final report

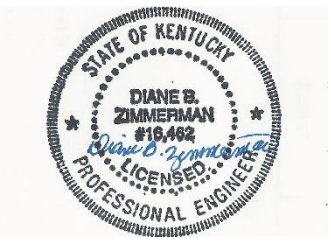
August 19, 2022
Revised November 17, 2022
Revised August 24, 2023

Traffic Impact Study

Mixed Residential Development
1614 Johnson Road (KY 1531)
Louisville, KY

Prepared for

Louisville Metro Planning Commission
Kentucky Transportation Cabinet



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INTRODUCTION

The site plan for the mixed residential development shows 97 single-family lots and 96 apartments on Johnson Road (KY 1531) opposite Eastwood Bluff Road in Louisville, KY. **Figure 1** displays a map of the site. Access to the site will be from two entrances on Johnson Road. The site plan is included in the appendix. 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 Johnson Road with Eastwood Bluff Road and the proposed entrance on Johnson Road. A separate study includes intersections in the vicinity.

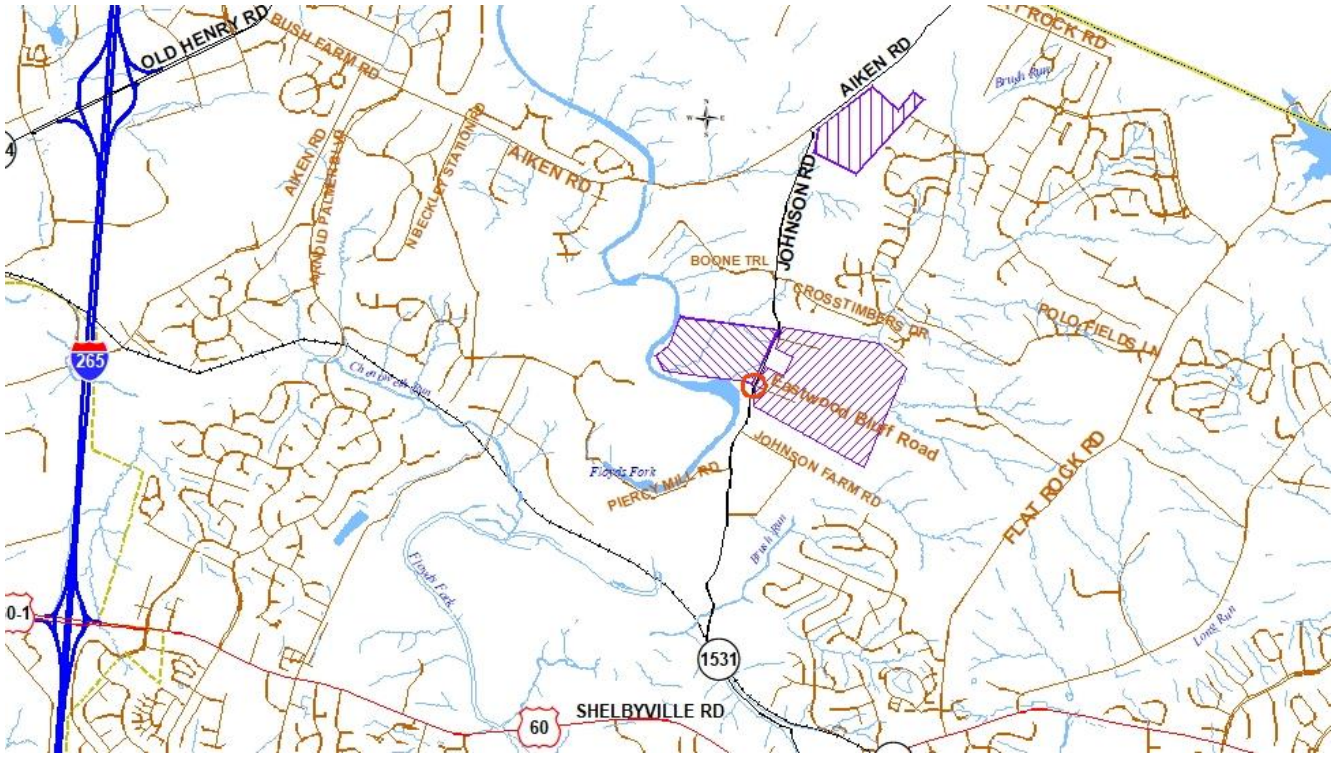


Figure 1. Site Map

EXISTING CONDITIONS

Johnson Road, KY 1531, is a state-maintained road with an estimated 2022 ADT of 1,300 vehicles per day south of Eastwood Bluff Road as estimated from the turning movement count and the K Factor of .13 at station 118. The road is a two-lane highway with nine-foot lanes with curb and gutter through the study area (provided by the Kentucky Transportation Cabinet). The speed limit is 35 mph. There are no sidewalks, but the Overlook at Eastwood has sidewalks along the frontage. The intersection at Eastwood Bluff Road is controlled with a stop sign.

Peak hour traffic count for the intersections were obtained on Thursday, May 19, 2022. The a.m. peak hour occurred between 7:00 and 8:00 and the p.m. occurred between 4:00 and 5:00. **Figure 2** illustrates the existing a.m. and p.m. peak hour traffic volumes. The Appendix contains the full count data.

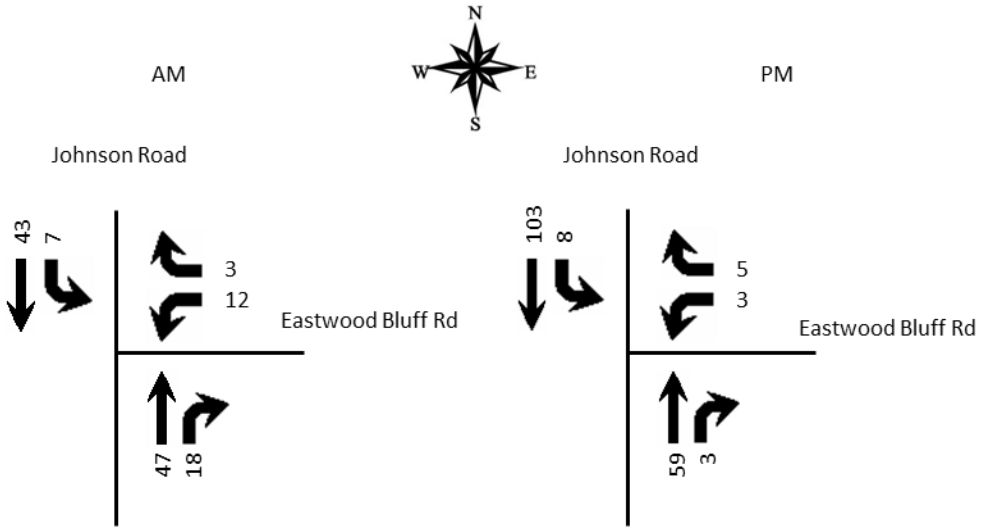


Figure 2. Existing Peak Hour Volumes

FUTURE CONDITIONS

The project completion date is 2027. An annual growth rate of 8.7 percent was applied to the 2022 thru volumes. This is calculated from the traffic impact study *"Aiken North Subdivision"* dated February 23, 2021. The trip generation for the 334 lots in the Overlook at Eastwood was included. The trip distribution is included in the appendix on page 14. **Figure 3** displays the 2027 No Build peak hour volumes.

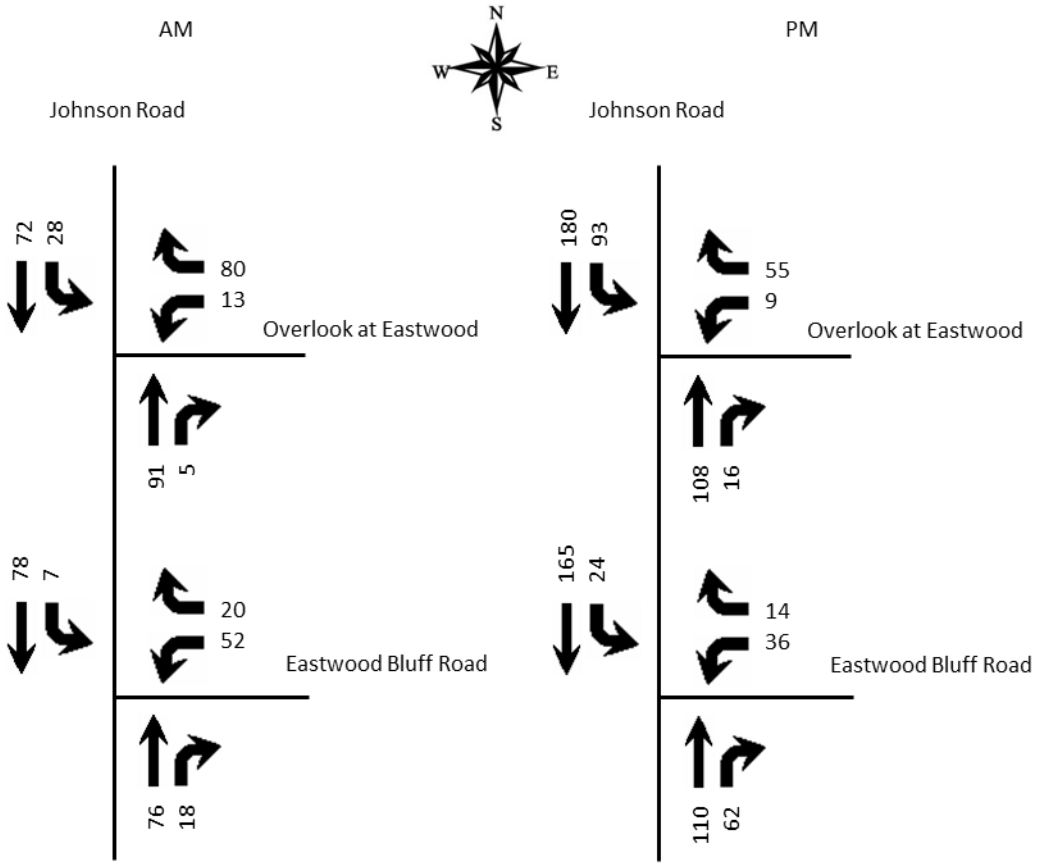


Figure 3. 2027 No Build Peak Hour Volumes

TRIP GENERATION

The Institute of Transportation Engineers Trip Generation Manual, 11th Edition contains trip generation rates for a wide range of developments. The land uses of "Single-Family Detached (210)" and "Multifamily Housing (Low-Rise) (220)" 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**. The multifamily trips were assigned to the internal network with 40% of northbound traffic using Meander Way. **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

	A.M. Peak Hour			P.M. Peak Hour		
Land Use	**Trips**	**In**	**Out**	**Trips**	**In**	**Out**
Single Family (97 units)	72	18	54	97	61	36
Multifamily (96 units)	53	13	40	62	39	23
TOTAL	**125**	**31**	**94**	**159**	**100**	**59**

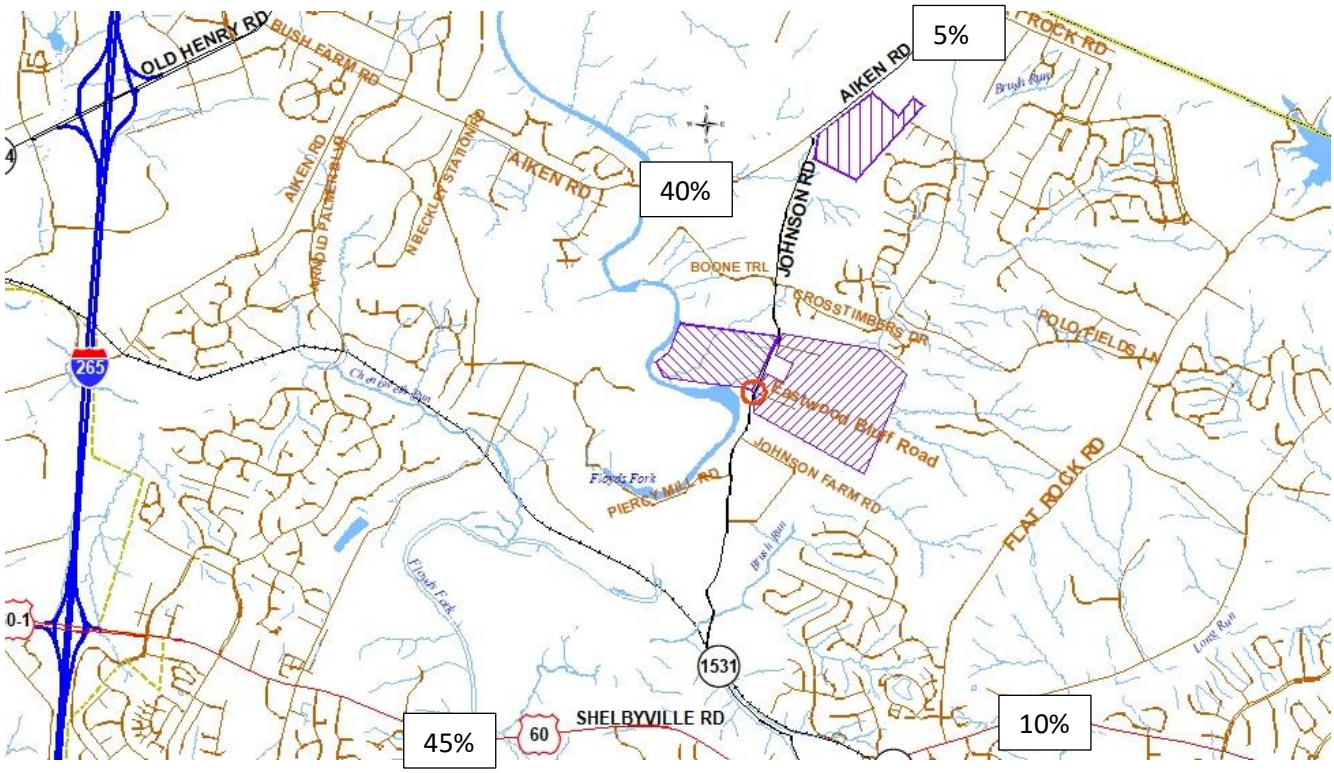


Figure 4. Trip Distribution Percentages

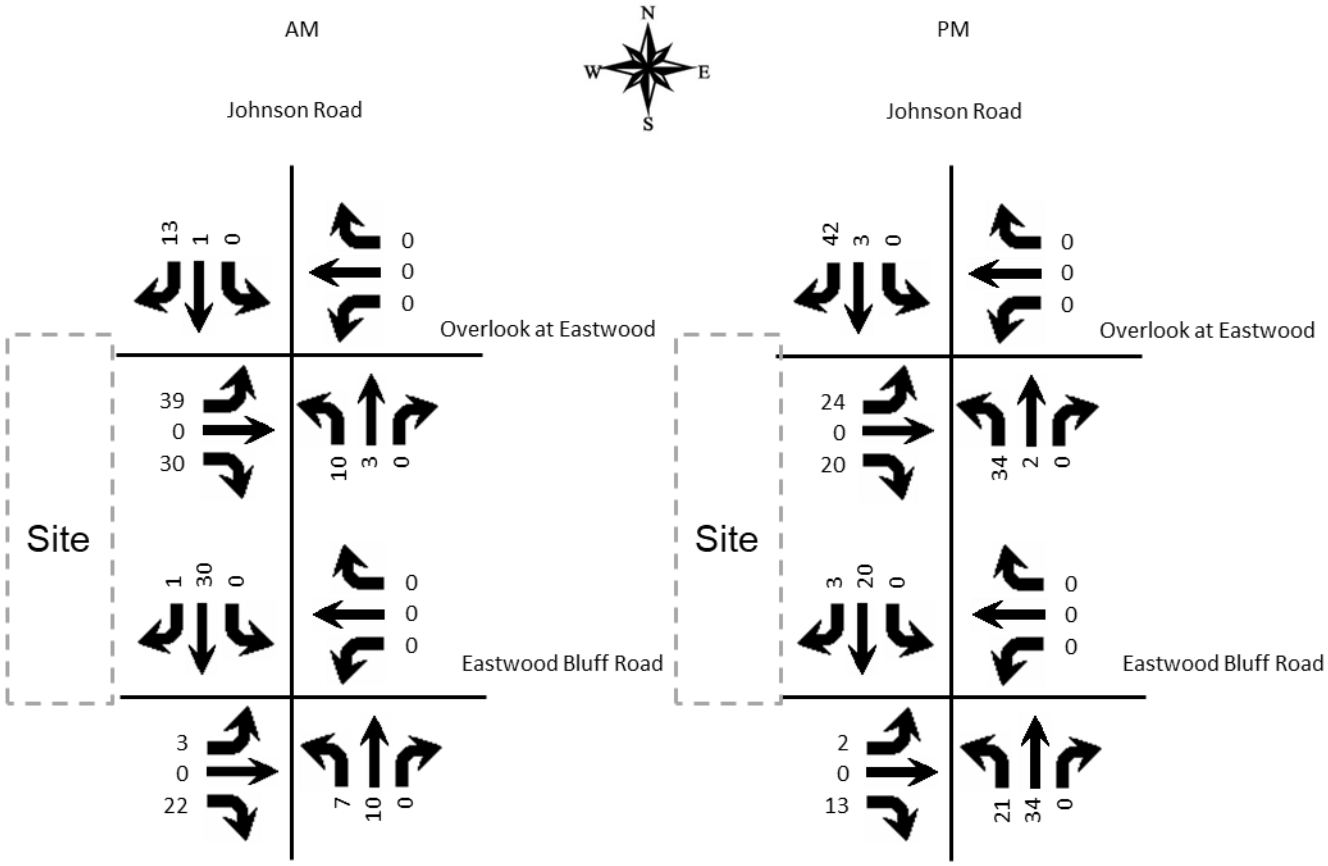


Figure 5. Peak Hour Trips Generated by Site

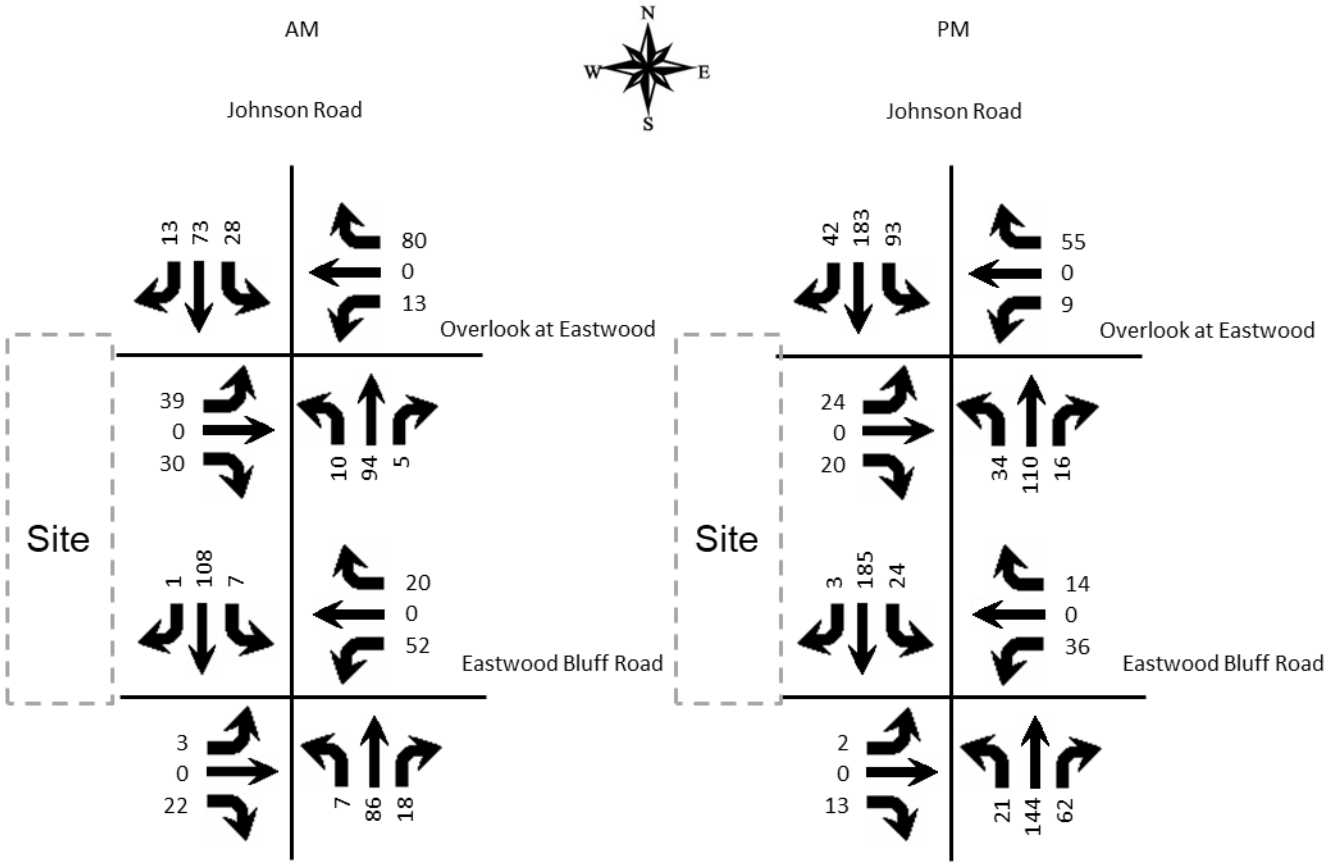


Figure 6. 2027 Build Peak Hour Volumes

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 delay experienced for lanes at stop-controlled intersections.

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 Two-Way Stop Controlled (version 2022) software. The delays and Level of Service are summarized in **Table 2**.

Table 2. Peak Hour Level of Service

	A.M.			P.M.		
Approach	2022 Existing	2027 No Build	2027 Build	2022 Existing	2027 No Build	2027 Build
Johnson Road at Overlook at Eastwood						
Entrance Eastbound		NA	B 10.7		NA	C 15.3
Overlook Entrance Westbound		A 9.4	A 9.5		B 10.0	B 10.7
Johnson Road Northbound (left)		NA	A 7.4		NA	A 7.9
Johnson Road Southbound (left)		A 7.5	A 7.5		A 7.7	A 7.7
Johnson Road at Eastwood Bluff Road						
Entrance Eastbound	NA	NA	A 9.1	NA	NA	B 10.1
Eastwood Bluff Road Westbound	A 9.1	A 9.7	B 10.5	A 9.2	B 11.2	B 13.3
Johnson Road Northbound (left)	NA	NA	A 7.5	NA	NA	A 7.7
Johnson Road Southbound (left)	A 7.6	A 7.4	A 7.5	A 7.4	A 7.7	A 7.8

Key: Level of Service, Delay in seconds per vehicle

The entrances were evaluated for turn lanes using the Kentucky Transportation Cabinet Highway Design Guidance Manual dated July, 2020. The traffic impact policy requires using volumes for ten years beyond opening date, or 2037. The 2037 volumes were determined by using 8.7% annual growth from the 2027 thru volumes. **Figure 7** is the 2037 No Build and **Figure 8** is the Build. The volumes in Figure 8 were utilized to determine turn lane requirements. **Table 3** displays the level of service results for 2037.

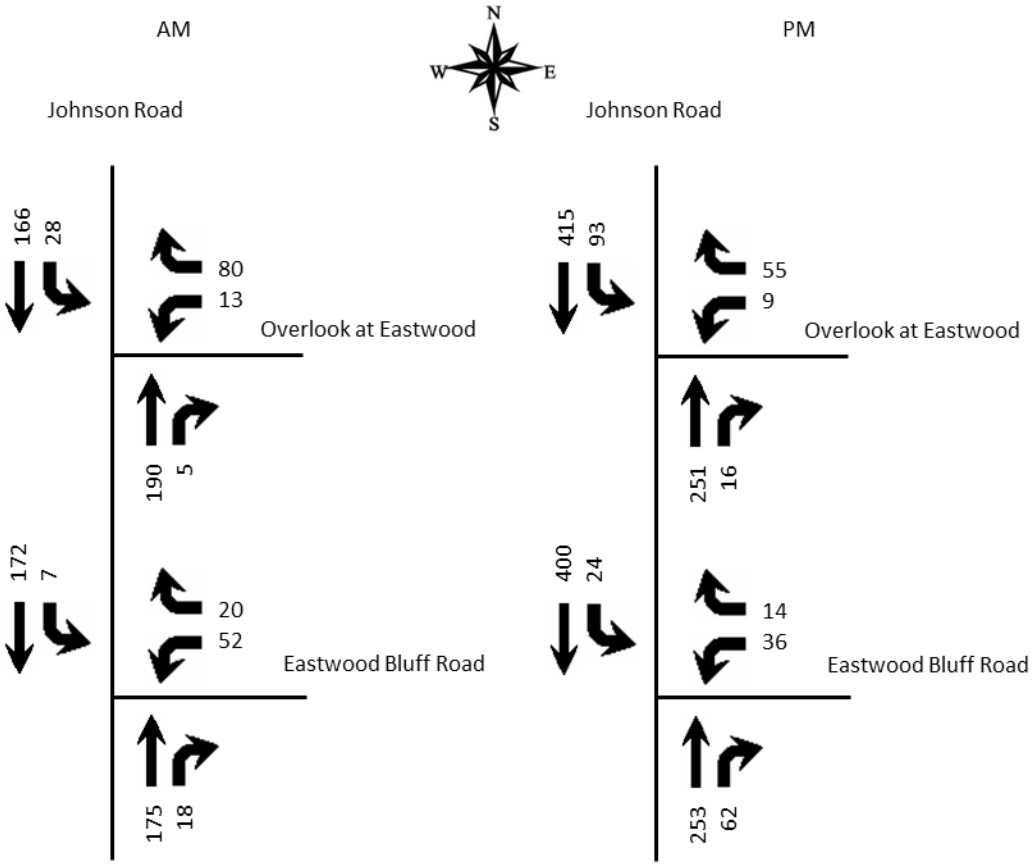


Figure 7. 2037 No Build Peak Hour Volumes

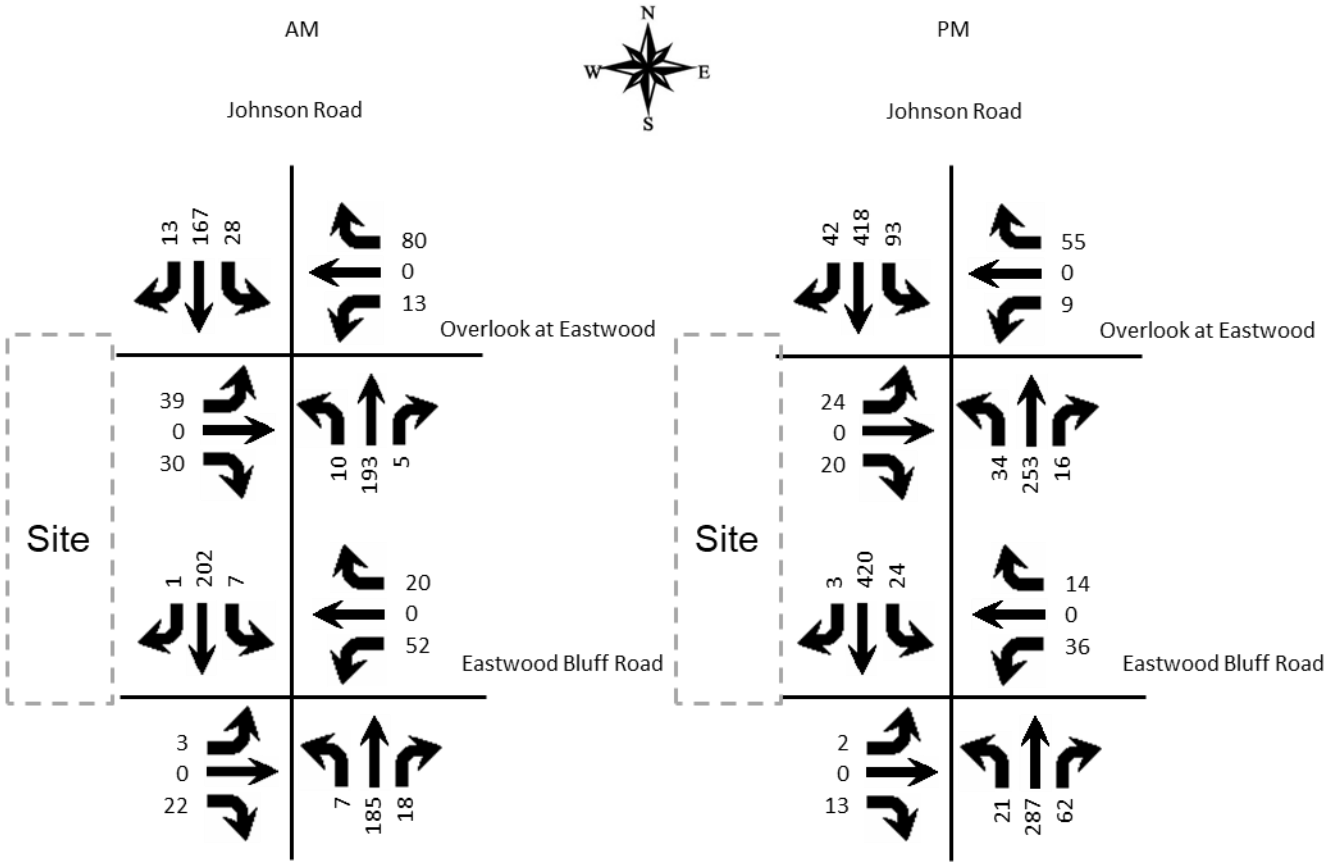


Figure 8. 2037 Build Peak Hour Volumes

Table 3. Peak Hour Level of Service 2037

	A.M.			P.M.		
Approach	2022 Existing	2037 No Build	2037 Build	2022 Existing	2037 No Build	2037 Build
Johnson Road at Overlook at Eastwood						
Entrance Eastbound		NA	B 12.7		NA	D 29.0
Overlook Entrance Westbound		B 10.2	B 10.5		B 12.4	B 14.3
Johnson Road Northbound (left)		NA	A 7.6		NA	A 8.7
Johnson Road Southbound (left)		A 7.7	A 7.7		A 8.2	A 8.2

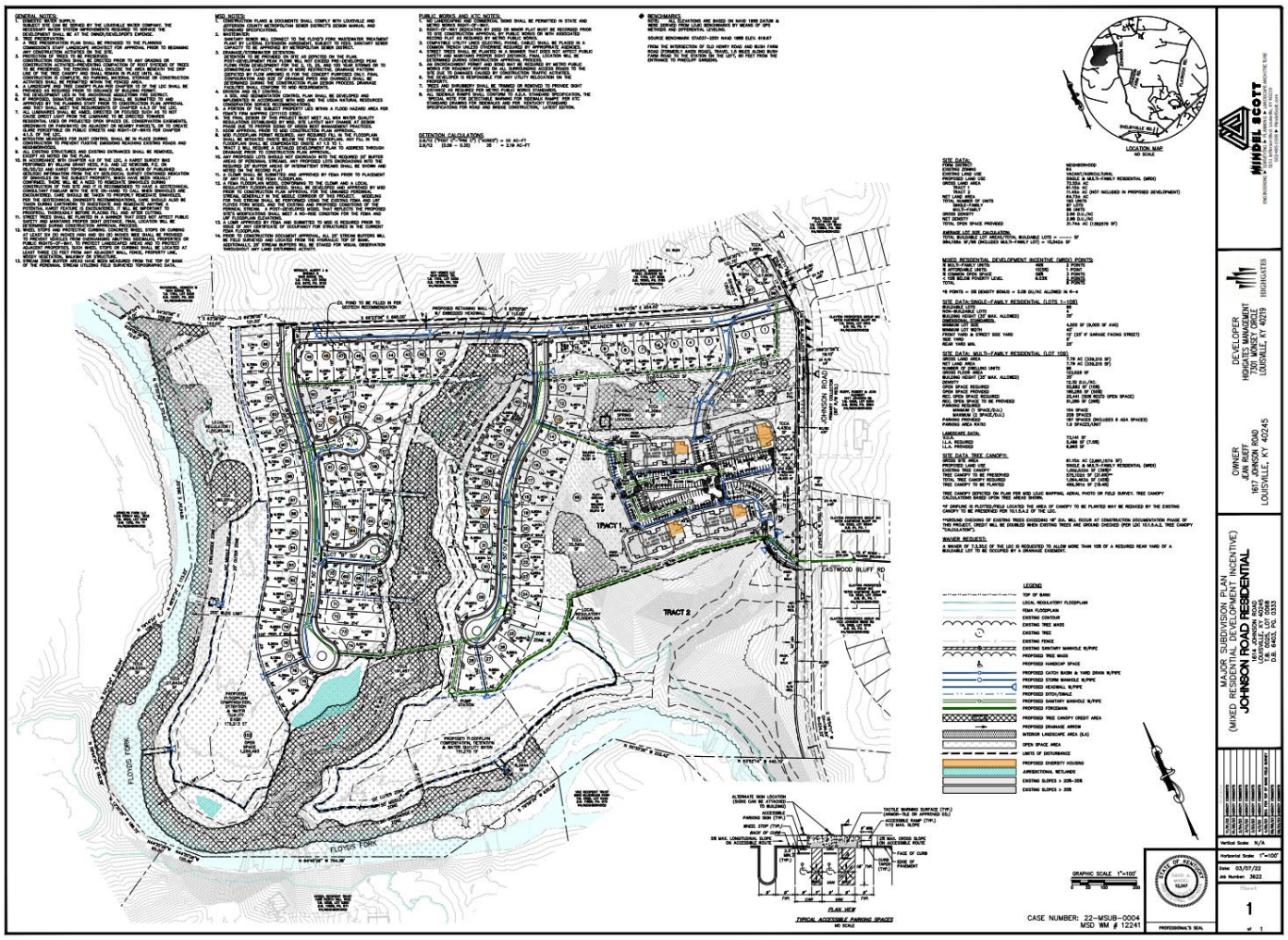
	A.M.			P.M.		
Approach	2022 Existing	2037 No Build	2037 Build	2022 Existing	2037 No Build	2037 Build
Johnson Road at Eastwood Bluff Road						
Entrance Eastbound	NA	NA	A 9.8	NA	NA	B 13.1
Eastwood Bluff Road Westbound	A 9.1	B 11.1	B 12.4	A 9.2	C 16.5	C 23.2
Johnson Road Northbound (left)	NA	NA	A 7.7	NA	NA	A 8.5
Johnson Road Southbound (left)	A 7.6	A 7.7	A 7.7	A 7.4	A 8.1	A 8.2

Key: Level of Service, Delay in seconds per vehicle

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2027 and 2037, there will be a slight impact to the existing highway network. No turn lanes will be required at the entrances.

APPENDIX


JOHNSON ROAD RESIDENTIAL
(MIXED RESIDENTIAL DEVELOPMENT INCENTIVE)
MAJOR SUBDIVISION PLAN
DEVELOPER
OWNER
JEAN RUEFF
187 JOHNSON ROAD
LOUISVILLE, KY 40245
CASE NUMBER: 22-MSUB-0004
MSD WM # 12241
TRACT 1
TRACT 2
EASTWOOD BLUFF RD
JOHNSON ROAD
FLOYDS FORK
LOCATION MAP
NO SCALE
GRAPHIC SCALE 1"=100'
TYPICAL ACCESSIBLE PARKING SPACES
PLAN VIEW
LEGEND

Traffic Counts

Classified Turn Movement Count || All vehicles

Marr Traffic DATA COLLECTION
www.marrtraffic.com

Louisville KY

Site 7 of 8
KY-1531 Johnson Rd (South)
KY-1531 Johnson Rd (North)

Eastwood Bluff Rd

Date
Thursday, May 19, 2022

Lat/Long
38.255313°, -85.456706°

Weather
Fair
74°F

0700 - 0900 (Weekday 2h Session) (05-19-2022)
All vehicles

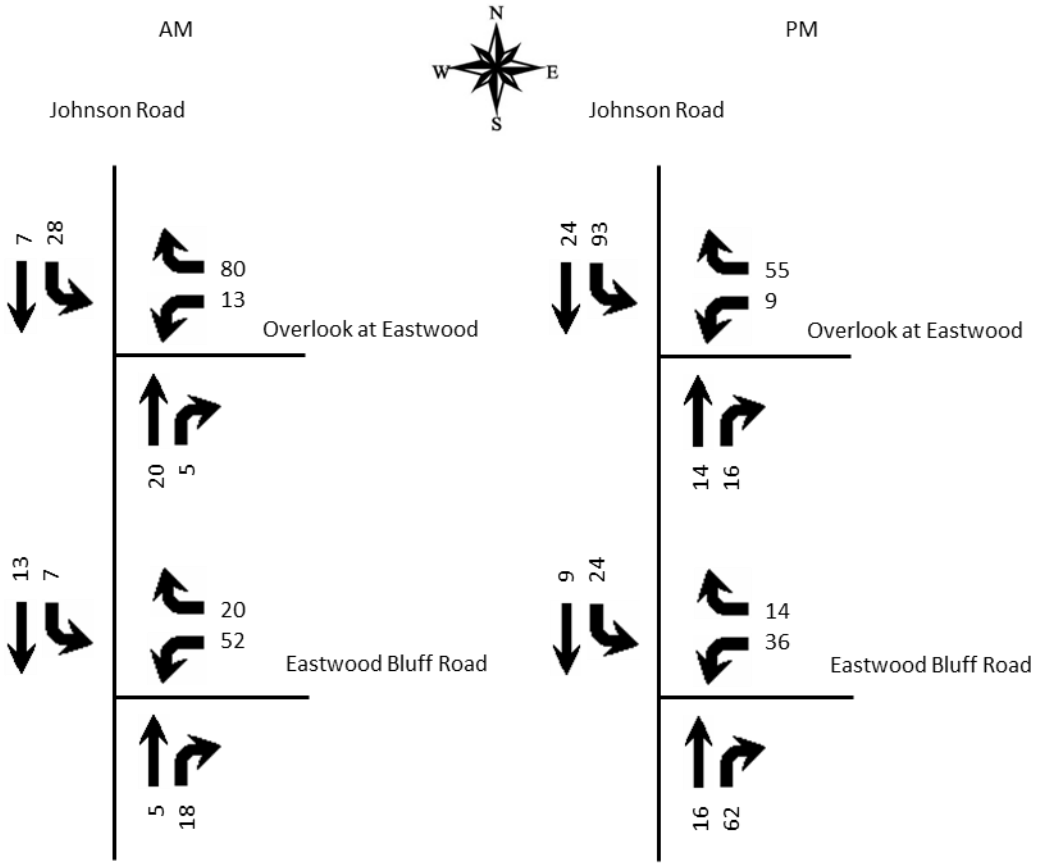
	Northbound KY-1531 Johnson Rd (South)				Southbound KY-1531 Johnson Rd (North)				Westbound Eastwood Bluff Rd				
TIME	Thru 7.1	Right 7.2	U-Turn 7.3	App Total	Left 7.4	Thru 7.5	U-Turn 7.6	App Total	Left 7.7	Right 7.8	U-Turn 7.9	App Total	Int Total
0700 - 0715	9	3	0	12	3	15	0	18	0	1	0	1	31
0715 - 0730	13	6	0	19	3	3	0	6	6	1	0	7	32
0730 - 0745	10	4	0	14	0	15	0	15	3	1	0	4	33
0745 - 0800	15	5	0	20	1	10	0	11	3	0	0	3	34
Hourly Total	47	18	0	**65**	7	43	0	**50**	12	3	0	**15**	**130**
0800 - 0815	4	5	0	9	5	8	0	13	2	2	0	4	26
0815 - 0830	7	0	0	7	2	4	0	6	3	4	0	7	20
0830 - 0845	2	2	0	4	3	7	0	10	4	3	0	7	21
0845 - 0900	0	1	0	1	4	7	1	12	3	2	1	6	19
Hourly Total	13	8	0	**21**	14	26	1	**41**	12	11	1	**24**	**86**
Grand Total	60	26	0	**86**	21	69	1	**91**	24	14	1	**39**	**216**
Approach %	69.77	30.23	0.00	-	23.08	75.82	1.10	-	61.54	35.90	2.56	-	
Intersection %	27.78	12.04	0.00	39.81	9.72	31.94	0.46	42.13	11.11	6.48	0.46	18.06	
PHF	0.78	0.75	0.00	**0.81**	0.58	0.72	0.00	**0.69**	0.50	0.75	0.00	**0.54**	**0.96**

1600 - 1800 (Weekday 2h Session) (05-19-2022)
All vehicles

	Northbound KY-1531 Johnson Rd (South)				Southbound KY-1531 Johnson Rd (North)				Westbound Eastwood Bluff Rd				
TIME	Thru 7.1	Right 7.2	U-Turn 7.3	App Total	Left 7.4	Thru 7.5	U-Turn 7.6	App Total	Left 7.7	Right 7.8	U-Turn 7.9	App Total	Int Total
1600 - 1615	16	1	0	17	1	34	0	35	0	1	0	1	53
1615 - 1630	17	1	0	18	2	28	0	30	1	2	0	3	51
1630 - 1645	16	1	0	17	2	30	0	32	2	1	0	3	52
1645 - 1700	10	0	0	10	3	11	0	14	0	1	0	1	25
Hourly Total	59	3	0	**62**	8	103	0	**111**	3	5	0	**8**	**181**
1700 - 1715	6	2	0	8	0	17	0	17	2	1	0	3	28
1715 - 1730	6	2	0	8	2	7	0	9	4	1	0	5	22
1730 - 1745	6	1	0	7	1	8	0	9	2	2	0	4	20
1745 - 1800	7	0	0	7	1	4	0	5	1	0	0	1	13
Hourly Total	25	5	0	**30**	4	36	0	**40**	9	4	0	**13**	**83**
Grand Total	84	8	0	**92**	12	139	0	**151**	12	9	0	**21**	**264**
Approach %	91.30	8.70	0.00	-	7.95	92.05	0.00	-	57.14	42.86	0.00	-	
Intersection %	31.82	3.03	0.00	34.85	4.55	52.65	0.00	57.20	4.55	3.41	0.00	7.95	
PHF	0.87	0.75	0.00	**0.86**	0.67	0.76	0.00	**0.79**	0.38	0.63	0.00	**0.67**	**0.85**

TRIP DISTRIBUTION for the OVERLOOK AT EASTWOOD
334 Lots

	A.M. Peak Hour			P.M. Peak Hour		
Land Use	**Trips**	**In**	**Out**	**Trips**	**In**	**Out**
Single Family (334 units)	223	58	165	309	195	114

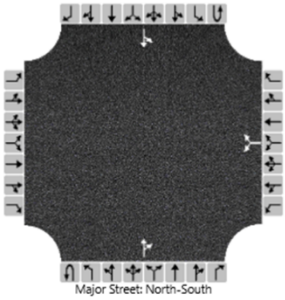


HCS Reports

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Overlook
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/21/2022	East/West Street	Overlook
Analysis Year	2027	North/South Street	Johnson Road
Time Analyzed	AM Peak	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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)						13		80			91	5		28	72	
Percent Heavy Vehicles (%)						3		3						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)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							96							29		
Capacity, c (veh/h)							920							1488		
v/c Ratio							0.10							0.02		
95% Queue Length, Q_{95} (veh)							0.3							0.1		
Control Delay (s/veh)							9.4							7.5	0.2	
Level of Service (LOS)							A							A	A	
Approach Delay (s/veh)						9.4							2.2			
Approach LOS						A							A			

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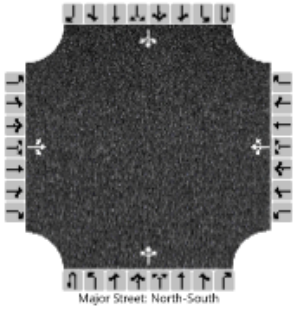
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Overlook
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	08/24/2023	East/West Street	Overlook
Analysis Year	2027	North/South Street	Johnson Road
Time Analyzed	AM Peak Build	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		39	0	30		13	0	80		10	94	5		28	73	13
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				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)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			71				96			10				29		
Capacity, c (veh/h)			701				891			1501				1484		
v/c Ratio			0.10				0.11			0.01				0.02		
95% Queue Length, Q_{95} (veh)			0.3				0.4			0.0				0.1		
Control Delay (s/veh)			10.7				9.5			7.4	0.1	0.1		7.5	0.2	0.2
Level of Service (LOS)			B				A			A	A	A		A	A	A
Approach Delay (s/veh)		10.7				9.5				0.7				2.0		
Approach LOS		B				A				A				A		

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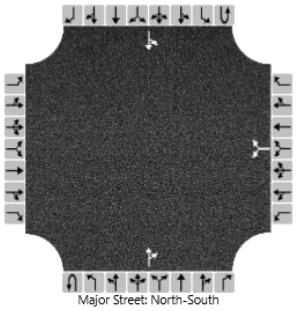
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Overlook
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/21/2022	East/West Street	Overlook
Analysis Year	2037	North/South Street	Johnson Road
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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)						13		80			190	5		28	166	
Percent Heavy Vehicles (%)						3		3						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)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							96							29		
Capacity, c (veh/h)							788							1365		
v/c Ratio							0.12							0.02		
95% Queue Length, Q_{95} (veh)							0.4							0.1		
Control Delay (s/veh)							10.2							7.7	0.2	
Level of Service (LOS)							B							A	A	
Approach Delay (s/veh)						10.2								1.3		
Approach LOS						B								A		

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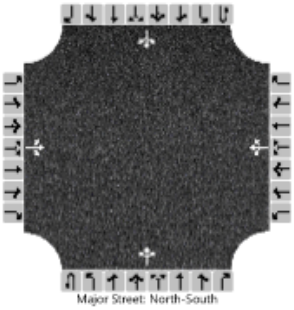
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Overlook
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	08/24/2023	East/West Street	Overlook
Analysis Year	2037	North/South Street	Johnson Road
Time Analyzed	AM Peak Build	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		39	0	30		13	0	80		10	193	5		28	167	13
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				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)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			71				96			10				29		
Capacity, c (veh/h)			539				753			1383				1361		
v/c Ratio			0.13				0.13			0.01				0.02		
95% Queue Length, Q_{95} (veh)			0.5				0.4			0.0				0.1		
Control Delay (s/veh)			12.7				10.5			7.6	0.1	0.1		7.7	0.2	0.2
Level of Service (LOS)			B				B			A	A	A		A	A	A
Approach Delay (s/veh)		12.7				10.5				0.4				1.2		
Approach LOS		B				B				A				A		

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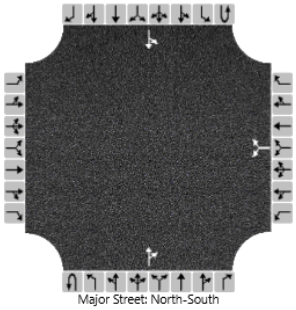
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Overlook
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/21/2022	East/West Street	Overlook at Eastwood
Analysis Year	2027	North/South Street	Johnson Road
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.85
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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)						9		55			108	16		93	180	
Percent Heavy Vehicles (%)						3		3						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)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							75							109		
Capacity, c (veh/h)							791							1430		
v/c Ratio							0.10							0.08		
95% Queue Length, Q_{95} (veh)							0.3							0.2		
Control Delay (s/veh)							10.0							7.7	0.7	
Level of Service (LOS)							B							A	A	
Approach Delay (s/veh)						10.0								3.1		
Approach LOS						B								A		

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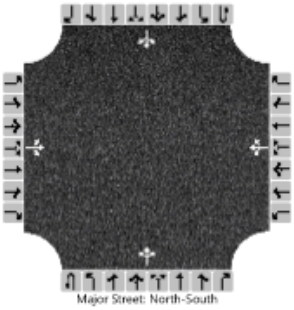
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Overlook
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	08/24/2023	East/West Street	Overlook at Eastwood
Analysis Year	2027	North/South Street	Johnson Road
Time Analyzed	PM Peak Build	Peak Hour Factor	0.85
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		24	0	20		9	0	55		34	110	16		93	183	42
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				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)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			52				75			40				109		
Capacity, c (veh/h)			401				710			1294				1427		
v/c Ratio			0.13				0.11			0.03				0.08		
95% Queue Length, Q_{95} (veh)			0.4				0.4			0.1				0.2		
Control Delay (s/veh)			15.3				10.7			7.9	0.3	0.3		7.7	0.7	0.7
Level of Service (LOS)			C				B			A	A	A		A	A	A
Approach Delay (s/veh)		15.3				10.7				1.9				2.8		
Approach LOS		C				B				A				A		

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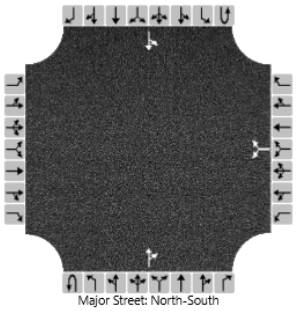
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Overlook
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/21/2022	East/West Street	Overlook at Eastwood
Analysis Year	2037	North/South Street	Johnson Road
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.85
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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)						9		55			251	16		93	415	
Percent Heavy Vehicles (%)						3		3						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)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							75							109		
Capacity, c (veh/h)							562							1240		
v/c Ratio							0.13							0.09		
95% Queue Length, Q_{95} (veh)							0.5							0.3		
Control Delay (s/veh)							12.4							8.2	1.0	
Level of Service (LOS)							B							A	A	
Approach Delay (s/veh)							12.4							2.3		
Approach LOS							B							A		

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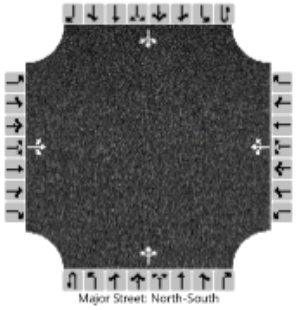
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Overlook
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	08/24/2023	East/West Street	Overlook at Eastwood
Analysis Year	2037	North/South Street	Johnson Road
Time Analyzed	PM Peak Build	Peak Hour Factor	0.85
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		24	0	20		9	0	55		34	253	16		93	418	42
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				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)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			52				75			40				109		
Capacity, c (veh/h)			201				462			1022				1238		
v/c Ratio			0.26				0.16			0.04				0.09		
95% Queue Length, Q_{95} (veh)			1.0				0.6			0.1				0.3		
Control Delay (s/veh)			29.0				14.3			8.7	0.4	0.4		8.2	1.0	1.0
Level of Service (LOS)			D				B			A	A	A		A	A	A
Approach Delay (s/veh)		29.0				14.3				1.3				2.2		
Approach LOS		D				B				A				A		

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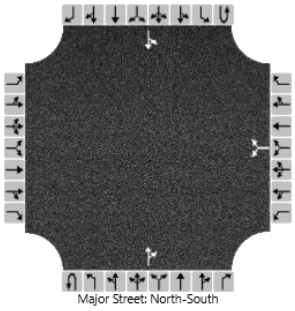
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Eastwood Bluff
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/21/2022	East/West Street	Eastwood Bluff Road
Analysis Year	2022	North/South Street	Johnson Road
Time Analyzed	AM Peak	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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)						12		3			47	18		7	43	
Percent Heavy Vehicles (%)						0		33						28		
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		6.53						4.38		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.50		3.60						2.45		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							15							7		
Capacity, c (veh/h)							889							1384		
v/c Ratio							0.02							0.01		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							9.1							7.6	0.0	
Level of Service (LOS)							A							A	A	
Approach Delay (s/veh)							9.1							1.1		
Approach LOS							A							A		

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Eastwood AM 22.xtw

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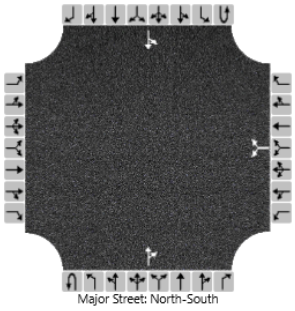
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Eastwood Bluff
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/21/2022	East/West Street	Eastwood Bluff Road
Analysis Year	2027	North/South Street	Johnson Road
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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)						52		20			76	18		7	78	
Percent Heavy Vehicles (%)						5		5						5		
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)						6.45		6.25						4.15		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.55		3.35						2.25		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							74							7		
Capacity, c (veh/h)							836							1478		
v/c Ratio							0.09							0.00		
95% Queue Length, Q_{95} (veh)							0.3							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							0.6			
Approach LOS						A							A			

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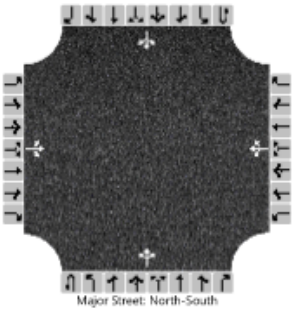
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Eastwood Bluff
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	08/24/2023	East/West Street	Eastwood Bluff Road
Analysis Year	2027	North/South Street	Johnson Road
Time Analyzed	AM Peak Build	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		3	0	22		52	0	20		7	86	18		7	108	1
Percent Heavy Vehicles (%)		3	3	3		5	3	5		3				5		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.15	6.53	6.25		4.13				4.15		
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)		3.53	4.03	3.33		3.55	4.03	3.35		2.23				2.25		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			26				74			7				7		
Capacity, c (veh/h)			898				733			1471				1465		
v/c Ratio			0.03				0.10			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.1				0.3			0.0				0.0		
Control Delay (s/veh)			9.1				10.5			7.5	0.0	0.0		7.5	0.0	0.0
Level of Service (LOS)			A				B			A	A	A		A	A	A
Approach Delay (s/veh)		9.1				10.5				0.5				0.5		
Approach LOS		A				B				A				A		

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Eastwood AM 27 B.xtw

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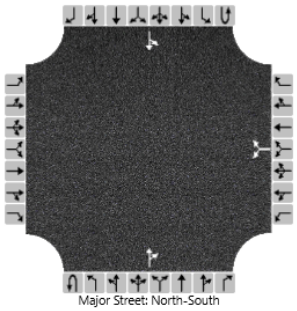
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Eastwood Bluff
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/21/2022	East/West Street	Eastwood Bluff Road
Analysis Year	2037	North/South Street	Johnson Road
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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)						52		20			175	18		7	172	
Percent Heavy Vehicles (%)						5		5						5		
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)						6.45		6.25						4.15		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.55		3.35						2.25		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							74							7		
Capacity, c (veh/h)							662							1356		
v/c Ratio							0.11							0.01		
95% Queue Length, Q_{95} (veh)							0.4							0.0		
Control Delay (s/veh)							11.1							7.7	0.0	
Level of Service (LOS)							B							A	A	
Approach Delay (s/veh)							11.1							0.3		
Approach LOS							B							A		

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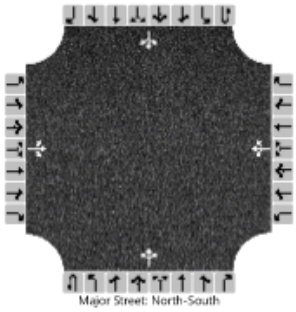
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Eastwood Bluff
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	08/24/2023	East/West Street	Eastwood Bluff Road
Analysis Year	2037	North/South Street	Johnson Road
Time Analyzed	AM Peak Build	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		3	0	22		52	0	20		7	185	18		7	202	1
Percent Heavy Vehicles (%)		3	3	3		5	3	5		3				5		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.15	6.53	6.25		4.13				4.15		
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)		3.53	4.03	3.33		3.55	4.03	3.35		2.23				2.25		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			26				74			7				7		
Capacity, c (veh/h)			768				558			1356				1344		
v/c Ratio			0.03				0.13			0.01				0.01		
95% Queue Length, Q_{95} (veh)			0.1				0.5			0.0				0.0		
Control Delay (s/veh)			9.8				12.4			7.7	0.0	0.0		7.7	0.0	0.0
Level of Service (LOS)			A				B			A	A	A		A	A	A
Approach Delay (s/veh)		9.8				12.4				0.3				0.3		
Approach LOS		A				B				A				A		

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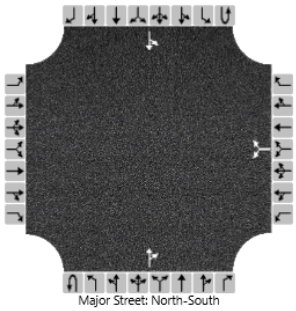
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Eastwood Bluff
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/21/2022	East/West Street	Eastwood Bluff Road
Analysis Year	2022	North/South Street	Johnson Road
Time Analyzed	PM Peak	Peak Hour Factor	0.85
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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)						3		5			59	3		8	103	
Percent Heavy Vehicles (%)						33		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)						6.73		6.20						4.10		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.80		3.30						2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							9							9		
Capacity, c (veh/h)							865							1540		
v/c Ratio							0.01							0.01		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							9.2							7.4	0.0	
Level of Service (LOS)							A							A	A	
Approach Delay (s/veh)							9.2							0.6		
Approach LOS							A							A		

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Eastwood PM 22.xtw

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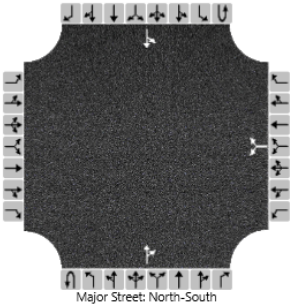
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Eastwood Bluff
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/21/2022	East/West Street	Eastwood Bluff Road
Analysis Year	2027	North/South Street	Johnson Road
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.85
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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)						36		14			110	62		24	165	
Percent Heavy Vehicles (%)						3		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)						6.43		6.20						4.10		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.30						2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							59							28		
Capacity, c (veh/h)							639							1382		
v/c Ratio							0.09							0.02		
95% Queue Length, Q_{95} (veh)							0.3							0.1		
Control Delay (s/veh)							11.2							7.7	0.2	
Level of Service (LOS)							B							A	A	
Approach Delay (s/veh)						11.2								1.1		
Approach LOS						B								A		

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Eastwood PM 27 NB.xtw

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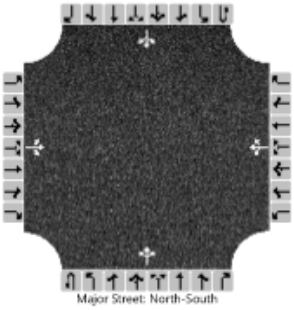
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Eastwood Bluff
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	08/24/2023	East/West Street	Eastwood Bluff Road
Analysis Year	2027	North/South Street	Johnson Road
Time Analyzed	PM Peak Build	Peak Hour Factor	0.85
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		2	0	13		36	0	14		21	144	62		24	185	3
Percent Heavy Vehicles (%)		3	3	3		3	3	0		3				0		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.20		4.13				4.10		
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)		3.53	4.03	3.33		3.53	4.03	3.30		2.23				2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			18				59			25				28		
Capacity, c (veh/h)			727				492			1342				1336		
v/c Ratio			0.02				0.12			0.02				0.02		
95% Queue Length, Q_{95} (veh)			0.1				0.4			0.1				0.1		
Control Delay (s/veh)			10.1				13.3			7.7	0.2	0.2		7.8	0.2	0.2
Level of Service (LOS)			B				B			A	A	A		A	A	A
Approach Delay (s/veh)		10.1				13.3				0.9				1.0		
Approach LOS		B				B				A				A		

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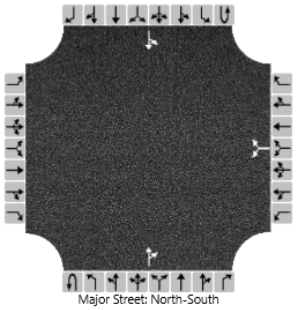
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Johnson Rd at Eastwood Bluff
Agency/Co.	Diane B. Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/21/2022	East/West Street	Eastwood Bluff Road
Analysis Year	2037	North/South Street	Johnson Road
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.85
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Johnson Road Mixed		

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)						36		14			253	62		24	400	
Percent Heavy Vehicles (%)						3		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)						6.43		6.20						4.10		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.30						2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							59							28		
Capacity, c (veh/h)							373							1199		
v/c Ratio							0.16							0.02		
95% Queue Length, Q_{95} (veh)							0.6							0.1		
Control Delay (s/veh)							16.5							8.1	0.3	
Level of Service (LOS)							C							A	A	
Approach Delay (s/veh)						16.5							0.7			
Approach LOS						C							A			

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Eastwood PM 37 NB.xtw

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HCS Two-Way Stop-Control Report

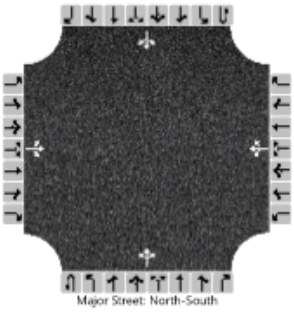
General Information

Analyst	Diane Zimmerman
Agency/Co.	Diane B. Zimmerman Traffic Engineering
Date Performed	08/24/2023
Analysis Year	2037
Time Analyzed	PM Peak Build
Intersection Orientation	North-South
Project Description	Johnson Road Mixed

Site Information

Intersection	Johnson Rd at Eastwood Bluff
Jurisdiction	
East/West Street	Eastwood Bluff Road
North/South Street	Johnson Road
Peak Hour Factor	0.85
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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		2	0	13		36	0	14		21	287	62		24	420	3
Percent Heavy Vehicles (%)		3	3	3		3	3	0		3				0		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.20		4.13				4.10		
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)		3.53	4.03	3.33		3.53	4.03	3.30		2.23				2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			18				59			25				28		
Capacity, c (veh/h)			463				257			1061				1159		
v/c Ratio			0.04				0.23			0.02				0.02		
95% Queue Length, Q_{95} (veh)			0.1				0.9			0.1				0.1		
Control Delay (s/veh)			13.1				23.2			8.5	0.3	0.3		8.2	0.3	0.3
Level of Service (LOS)			B				C			A	A	A		A	A	A
Approach Delay (s/veh)		13.1				23.2				0.7				0.7		
Approach LOS		B				C				A				A		

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Left Turn Lane Warrants

Input Fields

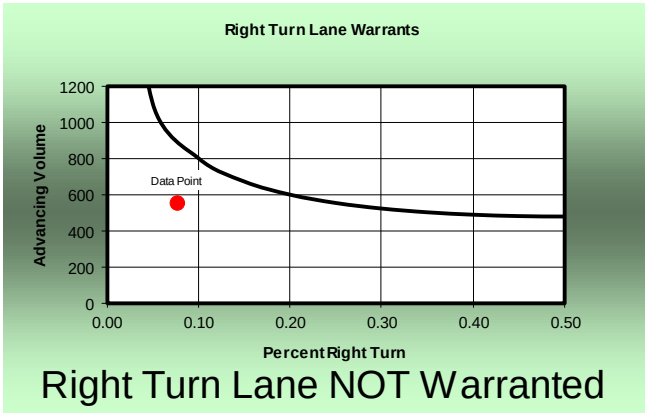
Left Turn Volume (vph)	34	Speed Limit (mph)	35
Advancing Volume (vph)	303	No. of through lanes	1
Opposing Volume (vph)	553	Percent Heavy Vehicles (decimal percent)	0.01

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)	42	Speed Limit (mph)	35
Advancing Volume (vph)	553		



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.