		0						0	83				75	13
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type   Storage	Undivided															
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)			13							0						
Capacity, c (veh/h)			782							1489						
v/c Ratio			0.02							0.00						
95% Queue Length, Q <sub>95</sub> (veh)			0.0							0.0						
Control Delay (s/veh)			9.7							7.4	0.0					
Level of Service (LOS)			A							A	A					
Approach Delay (s/veh)	9.7								0.0							
Approach LOS	A								A							

HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection				Cedar Creek at Black Powder Ln				
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction								
Date Performed	7/24/2023							East/West Street				Black Powder Lane				
Analysis Year	2033							North/South Street				Cedar Creek Road				
Time Analyzed	AM Peak No Build							Peak Hour Factor				0.78				
Intersection Orientation	North-South							Analysis Time Period (hrs)				0.25				
Project Description	6805 Beulah Church															
<b>Lanes</b>																
<b>Vehicle Volumes and Adjustments</b>																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	10	1	2	3	4	5	6	
Number of Lanes		0	1	0		0	0	0		0	1	0		0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		11		0						0	92				83	14
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type   Storage	Undivided															
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)			14							0						
Capacity, c (veh/h)			759							1475						
v/c Ratio			0.02							0.00						
95% Queue Length, Q <sub>95</sub> (veh)			0.1							0.0						
Control Delay (s/veh)			9.8							7.4	0.0					
Level of Service (LOS)			A							A	A					
Approach Delay (s/veh)	9.8								0.0							
Approach LOS	A								A							

## HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cedar Creek at Black Powder Ln
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC	Jurisdiction	
Date Performed	7/24/2023	East/West Street	Black Powder Lane
Analysis Year	2033	North/South Street	Cedar Creek Road
Time Analyzed	AM Peak Build	Peak Hour Factor	0.78
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	6805 Beulah Church		

### Lanes



### 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		10	11	12		7	8	9	10	1	2	3	4	5	6	
Number of Lanes		0	1	0		0	0	0		0	1	0		0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		32		0						0	92				83	34
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type   Storage					Undivided											

### Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

### Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			41							0						
Capacity, c (veh/h)			747							1444						
v/c Ratio			0.05							0.00						
95% Queue Length, Q <sub>95</sub> (veh)			0.2							0.0						
Control Delay (s/veh)			10.1							7.5	0.0					
Level of Service (LOS)			B							A	A					
Approach Delay (s/veh)	10.1								0.0							
Approach LOS	B								A							

HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection				Cedar Creek at Black Powder Ln				
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction								
Date Performed	3/6/2023							East/West Street				Black Powder Lane				
Analysis Year	2022							North/South Street				Cedar Creek Road				
Time Analyzed	PM Peak							Peak Hour Factor				0.96				
Intersection Orientation	North-South							Analysis Time Period (hrs)				0.25				
Project Description	6805 Beulah Church															
<b>Lanes</b>																
<b>Vehicle Volumes and Adjustments</b>																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		8		1						3	126				118	19
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type   Storage					Undivided											
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)			9							3						
Capacity, c (veh/h)			740							1452						
v/c Ratio			0.01							0.00						
95% Queue Length, Q <sub>95</sub> (veh)			0.0							0.0						
Control Delay (s/veh)			9.9							7.5	0.0					
Level of Service (LOS)			A							A	A					
Approach Delay (s/veh)	9.9								0.2							
Approach LOS	A								A							



HCS Two-Way Stop-Control Report																
General Information									Site Information							
Analyst	DBZ				Intersection				Cedar Creek at Black Powder Ln							
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC				Jurisdiction											
Date Performed	7/24/2023				East/West Street				Black Powder Lane							
Analysis Year	2033				North/South Street				Cedar Creek Road							
Time Analyzed	PM Peak No Build				Peak Hour Factor				0.96							
Intersection Orientation	North-South				Analysis Time Period (hrs)				0.25							
Project Description	6805 Beulah Church															
<b>Lanes</b>																
<p>Major Street: North-South</p>																
<b>Vehicle Volumes and Adjustments</b>																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	10	1	2	3	4	5	6	
Number of Lanes		0	1	0		0	0	0		0	1	0		0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		9		1						3	139				130	21
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type   Storage	Undivided															
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)			10							3						
Capacity, c (veh/h)			713							1435						
v/c Ratio			0.01							0.00						
95% Queue Length, Q <sub>95</sub> (veh)			0.0							0.0						
Control Delay (s/veh)			10.1							7.5	0.0					
Level of Service (LOS)			B							A	A					
Approach Delay (s/veh)	10.1								0.2							
Approach LOS	B								A							



HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection				Cedar Creek at Black Powder Ln				
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC							Jurisdiction								
Date Performed	7/24/2023							East/West Street				Black Powder Lane				
Analysis Year	2033							North/South Street				Cedar Creek Road				
Time Analyzed	PM Peak Build							Peak Hour Factor				0.96				
Intersection Orientation	North-South							Analysis Time Period (hrs)				0.25				
Project Description	6805 Beulah Church															
<b>Lanes</b>																
<p>Major Street: North-South</p>																
<b>Vehicle Volumes and Adjustments</b>																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	10	1	2	3	4	5	6	
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		29		1						3	139				130	45
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type   Storage	Undivided															
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)			31							3						
Capacity, c (veh/h)			690							1405						
v/c Ratio			0.05							0.00						
95% Queue Length, Q <sub>95</sub> (veh)			0.1							0.0						
Control Delay (s/veh)			10.5							7.6	0.0					
Level of Service (LOS)			B							A	A					
Approach Delay (s/veh)	10.5								0.2							
Approach LOS	B								A							

## Beulah Church Road

### Left Turn Lane Warrants

#### Input Fields

Left Turn Volume (vph)	110	Speed Limit (mph)	35
Advancing Volume (vph)	818	No. of through lanes	1
Opposing Volume (vph)	590	Percent Heavy Vehicles (decimal percent)	0.01

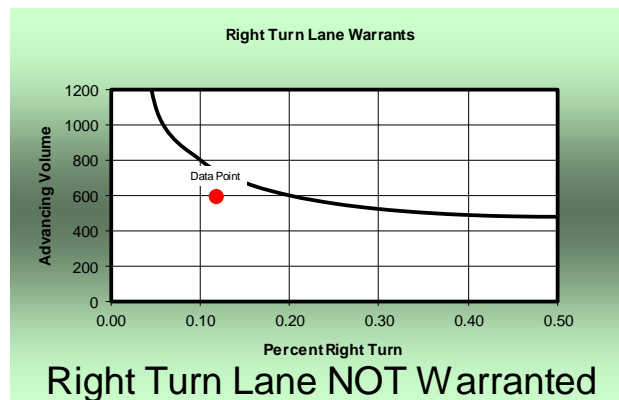


Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

### Right Turn Lane Warrants

#### Input Fields

Right Turn Volume (vph)	69	Speed Limit (mph)	35
Advancing Volume (vph)	590		



Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

Beulah Church Road RI/RO

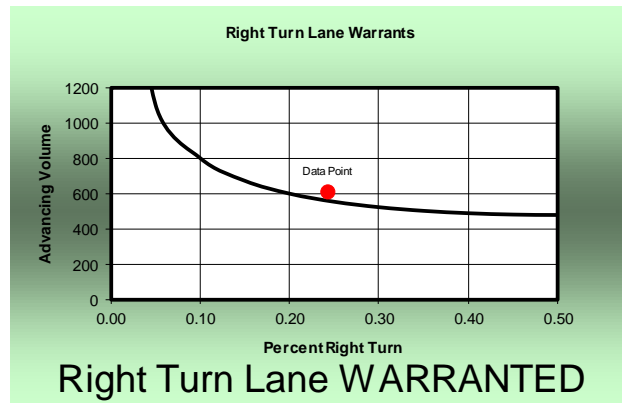
**Right Turn Lane Warrants**

Input Fields

Right Turn Volume (vph) **147**

Speed Limit (mph) **35**

Advancing Volume (vph) **607**



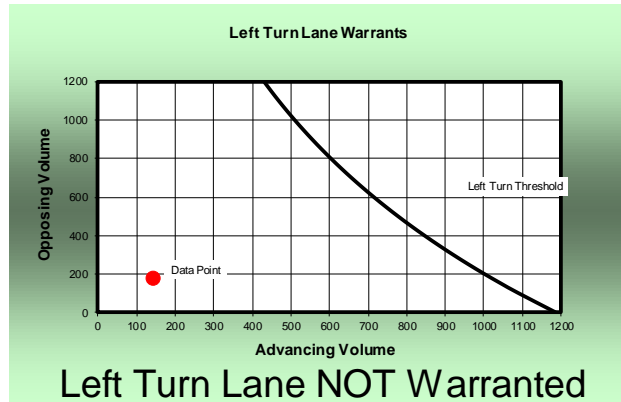
Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

Cedar Creek Road

Left Turn Lane Warrants

Input Fields

Left Turn Volume (vph)	3	Speed Limit (mph)	35
Advancing Volume (vph)	142	No. of through lanes	1
Opposing Volume (vph)	175	Percent Heavy Vehicles (decimal percent)	0.01

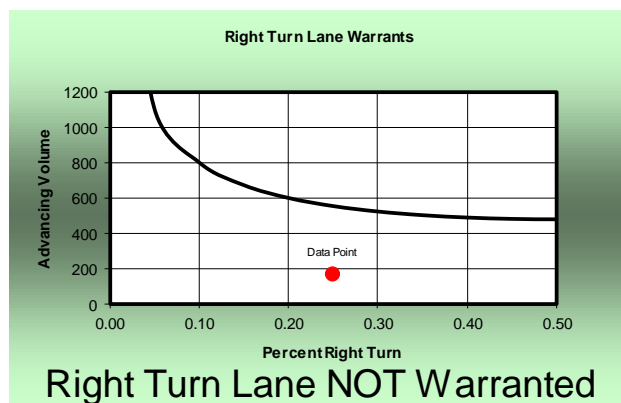


Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)	43	Speed Limit (mph)	35
Advancing Volume (vph)	173		



Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.