

final report

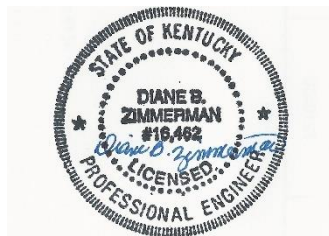
June 1, 2022

Traffic Impact Study

*Prospect Cove
6500 Forrest Cove Lane
Louisville, KY*

Prepared for

Louisville Metro Planning Commission



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INTRODUCTION

The development plan for an apartment community on Forest Cove Lane in Louisville, KY shows 178 apartment units. **Figure 1** displays a map of the site. Access to the community will be from an entrance on Forest Cove Lane. 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 Forest Cove Lane with Timber Ridge Drive, Timber Ridge Drive with River Road and US 42.

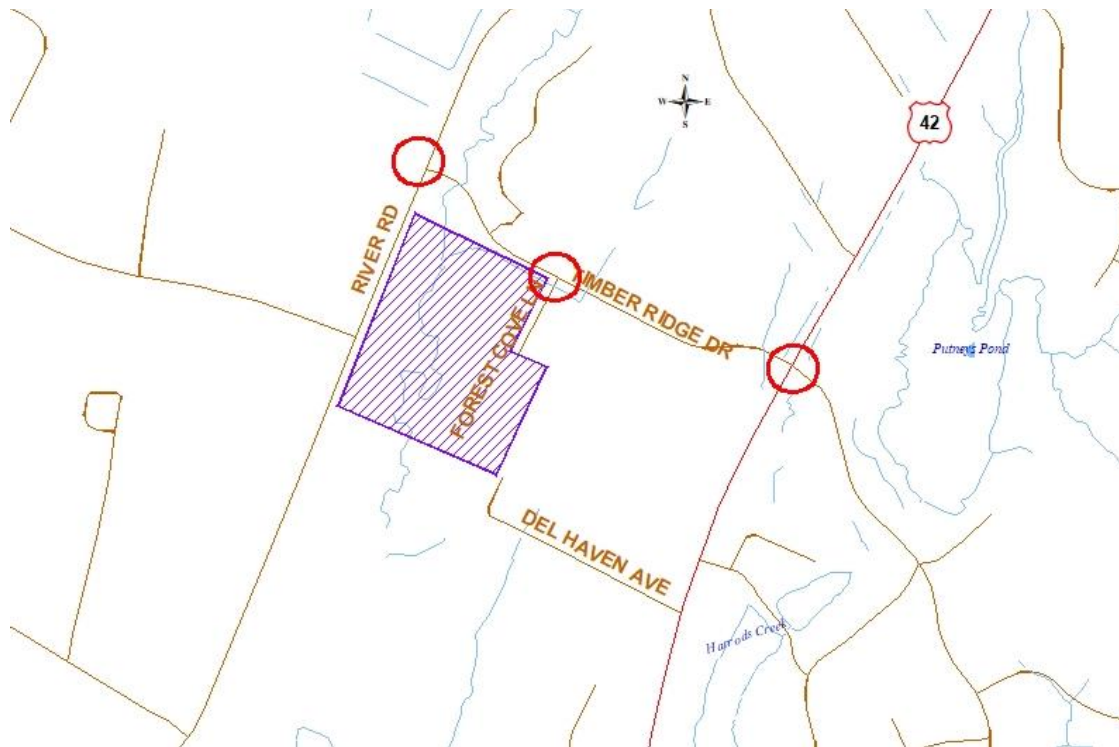


Figure 1. Site Map

EXISTING CONDITIONS

Timber Ridge Drive is maintained by the city of Prospect with an estimated 2022 ADT of 4,400 vehicles per day between Forest Cove Lane and River Road, as estimated from the turning movement count. The roadway has two twelve-foot lanes, striped bike lanes with curb and gutter. There are sidewalks along the north side and in front of the Kroger Fuel Center along the south side. The intersections of River Road and Forest Cove Lane are controlled with stop signs. The intersection with US 42 is controlled with a traffic signal. Both approaches on US 42 and Timber Ridge Drive eastbound have separate right and left turn lanes. Timber Ridge Drive eastbound has a shared left/thru lane.

Peak hour traffic count for the intersections were obtained on February 15, 2022. The a.m. peak was 7:30 to 8:30 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.

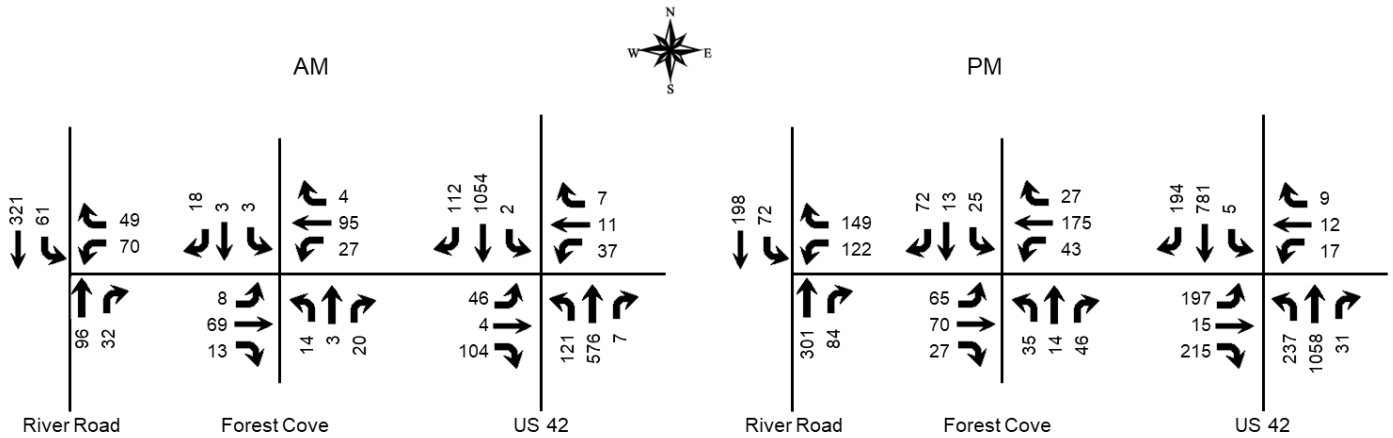


Figure 2. Existing Peak Hour Volumes

FUTURE CONDITIONS

The projected completion year for this development is 2025. To predict traffic conditions in 2025, one percent annual growth in traffic. This growth is based upon a review of the historical count data at the Kentucky Transportation Cabinet count station 111 and W01. **Figure 3** illustrates the 2025 traffic volumes without the development.

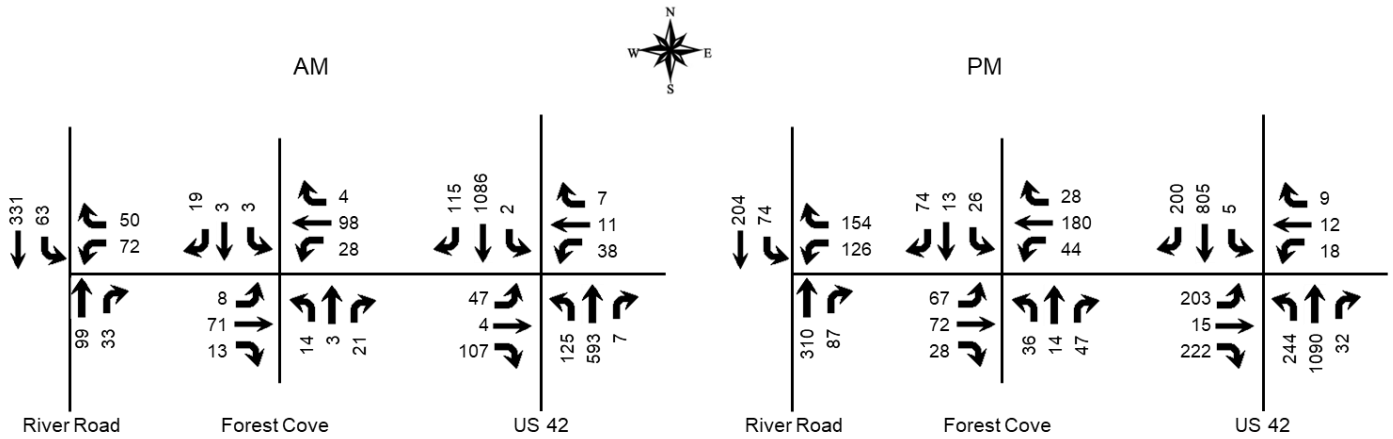


Figure 3. 2025 Peak Hour No Build Volumes

TRIP GENERATION

The Institute of Transportation Engineers Trip Generation Manual, 11th Edition contains trip generation rates for a wide range of developments. The land use of “Multifamily Housing Low-Rise (220)” was reviewed and determined to be the best match. The trip generation results are listed in **Table 1**. The trips were assigned to the highway network with the percentages shown in **Figure 4**. **Figure 5** shows the trips generated by this development and distributed throughout the road network during the peak hours. **Figure 6** displays the individual turning movements for the peak hours when the development is completed.

Table 1. Peak Hour Trips Generated by Site

Land Use	A.M. Peak Hour			P.M. Peak Hour		
	Trips	In	Out	Trips	In	Out
Multifamily Housing Low-Rise (178 units)	78	19	59	100	61	39

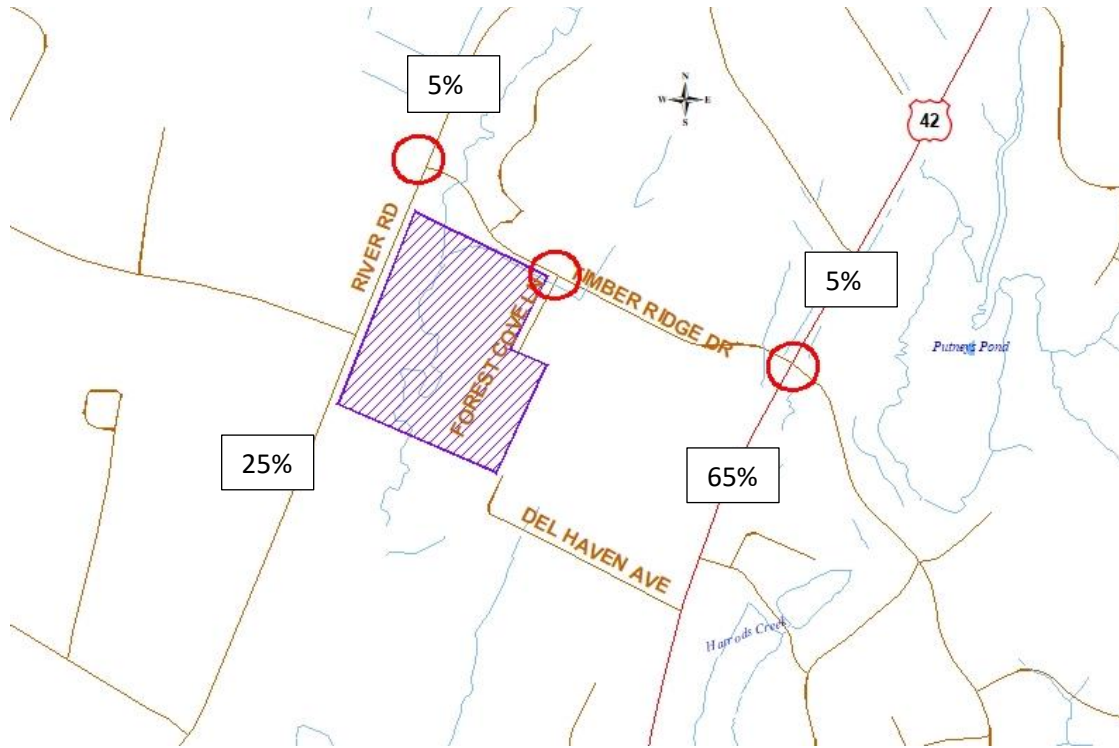


Figure 4. Trip Distribution Percentages

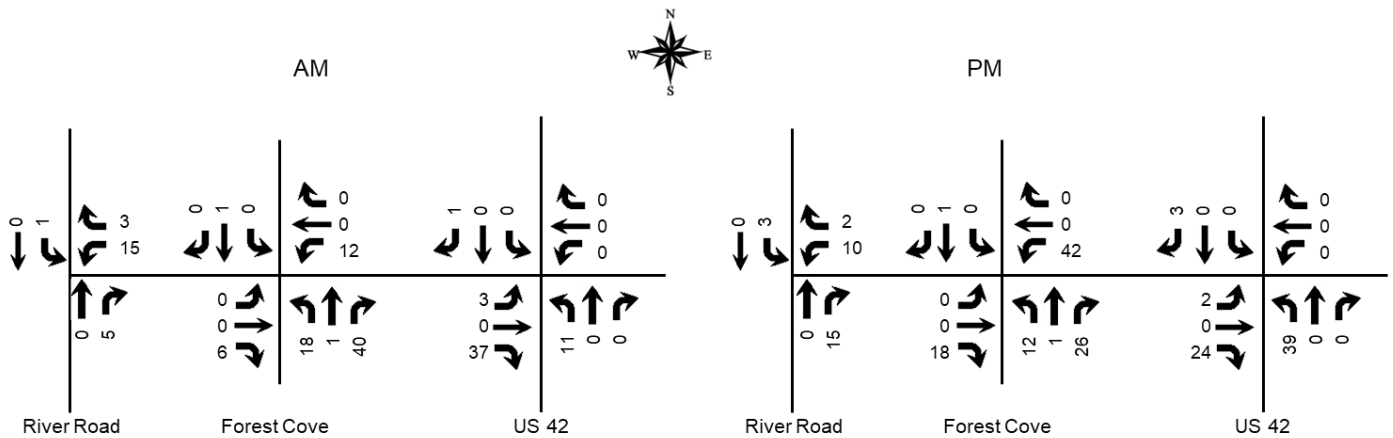


Figure 5. Peak Hour Trips Generated by Site

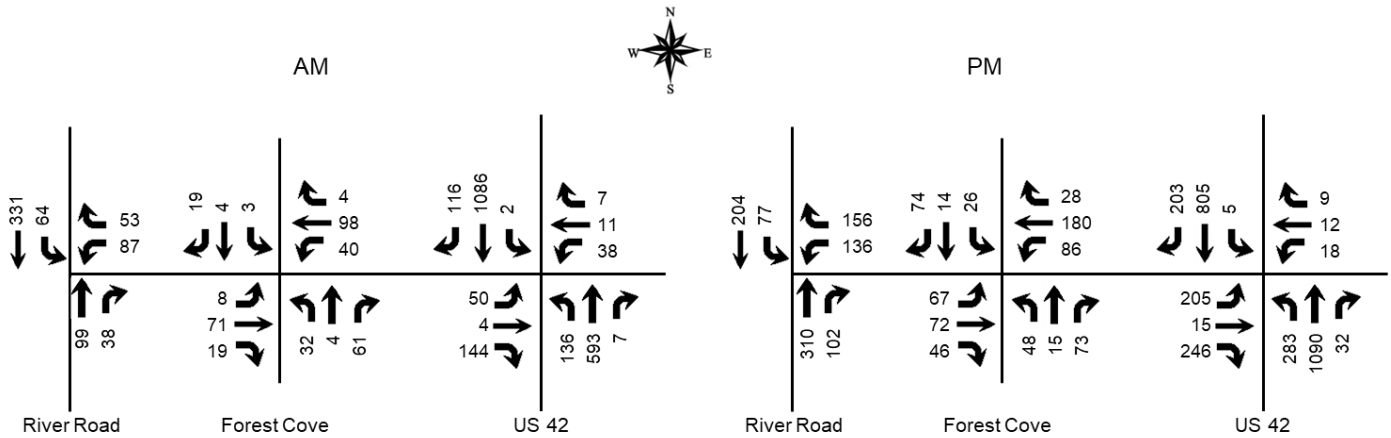


Figure 6. Build Peak Hour Volumes

ANALYSIS

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

To evaluate the impact of the proposed development, the vehicle delays at the intersections were determined using procedures detailed in the Highway Capacity Manual, 7th edition. Future delays and Level of Service were determined for the intersections using the HCS Streets and TWSC (version 2022) software. The delays and Level of Service are summarized in **Table 2**.

Table 2. Peak Hour Level of Service

Approach	A.M.			P.M.		
	2022 Existing	2025 No Build	2025 Build	2022 Existing	2025 No Build	2025 Build
River Road at Timber Ridge Drive						
Timber Ridge Drive Westbound	B 11.1	B 11.3	B 11.9	B 14.2	B 14.9	C 16.0
River Road Southbound (left)	A 7.7	A 7.7	A 7.8	A 8.4	A 8.4	A 8.5
Timber Ridge Drive at Forest Cove Lane						
Timber Ridge Drive Eastbound (left)	A 7.4	A 7.4	A 7.4	A 7.8	A 7.8	A 7.8
Timber Ridge Drive Westbound (left)	A 7.4	A 7.4	A 7.5	A 7.5	A 7.5	A 7.6
Forest Cove Lane Northbound	A 9.7	A 9.7	B 10.1	B 12.7	B 13.0	B 14.9

Approach	A.M.			P.M.		
	2022 Existing	2025 No Build	2025 Build	2022 Existing	2025 No Build	2025 Build
Shopping Center Southbound	A 9.3	A 9.4	A 9.5	B 12.0	B 12.2	B 13.3
Timber Ridge Drive at US 42	B 18.4	B 18.7	C 21.2	C 20.5	C 21.0	C 22.6
Timber Ridge Drive Eastbound	E 60.3	E 60.1	E 58.3	E 66.6	E 65.9	E 63.5
Timber Ridge Drive Westbound	E 73.5	E 73.6	E 73.6	F 82.5	F 82.9	F 82.9
US 42 Northbound	B 10.3	B 10.6	B 12.3	B 11.7	B 12.3	B 13.6
US 42 Southbound	B 15.1	B 15.6	B 18.2	B 14.7	B 15.4	B 17.8

Key: Level of Service, Delay in seconds per vehicle

The Forest Cove Lane intersection on Timber Ridge Drive was evaluated for turn lanes using the Kentucky Transportation Cabinet [Highway Design Guidance Manual](#) dated July, 2020. Using the volumes in Figure 6, the volume warrant is not met for turn lanes.

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2025, there will be a minimal impact to the existing highway network, with the signalized intersection continuing to operate at acceptable levels of service. No improvements are needed at the intersections evaluated.

APPENDIX

Traffic Counts

Classified Turn Movement Count || All vehicles



Jefferson County, KY

www.marrtraffic.com

Site 3 of 3
River Rd (South)
River Rd (North)

Date
Tuesday, February 15, 2022

Weather
Fair
43°F

Timber Ridge Dr

Lat/Long
38.340444°, -85.625339°

0700 - 0900 (Weekday 2h Session) (02-15-2022)

All vehicles

TIME	Northbound River Rd (South)				Southbound River Rd (North)				U-Turn 3.6	App Total
	Thru 3.1	Right 3.2	U-Turn 3.3	App Total	Left 3.4	Thru 3.5	U-Turn 3.6	App Total		
0700 - 0715	13	4	0	17	8	77	0	85		
0715 - 0730	15	9	0	24	13	84	0	97		
0730 - 0745	22	11	0	33	6	100	0	106		
0745 - 0800	21	9	0	30	9	68	0	77		
Hourly Total	71	33	0	104	36	329	0	365		
0800 - 0815	28	8	0	36	21	80	0	101		
0815 - 0830	25	4	0	29	25	73	0	98		
0830 - 0845	33	7	0	40	14	70	0	84		
0845 - 0900	23	7	0	30	11	47	0	58		
Hourly Total	109	26	0	135	71	270	0	341		
Grand Total	180	59	0	239	107	599	0	706		
Approach %	75.31	24.69	0.00	-	15.16	84.84	0.00	-		
Intersection %	15.67	5.13	0.00	20.80	9.31	52.13	0.00	61.44		
PHF	0.86	0.73	0.00	0.89	0.61	0.80	0.00	0.90		

Left 3.7	Westbound Timber Ridge Dr			Int Total
	Right 3.8	U-Turn 3.9	App Total	
13	3	0	16	118
13	6	0	19	140
17	9	0	26	165
16	19	0	35	142
59	37	0	96	565
12	13	0	25	162
25	8	0	33	160
15	7	0	22	146
7	21	0	28	116
59	49	0	108	584
118	86	0	204	1149
57.84	42.16	0.00	-	
10.27	7.48	0.00	17.75	
0.70	0.64	0.00	0.85	0.95

1600 - 1800 (Weekday 2h Session) (02-15-2022)

All vehicles

TIME	Northbound River Rd (South)				Southbound River Rd (North)				U-Turn 3.6	App Total
	Thru 3.1	Right 3.2	U-Turn 3.3	App Total	Left 3.4	Thru 3.5	U-Turn 3.6	App Total		
1600 - 1615	62	16	0	78	12	31	0	43		
1615 - 1630	68	13	0	81	26	32	0	58		
1630 - 1645	57	26	0	83	32	33	0	65		
1645 - 1700	65	22	0	87	24	43	0	67		
Hourly Total	252	77	0	329	94	139	0	233		
1700 - 1715	75	23	0	98	26	35	0	61		
1715 - 1730	80	22	0	102	18	47	0	65		
1730 - 1745	81	13	0	94	20	55	0	75		
1745 - 1800	69	26	0	95	8	61	0	69		
Hourly Total	305	84	0	389	72	198	0	270		
Grand Total	557	161	0	718	166	337	0	503		
Approach %	77.58	22.42	0.00	-	33.00	67.00	0.00	-		
Intersection %	33.00	9.54	0.00	42.54	9.83	19.96	0.00	29.80		
PHF	0.94	0.81	0.00	0.95	0.69	0.81	0.00	0.90		

Left 3.7	Westbound Timber Ridge Dr			Int Total
	Right 3.8	U-Turn 3.9	App Total	
18	36	0	54	175
11	35	0	46	185
13	39	0	52	200
14	30	0	44	198
56	140	0	196	758
20	33	0	53	212
17	43	0	60	227
32	42	0	74	243
53	31	0	84	248
122	149	0	271	930
178	289	0	467	1688
38.12	61.88	0.00	-	
10.55	17.12	0.00	27.67	
0.58	0.87	0.00	0.81	0.94

Classified Turn Movement Count || All vehicles



Jefferson County, KY

www.marrtraffic.com

Site 2 of 3
 Driveway (South)
 Driveway (North)
 Timber Ridge Dr (West)
 Timber Ridge Dr (East)

Date
 Tuesday, February 15, 2022

Lat/Long
 38.339273°, -85.623572°

Weather
 Fair
 43°F

0700 - 0900 (Weekday 2h Session) (02-15-2022)

All vehicles

TIME	Northbound					Southbound					Eastbound					Westbound					Int Total
	Driveway (South)					Driveway (North)					Timber Ridge Dr (West)					Timber Ridge Dr (East)					
	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	
0700 - 0715	1	1	3	0	5	0	0	0	0	0	0	13	0	0	13	5	13	1	0	19	37
0715 - 0730	2	0	3	0	5	0	1	1	0	2	2	16	1	0	19	1	14	0	0	15	41
0730 - 0745	1	2	5	0	8	1	1	4	0	6	1	16	0	0	17	8	23	1	0	32	63
0745 - 0800	6	0	5	0	11	1	0	2	0	3	2	13	3	0	18	8	26	2	0	36	68
Hourly Total	10	3	16	0	29	2	2	7	0	11	5	58	4	0	67	22	76	4	0	102	209
0800 - 0815	5	1	3	0	9	1	1	4	0	6	3	22	3	0	28	4	25	0	0	29	72
0815 - 0830	2	0	7	0	9	0	1	8	0	9	2	18	7	0	27	7	21	1	0	29	74
0830 - 0845	4	1	9	0	14	0	0	2	0	2	4	11	7	0	22	4	19	0	0	23	61
0845 - 0900	5	0	7	0	12	6	0	6	0	12	3	13	2	0	18	8	18	1	0	27	69
Hourly Total	16	2	26	0	44	7	2	20	0	29	12	64	19	0	95	23	83	2	0	108	276
Grand Total	26	5	42	0	73	9	4	27	0	40	17	122	23	0	162	45	159	6	0	210	485
Approach %	35.62	6.85	57.53	0.00	-	22.50	10.00	67.50	0.00	-	10.49	75.31	14.20	0.00	-	21.43	75.71	2.86	0.00	-	-
Intersection %	5.36	1.03	8.66	0.00	15.05	1.86	0.82	5.57	0.00	8.25	3.51	25.15	4.74	0.00	33.40	9.28	32.78	1.24	0.00	43.30	
PHF	0.58	0.38	0.71	0.00	0.84	0.75	0.75	0.56	0.00	0.67	0.67	0.78	0.46	0.00	0.80	0.84	0.91	0.50	0.00	0.88	0.94

1600 - 1800 (Weekday 2h Session) (02-15-2022)

All vehicles

TIME	Northbound					Southbound					Eastbound					Westbound					Int Total
	Driveway (South)					Driveway (North)					Timber Ridge Dr (West)					Timber Ridge Dr (East)					
	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	
1600 - 1615	5	3	7	0	15	4	1	18	0	23	7	15	11	0	33	9	26	1	0	36	107
1615 - 1630	11	3	14	0	28	5	2	20	0	27	15	20	9	0	44	20	24	7	0	51	150
1630 - 1645	9	2	14	0	25	9	2	14	0	25	21	34	9	0	64	12	27	6	0	45	159
1645 - 1700	3	3	13	0	19	7	4	17	0	28	19	22	7	0	48	12	25	11	0	48	143
Hourly Total	28	11	48	0	87	25	9	69	0	103	62	91	36	0	189	53	102	25	0	180	559
1700 - 1715	11	5	12	0	28	8	5	13	0	26	17	24	10	0	51	14	34	5	0	53	158
1715 - 1730	10	5	14	0	29	4	4	15	0	23	21	15	8	0	44	10	36	9	0	55	151
1730 - 1745	7	3	8	0	18	6	2	19	0	27	12	15	5	0	32	9	57	4	0	70	147
1745 - 1800	7	1	12	0	20	7	2	25	0	34	15	16	4	0	35	10	48	9	0	67	156
Hourly Total	35	14	46	0	95	25	13	72	0	110	65	70	27	0	162	43	175	27	0	245	612
Grand Total	63	25	94	0	182	50	22	141	0	213	127	161	63	0	351	96	277	52	0	425	1171
Approach %	34.62	13.74	51.65	0.00	-	23.47	10.33	66.20	0.00	-	36.18	45.87	17.95	0.00	-	22.59	65.18	12.24	0.00	-	-
Intersection %	5.38	2.13	8.03	0.00	15.54	4.27	1.88	12.04	0.00	18.19	10.85	13.75	5.38	0.00	29.97	8.20	23.65	4.44	0.00	36.29	
PHF	0.80	0.70	0.82	0.00	0.82	0.78	0.65	0.72	0.00	0.81	0.77	0.73	0.68	0.00	0.79	0.77	0.77	0.75	0.00	0.88	0.97

Classified Turn Movement Count || All vehicles

Jefferson County, KY

Site 1 of 3
US-42 W (South)
US-42 W (North)
Timber Ridge Dr (West)
Timber Ridge Dr (East)

Date
Tuesday, February 15, 2022

Lat/Long
38.338345°, -85.620354°

Weather
Fair
43°F

0700 - 0900 (Weekday 2h Session) (02-15-2022)
All vehicles

TIME	Northbound					Southbound					Eastbound					Westbound					Int Total
	US-42 W (South)					US-42 W (North)					Timber Ridge Dr (West)					Timber Ridge Dr (East)					
	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	
0700 - 0715	11	92	1	0	104	0	238	21	0	259	2	1	21	0	24	8	3	0	0	11	398
0715 - 0730	21	112	4	0	137	0	298	25	0	323	9	0	22	0	31	9	1	0	0	10	501
0730 - 0745	29	105	1	0	135	0	336	20	0	356	6	0	23	0	29	13	6	0	0	19	539
0745 - 0800	34	159	1	0	194	0	248	29	0	277	13	0	23	0	36	9	4	2	0	15	522
Hourly Total	95	468	7	0	570	0	1120	95	0	1215	30	1	89	0	120	39	14	2	0	55	1960
0800 - 0815	36	146	2	0	184	2	229	29	0	260	15	2	26	0	43	11	0	3	0	14	501
0815 - 0830	22	166	3	0	191	0	241	34	0	275	12	2	32	0	46	4	1	2	0	7	519
0830 - 0845	23	141	0	0	164	4	278	22	0	304	12	0	25	0	37	8	2	4	0	14	519
0845 - 0900	35	160	2	0	197	0	239	28	0	267	6	1	38	0	45	16	2	0	0	18	527
Hourly Total	116	613	7	0	736	6	987	113	0	1106	45	5	121	0	171	39	5	9	0	53	2066
Grand Total	211	1081	14	0	1306	6	2107	208	0	2321	75	6	210	0	291	78	19	11	0	108	4026
Approach %	16.16	82.77	1.07	0.00	-	0.26	90.78	8.96	0.00	-	25.77	2.06	72.16	0.00	-	72.22	17.59	10.19	0.00	-	
Intersection %	5.24	26.85	0.35	0.00	32.44	0.15	52.33	5.17	0.00	57.65	1.86	0.15	5.22	0.00	7.23	1.94	0.47	0.27	0.00	2.68	
PHF	0.84	0.87	0.58	0.00	0.91	0.25	0.78	0.82	0.00	0.82	0.77	0.50	0.81	0.00	0.84	0.71	0.46	0.58	0.00	0.72	0.97

1600 - 1800 (Weekday 2h Session) (02-15-2022)
All vehicles

TIME	Northbound					Southbound					Eastbound					Westbound					Int Total
	US-42 W (South)					US-42 W (North)					Timber Ridge Dr (West)					Timber Ridge Dr (East)					
	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	
1600 - 1615	49	269	6	0	324	4	227	47	0	278	37	6	30	0	73	3	1	1	0	5	680
1615 - 1630	66	259	7	0	332	6	173	61	0	240	45	1	44	0	90	3	0	4	0	7	669
1630 - 1645	43	243	8	0	294	1	229	51	0	281	41	2	70	0	113	6	2	4	0	12	700
1645 - 1700	64	262	8	0	334	0	174	44	0	218	57	5	38	0	100	4	1	2	0	7	659
Hourly Total	222	1033	29	0	1284	11	803	203	0	1017	180	14	182	0	376	16	4	11	0	31	2708
1700 - 1715	63	273	9	0	345	2	205	44	0	251	41	5	57	0	103	5	3	2	0	10	709
1715 - 1730	67	280	6	0	353	2	173	55	0	230	59	3	50	0	112	2	6	1	0	9	704
1730 - 1745	71	207	6	0	284	0	207	48	0	255	51	6	36	0	93	4	2	2	0	8	640
1745 - 1800	85	283	8	0	376	1	166	45	0	212	36	4	33	0	73	3	6	0	0	9	670
Hourly Total	286	1043	29	0	1358	5	751	192	0	948	187	18	176	0	381	14	17	5	0	36	2723
Grand Total	508	2076	58	0	2642	16	1554	395	0	1965	367	32	358	0	757	30	21	16	0	67	5431
Approach %	19.23	78.58	2.20	0.00	-	0.81	79.08	20.10	0.00	-	48.48	4.23	47.29	0.00	-	44.78	31.34	23.88	0.00	-	
Intersection %	9.35	38.23	1.07	0.00	48.65	0.29	28.61	7.27	0.00	36.18	6.76	0.59	6.59	0.00	13.94	0.55	0.39	0.29	0.00	1.23	
PHF	0.88	0.94	0.86	0.00	0.94	0.63	0.85	0.88	0.00	0.87	0.84	0.75	0.77	0.00	0.95	0.71	0.50	0.56	0.00	0.79	0.98

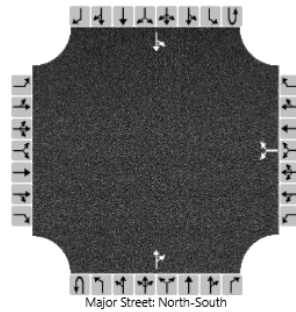
HCS Reports

HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	Diane Zimmerman							Intersection	River Road at Timber Ridge							
Agency/Co.	Diane B. Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	6/1/2022							East/West Street								
Analysis Year	2022							North/South Street								
Time Analyzed	AM Peak							Peak Hour Factor	0.95							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	Prospect Cove															
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)						70		49			96	32		61	321	
Percent Heavy Vehicles (%)						1		18						13		
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)						6.41		6.38						4.23		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.46						2.32		
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						125								64		
Capacity, c (veh/h)						719								1385		
v/c Ratio						0.17								0.05		
95% Queue Length, Q ₉₅ (veh)						0.6								0.1		
Control Delay (s/veh)						11.1								7.7	0.4	
Level of Service (LOS)						B								A	A	
Approach Delay (s/veh)						11.1								1.6		
Approach LOS						B								A		

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	River Road at Timber Ridge
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	6/1/2022	East/West Street	
Analysis Year	2025	North/South Street	
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.95
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Prospect Cove		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	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)						72		50			99	33		63	331	
Percent Heavy Vehicles (%)						1		18						13		
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)						6.41		6.38							4.23		
Base Follow-Up Headway (sec)						3.5		3.3							2.2		
Follow-Up Headway (sec)						3.51		3.46							2.32		

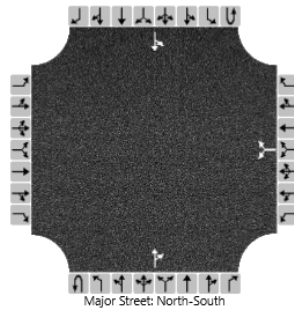
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						128									66		
Capacity, c (veh/h)						700									1380		
v/c Ratio						0.18									0.05		
95% Queue Length, Q ₉₅ (veh)						0.7									0.2		
Control Delay (s/veh)						11.3									7.7	0.5	
Level of Service (LOS)						B									A	A	
Approach Delay (s/veh)						11.3								1.6			
Approach LOS						B								A			

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	River Road at Timber Ridge
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	6/1/2022	East/West Street	
Analysis Year	2025	North/South Street	
Time Analyzed	AM Peak Build	Peak Hour Factor	0.95
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Prospect Cove		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
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	1	0		0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						87		53			99	38		64	331	
Percent Heavy Vehicles (%)						1		18						13		
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)						6.41		6.38						4.23		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.46						2.32		

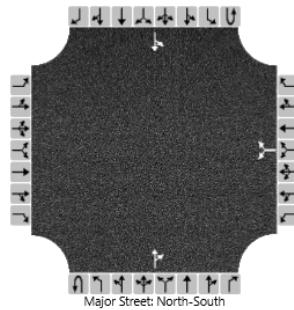
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						147								67		
Capacity, c (veh/h)						668								1373		
v/c Ratio						0.22								0.05		
95% Queue Length, Q ₉₅ (veh)						0.8								0.2		
Control Delay (s/veh)						11.9								7.8	0.5	
Level of Service (LOS)						B								A	A	
Approach Delay (s/veh)						11.9								1.7		
Approach LOS						B								A		

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	River Road at Timber Ridge
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	6/1/2022	East/West Street	
Analysis Year	2022	North/South Street	
Time Analyzed	PM Peak	Peak Hour Factor	0.94
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Prospect Cove		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
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	1	0		0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						122		149			301	84		72	198	
Percent Heavy Vehicles (%)						1		0						3		
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)						6.41		6.20						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.30						2.23		

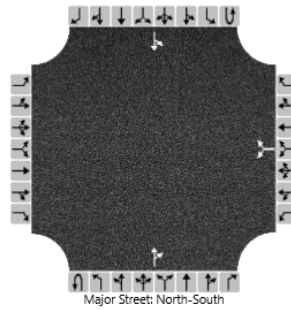
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						288								77		
Capacity, c (veh/h)						675								1144		
v/c Ratio						0.43								0.07		
95% Queue Length, Q ₉₅ (veh)						2.1								0.2		
Control Delay (s/veh)						14.2								8.4	0.6	
Level of Service (LOS)						B								A	A	
Approach Delay (s/veh)						14.2								2.7		
Approach LOS						B								A		

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	River Road at Timber Ridge
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	6/1/2022	East/West Street	
Analysis Year	2025	North/South Street	
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.94
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Prospect Cove		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
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	1	0		0	1	0
Configuration							LR					TR			LT	
Volume (veh/h)						126		154			310	87		74	204	
Percent Heavy Vehicles (%)						1		0						3		
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)						6.41		6.20						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.30						2.23		

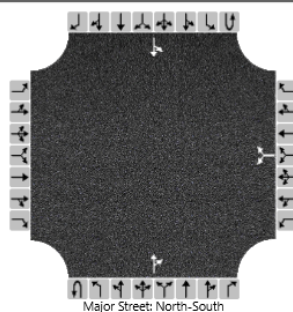
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						298								79		
Capacity, c (veh/h)						657								1132		
v/c Ratio						0.45								0.07		
95% Queue Length, Q ₉₅ (veh)						2.4								0.2		
Control Delay (s/veh)						14.9								8.4	0.7	
Level of Service (LOS)						B								A	A	
Approach Delay (s/veh)					14.9								2.7			
Approach LOS					B								A			

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	River Road at Timber Ridge
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	6/1/2022	East/West Street	
Analysis Year	2025	North/South Street	
Time Analyzed	PM Peak Build	Peak Hour Factor	0.94
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Prospect Cove		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	10U	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)						136		156			310	102		77	204	
Percent Heavy Vehicles (%)						1		0						3		
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)						6.41		6.20						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.30						2.23		

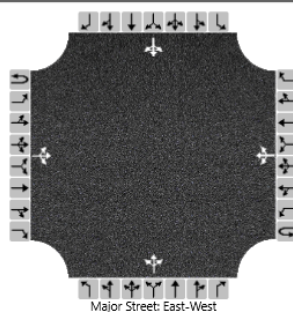
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						311								82		
Capacity, c (veh/h)						633								1116		
v/c Ratio						0.49								0.07		
95% Queue Length, Q ₉₅ (veh)						2.7								0.2		
Control Delay (s/veh)						16.0								8.5	0.7	
Level of Service (LOS)						C								A	A	
Approach Delay (s/veh)						16.0								2.8		
Approach LOS						C								A		

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Timber Ridge at Forest Cove
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	6/1/2022	East/West Street	Timber Ridge Drive
Analysis Year	2022	North/South Street	Forest Cove Lane
Time Analyzed	AM Peak	Peak Hour Factor	0.94
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Prospect Cove		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
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)		8	69	13		27	95	4		14	3	20		3	3	18
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

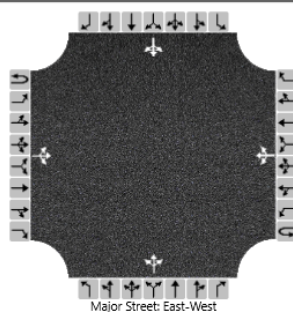
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		9				29				39						26
Capacity, c (veh/h)		1499				1521				802						855
v/c Ratio		0.01				0.02				0.05						0.03
95% Queue Length, Q ₉₅ (veh)		0.0				0.1				0.2						0.1
Control Delay (s/veh)		7.4	0.0	0.0		7.4	0.1	0.1		9.7						9.3
Level of Service (LOS)		A	A	A		A	A	A		A						A
Approach Delay (s/veh)		0.7				1.7				9.7				9.3		
Approach LOS		A				A				A				A		

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Timber Ridge at Forest Cove
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	6/1/2022	East/West Street	Timber Ridge Drive
Analysis Year	2025	North/South Street	Forest Cove Lane
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.94
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Prospect Cove		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
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)		8	71	13		28	98	4		14	3	21		3	3	19
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

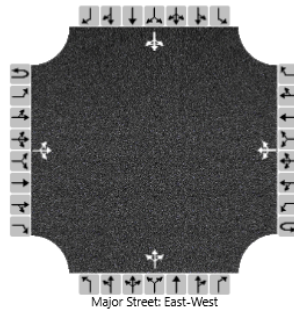
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		9				30				40						27
Capacity, c (veh/h)		1495				1519				800						853
v/c Ratio		0.01				0.02				0.05						0.03
95% Queue Length, Q ₉₅ (veh)		0.0				0.1				0.2						0.1
Control Delay (s/veh)		7.4	0.0	0.0		7.4	0.2	0.2		9.7						9.4
Level of Service (LOS)		A	A	A		A	A	A		A						A
Approach Delay (s/veh)		0.7			1.7					9.7			9.4			
Approach LOS		A			A					A			A			

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Timber Ridge at Forest Cove
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	6/1/2022	East/West Street	Timber Ridge Drive
Analysis Year	2025	North/South Street	Forest Cove Lane
Time Analyzed	AM Peak Build	Peak Hour Factor	0.94
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Prospect Cove		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
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)		8	71	19		40	98	4		32	4	61		3	4	19
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

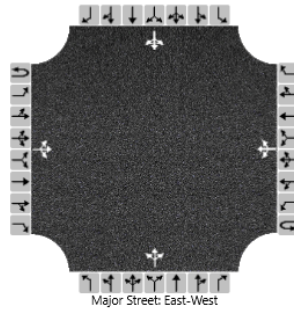
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		9				43					103					28
Capacity, c (veh/h)		1495				1511					804					820
v/c Ratio		0.01				0.03					0.13					0.03
95% Queue Length, Q ₉₅ (veh)		0.0				0.1					0.4					0.1
Control Delay (s/veh)		7.4	0.0	0.0		7.5	0.2	0.2			10.1					9.5
Level of Service (LOS)		A	A	A		A	A	A			B					A
Approach Delay (s/veh)		0.6			2.3					10.1			9.5			
Approach LOS		A			A					B			A			

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Timber Ridge at Forest Cove
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	6/1/2022	East/West Street	Timber Ridge Drive
Analysis Year	2022	North/South Street	Forest Cove Lane
Time Analyzed	PM Peak	Peak Hour Factor	0.97
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Prospect Cove		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
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)		65	70	27		43	175	27		35	14	46		25	13	72
Percent Heavy Vehicles (%)		0				0				0	0	2		0	0	1
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	6.22		7.10	6.50	6.21
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	3.32		3.50	4.00	3.31

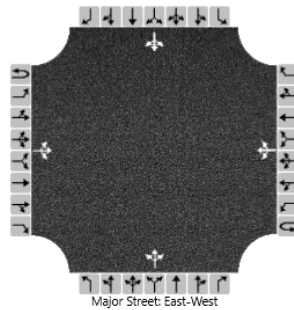
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		67				44					98					113
Capacity, c (veh/h)		1375				1505					564					625
v/c Ratio		0.05				0.03					0.17					0.18
95% Queue Length, Q ₉₅ (veh)		0.2				0.1					0.6					0.7
Control Delay (s/veh)		7.8	0.4	0.4		7.5	0.2	0.2			12.7					12.0
Level of Service (LOS)		A	A	A		A	A	A			B					B
Approach Delay (s/veh)		3.4				1.5				12.7				12.0		
Approach LOS		A				A				B				B		

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Timber Ridge at Forest Cove
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	6/1/2022	East/West Street	Timber Ridge Drive
Analysis Year	2025	North/South Street	Forest Cove Lane
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.97
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Prospect Cove		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
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)		67	72	28		44	180	28		36	14	47		26	13	74
Percent Heavy Vehicles (%)		0				0				0	0	2		0	0	1
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	6.22		7.10	6.50	6.21
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	3.32		3.50	4.00	3.31

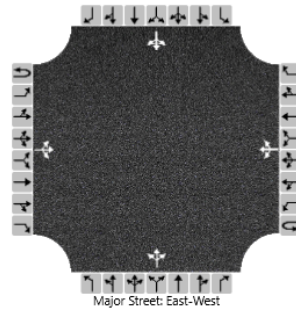
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		69				45				100					116	
Capacity, c (veh/h)		1368				1501				552					615	
v/c Ratio		0.05				0.03				0.18					0.19	
95% Queue Length, Q ₉₅ (veh)		0.2				0.1				0.7					0.7	
Control Delay (s/veh)		7.8	0.4	0.4		7.5	0.3	0.3		13.0				12.2		
Level of Service (LOS)		A	A	A		A	A	A		B				B		
Approach Delay (s/veh)		3.4				1.5				13.0				12.2		
Approach LOS		A				A				B				B		

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Timber Ridge at Forest Cove
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	6/1/2022	East/West Street	Timber Ridge Drive
Analysis Year	2025	North/South Street	Forest Cove Lane
Time Analyzed	PM Peak Build	Peak Hour Factor	0.97
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Prospect Cove		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
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)		67	72	46		86	180	28		48	15	73		26	14	74
Percent Heavy Vehicles (%)		0				0				0	0	2		0	0	1
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type Storage	Undivided															

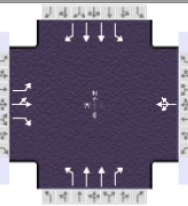
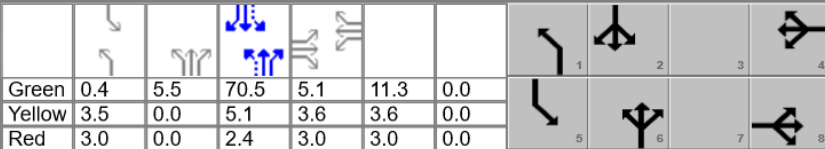
Critical and Follow-up Headways

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	6.22		7.10	6.50	6.21
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	3.32		3.50	4.00	3.31

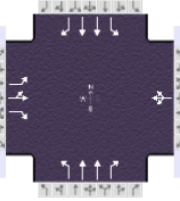
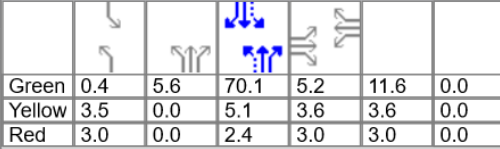
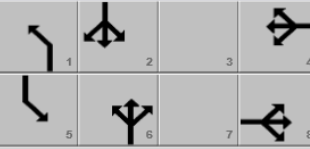
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		69				89					140					118
Capacity, c (veh/h)		1368				1478					505					549
v/c Ratio		0.05				0.06					0.28					0.21
95% Queue Length, Q ₉₅ (veh)		0.2				0.2					1.1					0.8
Control Delay (s/veh)		7.8	0.4	0.4		7.6	0.5	0.5			14.9					13.3
Level of Service (LOS)		A	A	A		A	A	A			B					B
Approach Delay (s/veh)		3.1				2.6				14.9				13.3		
Approach LOS		A				A				B				B		

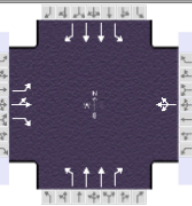
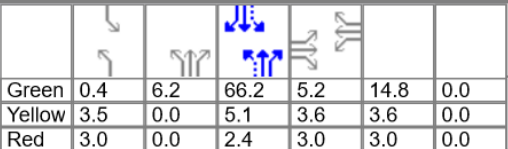

HCS Signalized Intersection Results Summary

General Information				Intersection Information																				
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250																			
Analyst	DBZ	Analysis Date	Jun 1, 2022	Area Type	Other																			
Jurisdiction		Time Period	AM Peak	PHF	0.97																			
Urban Street	US 42	Analysis Year	2022	Analysis Period	1> 7:30																			
Intersection	Timber Ridge	File Name	US 42 AM 22.xus																					
Project Description	Prospect Cove																							
Demand Information				EB			WB			NB			SB											
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R												
Demand (v), veh/h	46	4	104	37	11	7	121	576	7	2	1054	112												
Signal Information																								
Cycle, s	120.0	Reference Phase	6	Green	0.4	5.5	70.5	5.1	11.3	0.0	Yellow	3.5	0.0	5.1	3.6	3.6	0.0	Red	3.0	0.0	2.4	3.0	3.0	0.0
Offset, s	0	Reference Point	End	Uncoordinated	No	Simult. Gap E/W	Off	Force Mode	Fixed	Simult. Gap N/S	On													
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT													
Assigned Phase				8			4			1			6			5			2					
Case Number				9.0			12.0			1.1			3.0			1.1			3.0					
Phase Duration, s				17.9			11.7			12.4			83.5			6.9			78.0					
Change Period, (Y+R _c), s				6.6			6.6			6.5			7.5			6.5			7.5					
Max Allow Headway (MAH), s				5.3			4.6			4.5			0.0			5.0			0.0					
Queue Clearance Time (g _s), s				10.4			5.8			5.4			2.1											
Green Extension Time (g _e), s				0.9			0.2			0.5			0.0			0.0			0.0					
Phase Call Probability				0.99			0.85			0.98			0.07											
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	3	8	18	7	4	14	1	6	16	5	2	12												
Adjusted Flow Rate (v), veh/h	47	4	107	57			125	594	7	2	1087	115												
Adjusted Saturation Flow Rate (s), veh/h/ln	1753	1900	1497	1770			1697	1724	1610	1810	1795	1585												
Queue Service Time (g _s), s	3.0	0.2	8.4	3.8			3.4	9.1	0.2	0.1	21.5	3.9												
Cycle Queue Clearance Time (g _c), s	3.0	0.2	8.4	3.8			3.4	9.1	0.2	0.1	21.5	3.9												
Green Ratio (g/C)	0.09	0.09	0.09	0.04			0.65	0.63	0.63	0.59	0.59	0.59												
Capacity (c), veh/h	165	179	141	75			345	2185	1020	518	2109	931												
Volume-to-Capacity Ratio (X)	0.288	0.023	0.762	0.754			0.361	0.272	0.007	0.004	0.515	0.124												
Back of Queue (Q), ft/ln (90 th percentile)																								
Back of Queue (Q), veh/ln (90 th percentile)	2.5	0.2	6.0	3.7			2.1	5.5	0.1	0.0	11.9	2.4												
Queue Storage Ratio (RQ) (90 th percentile)	0.29	0.02	0.71	0.47			0.25	0.24	0.01	0.00	0.66	0.27												
Uniform Delay (d ₁), s/veh	50.6	49.4	53.1	56.8			11.0	9.7	8.1	10.2	14.6	11.0												
Incremental Delay (d ₂), s/veh	1.4	0.1	11.4	16.7			0.8	0.3	0.0	0.0	0.9	0.3												
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	52.0	49.4	64.4	73.5			11.7	10.0	8.1	10.2	15.5	11.3												
Level of Service (LOS)	D	D	E	E			B	B	A	B	B	B												
Approach Delay, s/veh / LOS	60.3		E	73.5		E	10.3		B	15.1		B												
Intersection Delay, s/veh / LOS	18.4						B																	
Multimodal Results				EB			WB			NB			SB											
Pedestrian LOS Score / LOS	2.47			B			2.47			B			2.08			B								
Bicycle LOS Score / LOS	0.75			A			0.58			A			1.09			A								

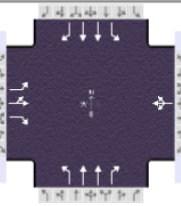
HCS Signalized Intersection Results Summary

General Information				Intersection Information											
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250										
Analyst	DBZ	Analysis Date	Jun 1, 2022	Area Type	Other										
Jurisdiction		Time Period	AM Peak	PHF	0.97										
Urban Street	US 42	Analysis Year	2025 No Build	Analysis Period	1> 7:30										
Intersection	Timber Ridge	File Name	US 42 AM 25 NB.xus												
Project Description	Prospect Cove														
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	4	107	38	11	7	125	593	7	2	1086	115			
Signal Information															
Cycle, s	120.0	Reference Phase	6												
Offset, s	0	Reference Point	End												
Uncoordinated	No	Simult. Gap E/W	Off												
Force Mode	Fixed	Simult. Gap N/S	On	Green	0.4	5.6	70.1	5.2	11.6	0.0	0.0	0.0			
				Yellow	3.5	0.0	5.1	3.6	3.6	0.0	0.0	0.0			
				Red	3.0	0.0	2.4	3.0	3.0	0.0	0.0	0.0			
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					8		4	1	6	5	2				
Case Number					9.0		12.0	1.1	3.0	1.1	3.0				
Phase Duration, s					18.2		11.8	12.5	83.2	6.9	77.6				
Change Period, (Y+R _c), s					6.6		6.6	6.5	7.5	6.5	7.5				
Max Allow Headway (MAH), s					5.3		4.6	4.5	0.0	5.0	0.0				
Queue Clearance Time (g _s), s					10.6		5.9	5.5		2.1					
Green Extension Time (g _e), s					1.0		0.2	0.6	0.0	0.0	0.0				
Phase Call Probability					1.00		0.85	0.99		0.07					
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	3	8	18	7	4	14	1	6	16	5	2	12			
Adjusted Flow Rate (v), veh/h	48	4	110		58		129	611	7	2	1120	119			
Adjusted Saturation Flow Rate (s), veh/h/ln	1753	1900	1497		1770		1697	1724	1610	1810	1795	1585			
Queue Service Time (g _s), s	3.1	0.2	8.6		3.9		3.5	9.5	0.2	0.1	22.6	4.0			
Cycle Queue Clearance Time (g _c), s	3.1	0.2	8.6		3.9		3.5	9.5	0.2	0.1	22.6	4.0			
Green Ratio (g/C)	0.10	0.10	0.10		0.04		0.64	0.63	0.63	0.59	0.58	0.58			
Capacity (c), veh/h	169	183	144		76		334	2175	1016	506	2097	926			
Volume-to-Capacity Ratio (X)	0.287	0.023	0.765		0.759		0.386	0.281	0.007	0.004	0.534	0.128			
Back of Queue (Q), ft/ln (90 th percentile)															
Back of Queue (Q), veh/ln (90 th percentile)	2.5	0.2	6.1		3.7		2.2	5.7	0.1	0.0	12.5	2.5			
Queue Storage Ratio (RQ) (90 th percentile)	0.29	0.02	0.73		0.47		0.26	0.25	0.01	0.00	0.70	0.28			
Uniform Delay (d ₁), s/veh	50.4	49.1	52.9		56.8		11.5	9.9	8.2	10.4	15.1	11.2			
Incremental Delay (d ₂), s/veh	1.3	0.1	11.3		16.8		0.9	0.3	0.0	0.0	1.0	0.3			
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	51.7	49.2	64.2		73.6		12.4	10.3	8.2	10.4	16.1	11.5			
Level of Service (LOS)	D	D	E		E		B	B	A	B	B	B			
Approach Delay, s/veh / LOS	60.1		E	73.6		E	10.6		B	15.6		B			
Intersection Delay, s/veh / LOS	18.7						B								
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.47		B	2.47		B	1.66		B	2.08		B			
Bicycle LOS Score / LOS	0.76		A	0.58		A	1.10		A	1.51		B			

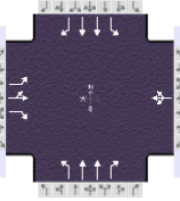
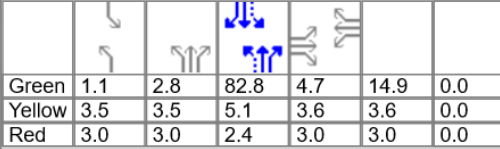
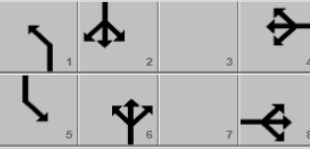
HCS Signalized Intersection Results Summary

General Information				Intersection Information																				
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250																			
Analyst	DBZ	Analysis Date	Jun 1, 2022	Area Type	Other																			
Jurisdiction		Time Period	AM Peak	PHF	0.97																			
Urban Street	US 42	Analysis Year	2025 Build	Analysis Period	1> 7:30																			
Intersection	Timber Ridge	File Name	US 42 AM 25 B.xus																					
Project Description	Prospect Cove																							
Demand Information				EB			WB			NB			SB											
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R												
Demand (v), veh/h	50	4	144	38	11	7	136	593	7	2	1086	116												
Signal Information																								
Cycle, s	120.0	Reference Phase	6	Green	0.4	6.2	66.2	5.2	14.8	0.0														
Offset, s	0	Reference Point	End	Yellow	3.5	0.0	5.1	3.6	3.6	0.0														
Uncoordinated	No	Simult. Gap E/W	Off	Red	3.0	0.0	2.4	3.0	3.0	0.0														
Force Mode	Fixed	Simult. Gap N/S	On																					
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT													
Assigned Phase				8			4			1														
Case Number				9.0			12.0			1.1														
Phase Duration, s				21.4			11.8			13.1														
Change Period, (Y+R c), s				6.6			6.6			7.5														
Max Allow Headway (MAH), s				5.3			4.6			4.5														
Queue Clearance Time (g s), s				13.6			5.9			6.1														
Green Extension Time (g e), s				1.2			0.2			0.6														
Phase Call Probability				1.00			0.85			0.99														
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	3	8	18	7	4	14	1	6	16	5	2	12												
Adjusted Flow Rate (v), veh/h	52	4	148		58		140	611	7	2	1120	120												
Adjusted Saturation Flow Rate (s), veh/h/ln	1753	1900	1497		1770		1697	1724	1610	1810	1795	1585												
Queue Service Time (g s), s	3.2	0.2	11.6		3.9		4.1	10.3	0.2	0.1	24.4	4.4												
Cycle Queue Clearance Time (g c), s	3.2	0.2	11.6		3.9		4.1	10.3	0.2	0.1	24.4	4.4												
Green Ratio (g/C)	0.12	0.12	0.12		0.04		0.62	0.60	0.60	0.55	0.55	0.55												
Capacity (c), veh/h	216	234	185		76		321	2081	972	479	1980	874												
Volume-to-Capacity Ratio (X)	0.238	0.018	0.803		0.759		0.437	0.294	0.007	0.004	0.565	0.137												
Back of Queue (Q), ft/ln (90 th percentile)																								
Back of Queue (Q), veh/ln (90 th percentile)	2.6	0.2	7.7		3.7		2.7	6.1	0.1	0.0	13.6	2.8												
Queue Storage Ratio (RQ) (90 th percentile)	0.30	0.02	0.92		0.47		0.31	0.27	0.01	0.01	0.76	0.32												
Uniform Delay (d 1), s/veh	47.5	46.2	51.2		56.8		13.4	11.5	9.5	12.1	17.5	13.0												
Incremental Delay (d 2), s/veh	0.8	0.0	10.9		16.8		1.1	0.4	0.0	0.0	1.2	0.3												
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	48.3	46.2	62.1		73.6		14.5	11.8	9.5	12.1	18.7	13.4												
Level of Service (LOS)	D	D	E		E		B	B	A	B	B	B												
Approach Delay, s/veh / LOS	58.3			E			73.6			E			12.3			B			18.2			B		
Intersection Delay, s/veh / LOS	21.2												C											
Multimodal Results				EB			WB			NB			SB											
Pedestrian LOS Score / LOS	2.47			B			2.46			B			1.66			B								
Bicycle LOS Score / LOS	0.82			A			0.58			A			1.11			A								

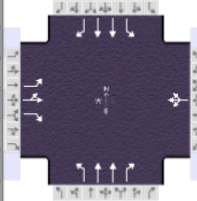
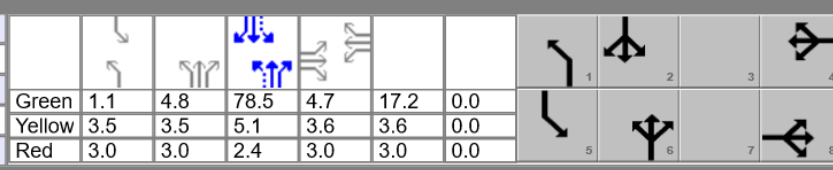
HCS Signalized Intersection Results Summary

General Information				Intersection Information															
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250														
Analyst	DBZ	Analysis Date	Jun 1, 2022	Area Type	Other														
Jurisdiction		Time Period	PM Peak	PHF	0.98														
Urban Street	US 42	Analysis Year	2022	Analysis Period	1> 4:30														
Intersection	Timber Ridge	File Name	US 42 PM 22.xus																
Project Description	Prospect Cove																		
																			
Demand Information				EB			WB			NB			SB						
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R							
Demand (v), veh/h	197	15	215	17	12	9	237	1058	31	5	781	194							
Signal Information																			
Cycle, s	140.0	Reference Phase	6																
Offset, s	0	Reference Point	End																
Uncoordinated	No	Simult. Gap E/W	Off	Green	1.1	2.4	83.9	4.7	14.2	0.0									
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.5	3.5	5.1	3.6	3.6	0.0									
				Red	3.0	3.0	2.4	3.0	3.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase			8				4		1		6		5		2				
Case Number			9.0				12.0		1.1		3.0		1.1		3.0				
Phase Duration, s			20.8				11.3		16.5		100.3		7.6		91.4				
Change Period, (Y+R _c), s			6.6				6.6		6.5		7.5		6.5		7.5				
Max Allow Headway (MAH), s			5.2				4.7		4.5		0.0		5.0		0.0				
Queue Clearance Time (g _s), s			12.2				5.1		8.9				2.2						
Green Extension Time (g _e), s			2.0				0.1		1.1		0.0		0.0		0.0				
Phase Call Probability			1.00				0.78		1.00				0.18						
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	3	8	18	7	4	14	1	6	16	5	2	12							
Adjusted Flow Rate (v), veh/h	121	96	117	39			242	1080	32	5	797	198							
Adjusted Saturation Flow Rate (s), veh/h/ln	1810	1810	1560	1714			1795	1795	1572	1810	1766	1560							
Queue Service Time (g _s), s	9.0	7.0	10.2	3.1			6.9	20.3	1.0	0.2	16.3	8.2							
Cycle Queue Clearance Time (g _c), s	9.0	7.0	10.2	3.1			6.9	20.3	1.0	0.2	16.3	8.2							
Green Ratio (g/C)	0.10	0.10	0.10	0.03			0.68	0.66	0.66	0.61	0.60	0.60							
Capacity (c), veh/h	184	184	159	57			511	2380	1043	333	2118	935							
Volume-to-Capacity Ratio (X)	0.656	0.520	0.740	0.678			0.473	0.454	0.030	0.015	0.376	0.212							
Back of Queue (Q), ft/ln (90 th percentile)																			
Back of Queue (Q), veh/ln (90 th percentile)	7.1	5.7	7.1	2.9			4.6	11.1	0.6	0.1	9.6	5.0							
Queue Storage Ratio (RQ) (90 th percentile)	0.79	0.67	0.82	0.38			0.51	0.47	0.07	0.01	0.54	0.58							
Uniform Delay (d ₁), s/veh	60.5	59.6	61.1	66.9			9.9	11.4	8.1	11.5	14.5	12.9							
Incremental Delay (d ₂), s/veh	5.5	3.2	9.2	15.6			0.8	0.6	0.1	0.0	0.5	0.5							
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	66.1	62.9	70.3	82.5			10.7	12.0	8.2	11.5	15.0	13.4							
Level of Service (LOS)	E	E	E	F			B	B	A	B	B	B							
Approach Delay, s/veh / LOS	66.6		E	82.5		F	11.7		B	14.7		B							
Intersection Delay, s/veh / LOS	20.5						C												
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS	2.48		B	2.47		B	1.66		B	2.23		B							
Bicycle LOS Score / LOS	1.04		A	0.55		A	1.60		B	1.31		A							

HCS Signalized Intersection Results Summary

General Information				Intersection Information																				
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250																			
Analyst	DBZ	Analysis Date	Jun 1, 2022	Area Type	Other																			
Jurisdiction		Time Period	PM Peak	PHF	0.98																			
Urban Street	US 42	Analysis Year	2025 No Build	Analysis Period	1> 4:30																			
Intersection	Timber Ridge	File Name	US 42 PM 25 NB.xus																					
Project Description	Prospect Cove																							
Demand Information				EB			WB			NB			SB											
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R												
Demand (v), veh/h	203	15	222	18	12	9	244	1090	32	5	805	200												
Signal Information																								
Cycle, s	140.0	Reference Phase	6																					
Offset, s	0	Reference Point	End																					
Uncoordinated	No	Simult. Gap E/W	Off																					
Force Mode	Fixed	Simult. Gap N/S	On	Green	1.1	2.8	82.8	4.7	14.9	0.0	Yellow	3.5	3.5	5.1	3.6	3.6	0.0	Red	3.0	3.0	2.4	3.0	3.0	0.0
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT													
Assigned Phase			8			4	1		6	5		2												
Case Number			9.0			12.0	1.1		3.0	1.1		3.0												
Phase Duration, s			21.5			11.3	16.9		99.6	7.6		90.3												
Change Period, (Y+R _c), s			6.6			6.6	6.5		7.5	6.5		7.5												
Max Allow Headway (MAH), s			5.2			4.6	4.5		0.0	5.0		0.0												
Queue Clearance Time (g _s), s			12.8			5.2	9.2			2.2														
Green Extension Time (g _e), s			2.1			0.1	1.1		0.0	0.0		0.0												
Phase Call Probability			1.00			0.79	1.00			0.18														
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	3	8	18	7	4	14	1	6	16	5	2	12												
Adjusted Flow Rate (v), veh/h	124	98	124	40			249	1112	33	5	821	204												
Adjusted Saturation Flow Rate (s), veh/h/ln	1810	1810	1560	1715			1795	1795	1572	1810	1766	1560												
Queue Service Time (g _s), s	9.2	7.2	10.8	3.2			7.2	21.5	1.0	0.2	17.3	8.6												
Cycle Queue Clearance Time (g _c), s	9.2	7.2	10.8	3.2			7.2	21.5	1.0	0.2	17.3	8.6												
Green Ratio (g/C)	0.11	0.11	0.11	0.03			0.68	0.66	0.66	0.60	0.59	0.59												
Capacity (c), veh/h	193	193	166	58			498	2360	1034	317	2089	922												
Volume-to-Capacity Ratio (X)	0.644	0.509	0.748	0.688			0.500	0.471	0.032	0.016	0.393	0.221												
Back of Queue (Q), ft/ln (90 th percentile)																								
Back of Queue (Q), veh/ln (90 th percentile)	7.2	5.8	7.5	3.0			4.8	11.7	0.6	0.1	10.1	5.3												
Queue Storage Ratio (RQ) (90 th percentile)	0.80	0.68	0.86	0.39			0.54	0.49	0.07	0.01	0.57	0.60												
Uniform Delay (d ₁), s/veh	60.0	59.1	60.7	66.9			10.5	11.9	8.4	12.0	15.2	13.5												
Incremental Delay (d ₂), s/veh	5.0	2.9	9.2	16.0			0.9	0.7	0.1	0.0	0.6	0.6												
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	65.0	62.0	69.9	82.9			11.4	12.6	8.4	12.1	15.8	14.0												
Level of Service (LOS)	E	E	E	F			B	B	A	B	B	B												
Approach Delay, s/veh / LOS	65.9		E	82.9		F	12.3	B		15.4		B												
Intersection Delay, s/veh / LOS	21.0						C																	
Multimodal Results				EB			WB			NB			SB											
Pedestrian LOS Score / LOS	2.48		B	2.47		B	1.66	B		2.23		B												
Bicycle LOS Score / LOS	1.06		A	0.55		A	1.64	B		1.34		A												

HCS Signalized Intersection Results Summary

General Information				Intersection Information											
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250										
Analyst	DBZ	Analysis Date	Jun 1, 2022	Area Type	Other										
Jurisdiction		Time Period	PM Peak	PHF	0.98										
Urban Street	US 42	Analysis Year	2025 Build	Analysis Period	1> 4:30										
Intersection	Timber Ridge	File Name	US 42 PM 25 B.xus												
Project Description	Prospect Cove														
Demand Information				EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R			
Demand (v), veh/h	205	15	246	18	12	9	283	1090	32	5	805	203			
Signal Information															
Cycle, s	140.0	Reference Phase	6												
Offset, s	0	Reference Point	End												
Uncoordinated	No	Simult. Gap E/W	Off												
Force Mode	Fixed	Simult. Gap N/S	On												
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase							4	1		6	5				
Case Number							12.0	1.1		3.0	1.1				
Phase Duration, s							11.3	18.9		97.3	86.0				
Change Period, ($Y+R_c$), s							6.6	6.5		7.5	6.5				
Max Allow Headway (MAH), s							4.6	4.5		0.0	5.0				
Queue Clearance Time (g_s), s							5.2	11.0		2.2					
Green Extension Time (g_e), s							2.3	0.1		1.3	0.0				
Phase Call Probability							1.00	0.79		1.00	0.18				
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	3	8	18	7	4	14	1	6	16	5	2	12			
Adjusted Flow Rate (v), veh/h	126	99	149				40	289	1112	33	5	821			
Adjusted Saturation Flow Rate (s), veh/h/ln	1810	1810	1560				1715	1795	1795	1572	1810	1766			
Queue Service Time (g_s), s	9.2	7.1	13.0				3.2	9.0	22.6	1.1	0.2	18.6			
Cycle Queue Clearance Time (g_c), s	9.2	7.1	13.0				3.2	9.0	22.6	1.1	0.2	18.6			
Green Ratio (g/C)	0.12	0.12	0.12				0.03	0.66	0.64	0.64	0.57	0.56			
Capacity (c), veh/h	223	223	192				58	497	2302	1008	305	1980			
Volume-to-Capacity Ratio (X)	0.564	0.445	0.776				0.688	0.581	0.483	0.032	0.017	0.415			
Back of Queue (Q), ft/ln (90 th percentile)															
Back of Queue (Q), veh/ln (90 th percentile)	7.1	5.7	8.6				3.0	5.8	12.4	0.7	0.1	10.9			
Queue Storage Ratio (RQ) (90 th percentile)	0.78	0.67	0.99				0.39	0.65	0.52	0.07	0.02	0.62			
Uniform Delay (d_1), s/veh	57.8	57.0	59.5				66.9	12.1	13.1	9.2	13.7	17.6			
Incremental Delay (d_2), s/veh	3.2	2.0	9.2				16.0	1.3	0.7	0.1	0.0	0.6			
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0			
Control Delay (d), s/veh	61.0	58.9	68.7				82.9	13.4	13.8	9.3	13.8	18.3			
Level of Service (LOS)	E	E	E				F	B	B	A	B	B			
Approach Delay, s/veh / LOS	63.5			E			82.9			F					
Intersection Delay, s/veh / LOS				22.6						C					
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.48			B			2.47			B			2.24		
Bicycle LOS Score / LOS	1.10			A			0.55			A			1.67		

Left Turn Lane Warrants

Input Fields

Left Turn Volume (vph)	86	Speed Limit (mph)	35
Advancing Volume (vph)	294	No. of through lanes	1
Opposing Volume (vph)	185	Percent Heavy Vehicles (decimal percent)	0.01

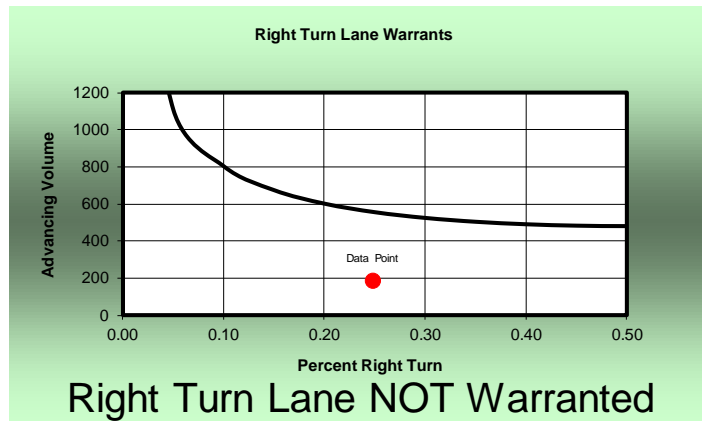


Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)	46	Speed Limit (mph)	35
Advancing Volume (vph)	185		



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.