final report

August 26, 2020

Traffic Impact Study

Residential
8300 Cooper Chapel Road (KY 864)
Louisville, KY

Prepared for

Louisville Metro Planning Commission
Kentucky Transportation Cabinet

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INTRODUCTION

The site plan for the proposed residential development shows 88 single-family lots and 432 apartments on Cooper Chapel Road (KY 864) at the intersection of Cedar Creek Road in Louisville, KY. **Figure 1** displays a map of the site. Access to the site will be from two entrances, one on Copper Chapel Road and one on Cedar Creek Road (KY 864). A connection will be made to Fantasy Trail to the south. 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 Cedar Creek Road with Loyal Drive and Cooper Chapel Road, and the proposed entrances.

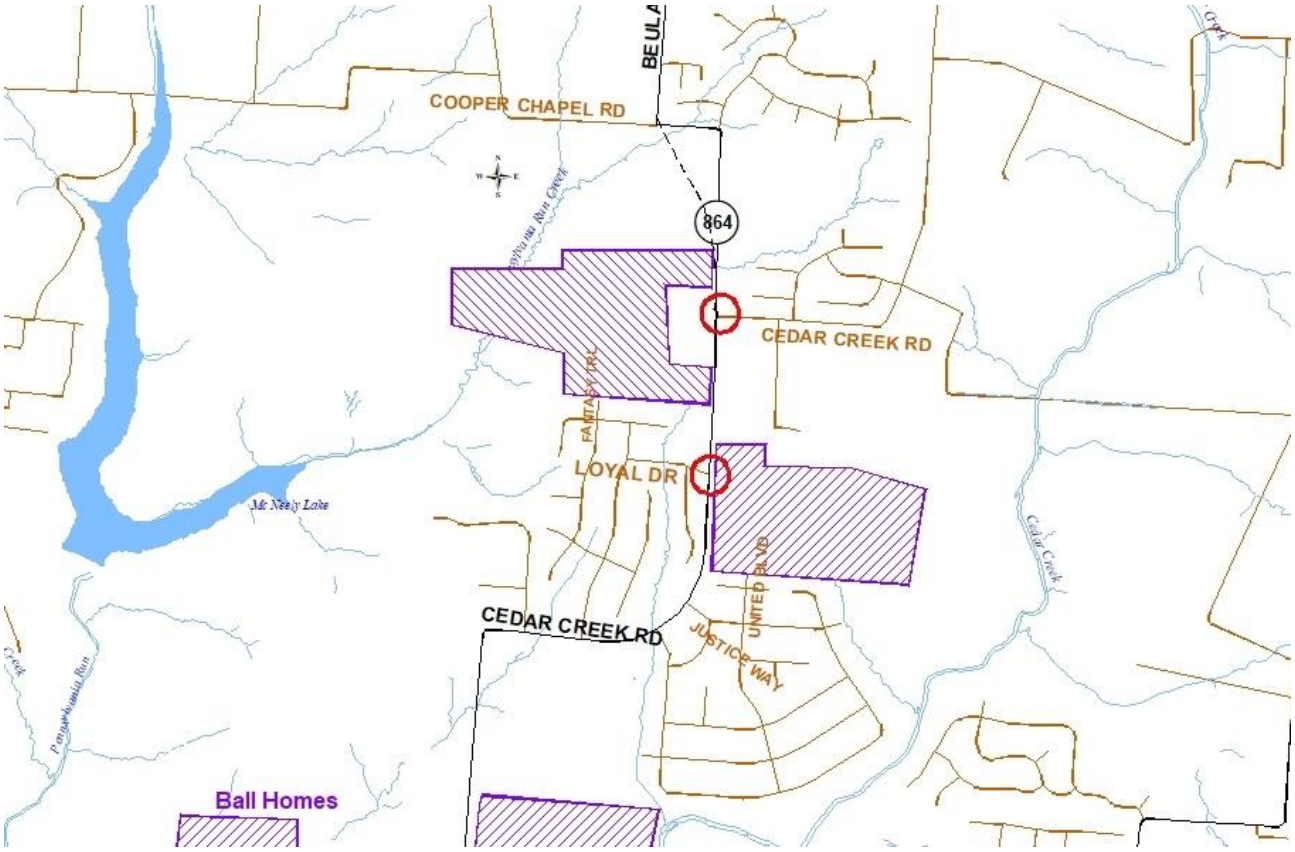


Figure 1. Site Map

EXISTING CONDITIONS

Cedar Creek Road, KY 864, is a state-maintained road with an estimated 2020 ADT of 2,400 vehicles per day between KY 2053 (Mt. Washington Road) and Cooper Chapel Road as estimated from the 2018 count at Kentucky Transportation Cabinet (KYTC) at station 279. The KYTC functional classification is Urban Major Collector. The road is a two-lane highway with ten-foot lanes with three-foot shoulders through the study area (provided by the Kentucky Transportation Cabinet). The speed limit is 35 mph. There are no sidewalks. The intersection at Loyal Drive is controlled with a stop sign on Loyal Drive. The intersection with Cedar Creek Road is controlled with a stop sign on Cedar Creek Road.

Peak hour traffic count for the intersection of Cedar Creek Road at Loyal Drive was obtained on Wednesday, January 15, 2020. The a.m. peak hour occurred between 7:00 and 8:00 and the p.m. peak hour occurred between 4:45 and

5:45. The turning movement data for the intersection of Cooper Chapel Road at Cedar Creek Road is from the KYTC traffic forecast for Cooper Chapel Road improvements (5-481.0) dated January 2013. The 2013 volumes have been project to 2020. **Figure 2** illustrates the existing a.m. and p.m. peak hour traffic volumes. The Appendix contains the full count data.

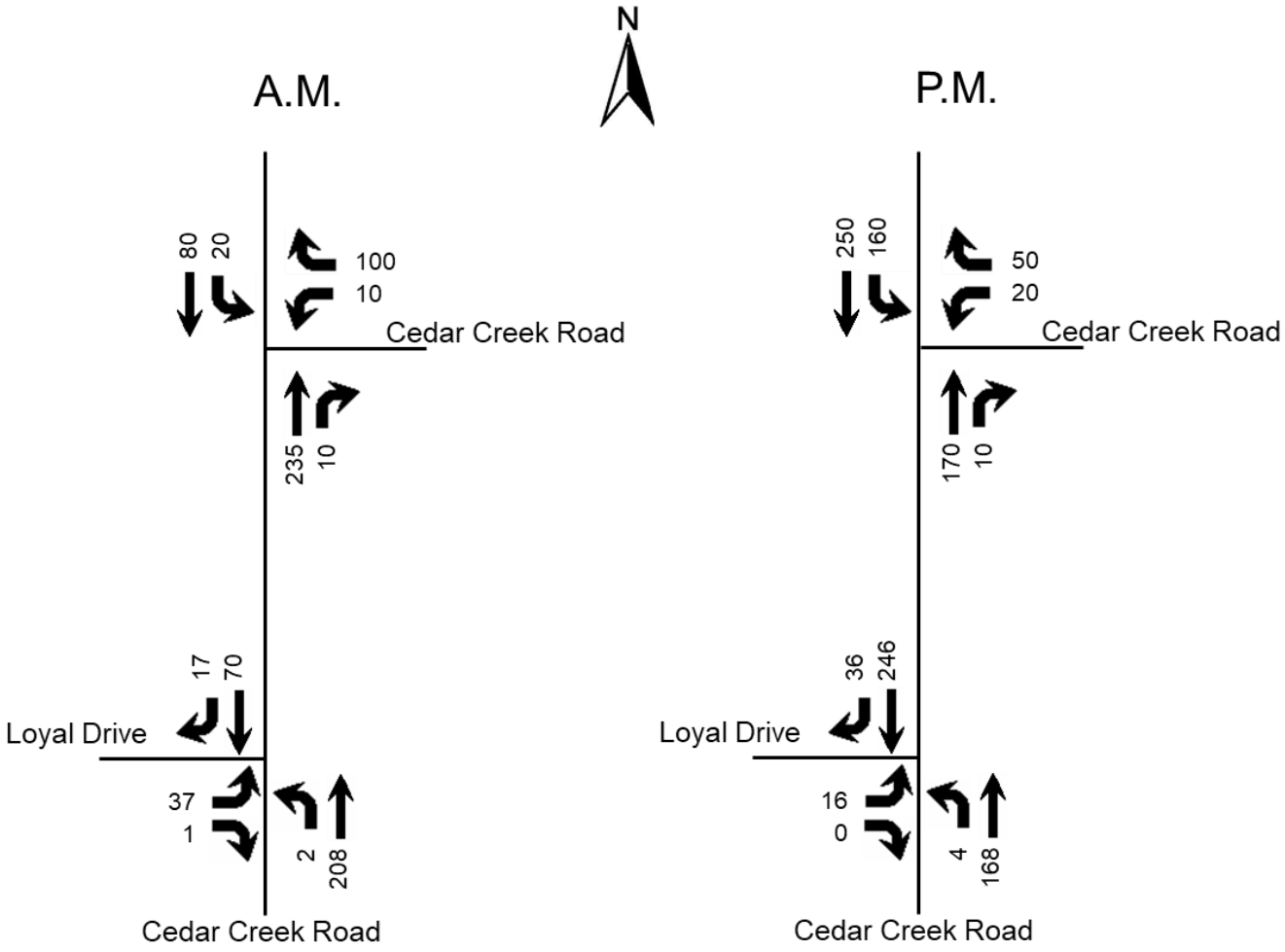


Figure 2. Existing Peak Hour Volumes

FUTURE CONDITIONS

The project completion date is 2024. An annual growth rate of 2 percent was applied to the 2020 thru volumes. This was determined by the historical growth at KYTC station 279. Trip generation for 523 lots from approved subdivisions to the south were included (see Appendix for detail). Trip generation for the remaining 62 lots to be accessed from Loyal Drive have been included on Loyal Drive. The Kentucky Transportation Cabinet and Louisville Metro will be constructing improvements to Cooper Chapel Road north to Beulah Church Road. This project will include a two-way left-turn lane. **Figure 3** displays the 2024 No Build peak hour volumes.

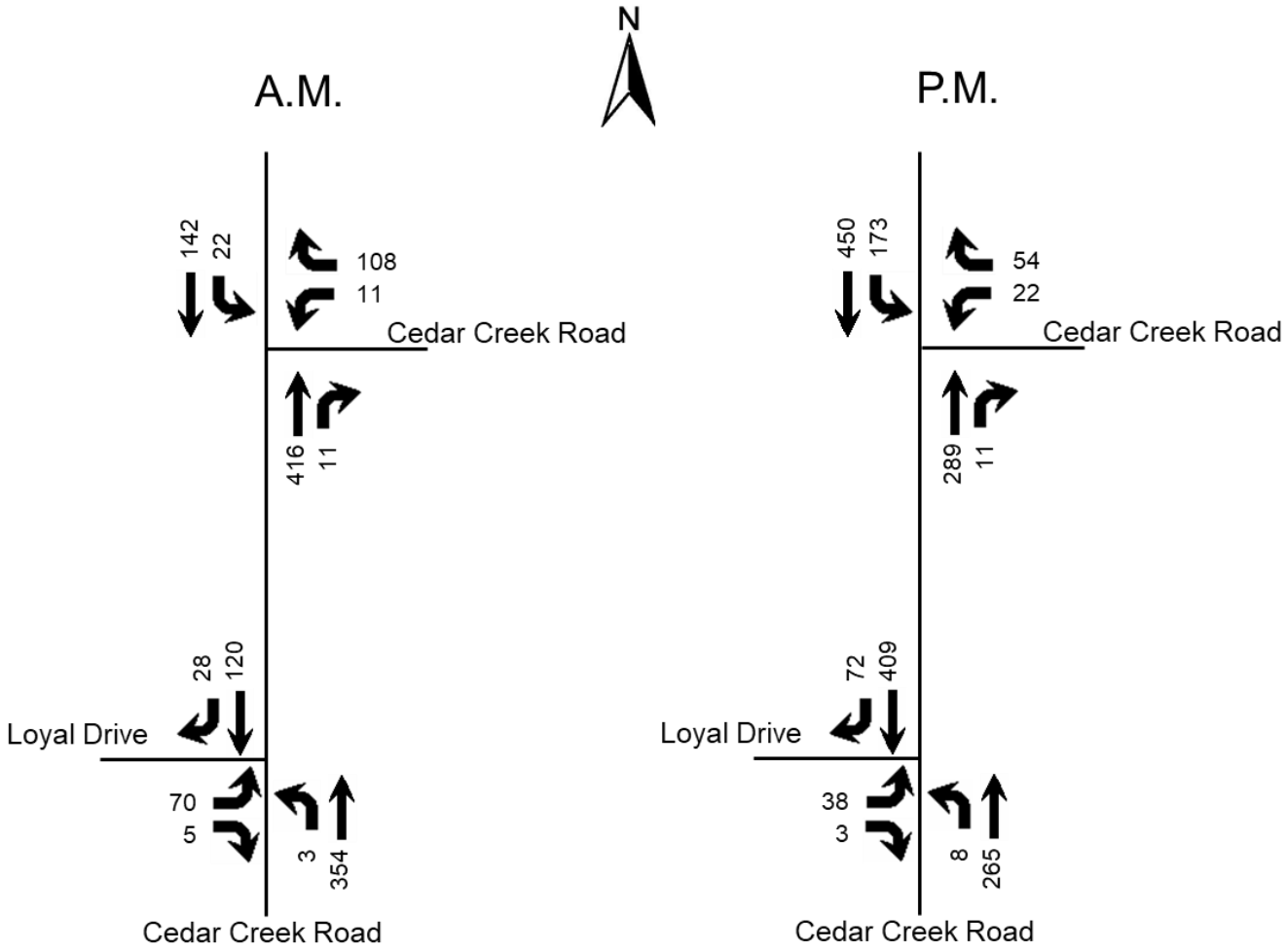


Figure 3. 2024 No Build Peak Hour Volumes

TRIP GENERATION

The Institute of Transportation Engineers Trip Generation Manual, 10th Edition contains trip generation rates for a wide range of developments. The land uses of "Single-Family Detached (210)" and "Multifamily Housing (Mid-Rise) (221)" were reviewed and determined to be the best match. The trip generation results are listed in **Table 1**. The trips were assigned to the highway network with the percentages shown in **Figure 4**. **Figure 5** shows 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 (88 units)	67	17	50	180	110	70
Multifamily (432 units)	144	37	107	180	110	70
TOTAL	**211**	**54**	**157**	**270**	**167**	**103**

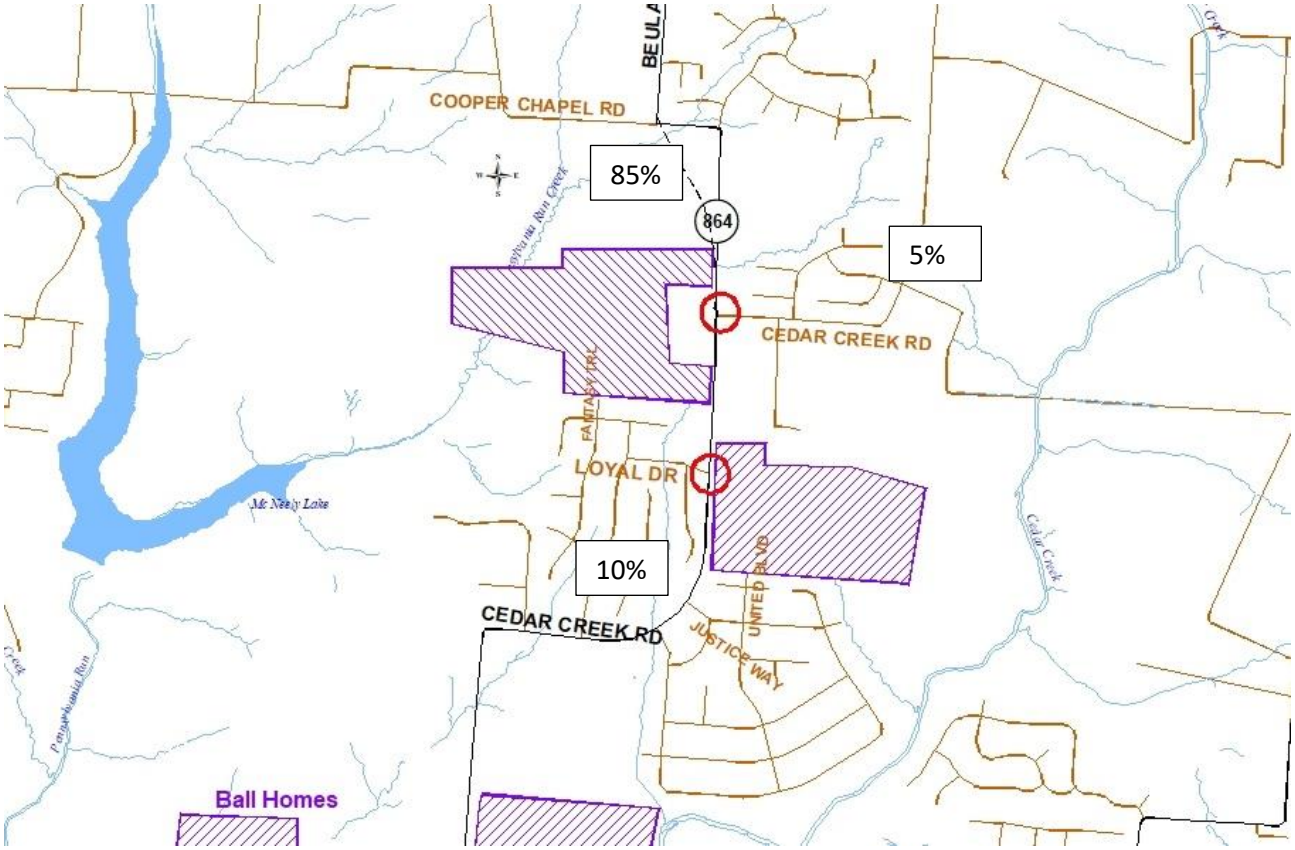


Figure 4. Trip Distribution Percentages

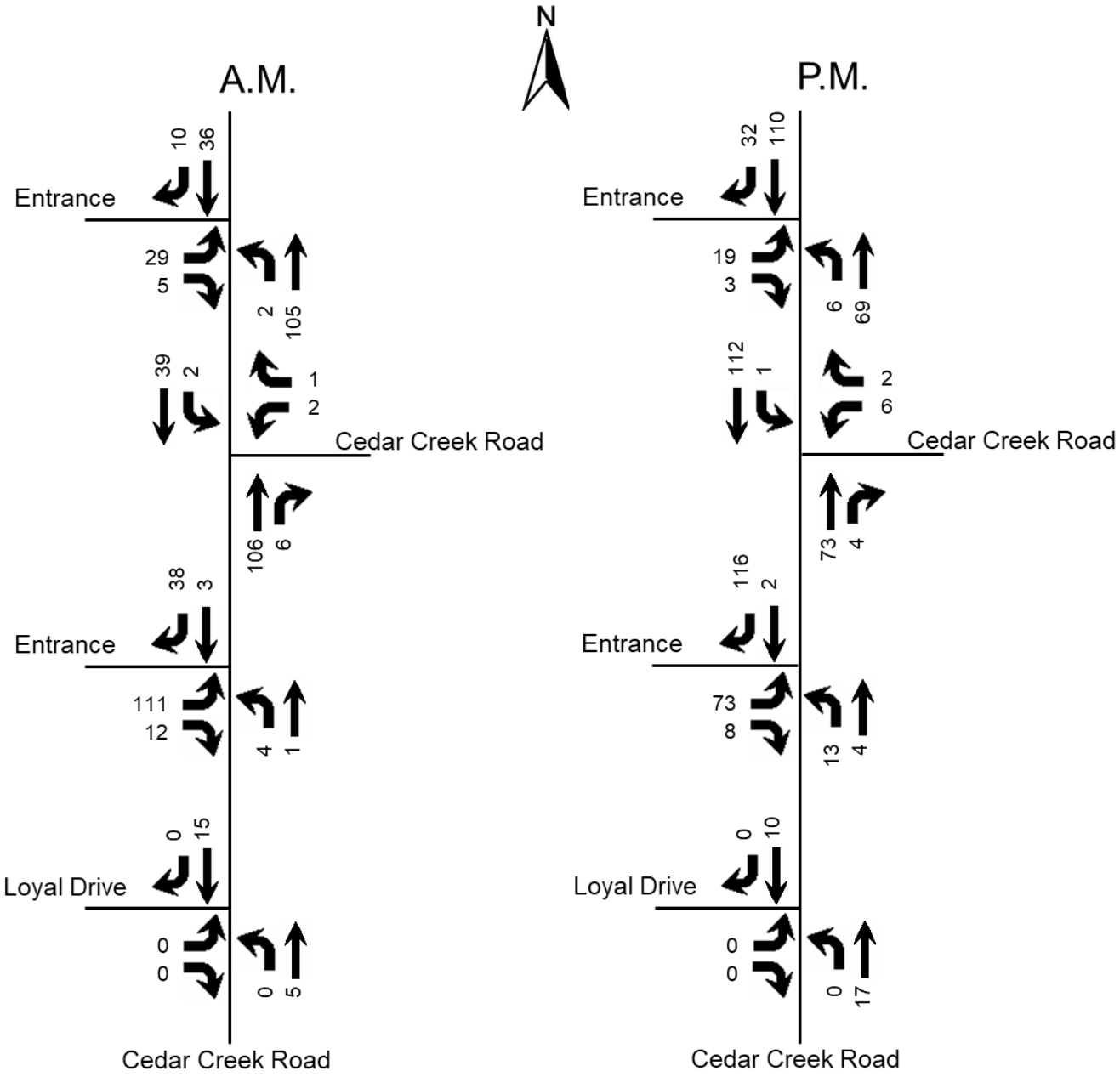


Figure 5. Peak Hour Trips Generated by Site

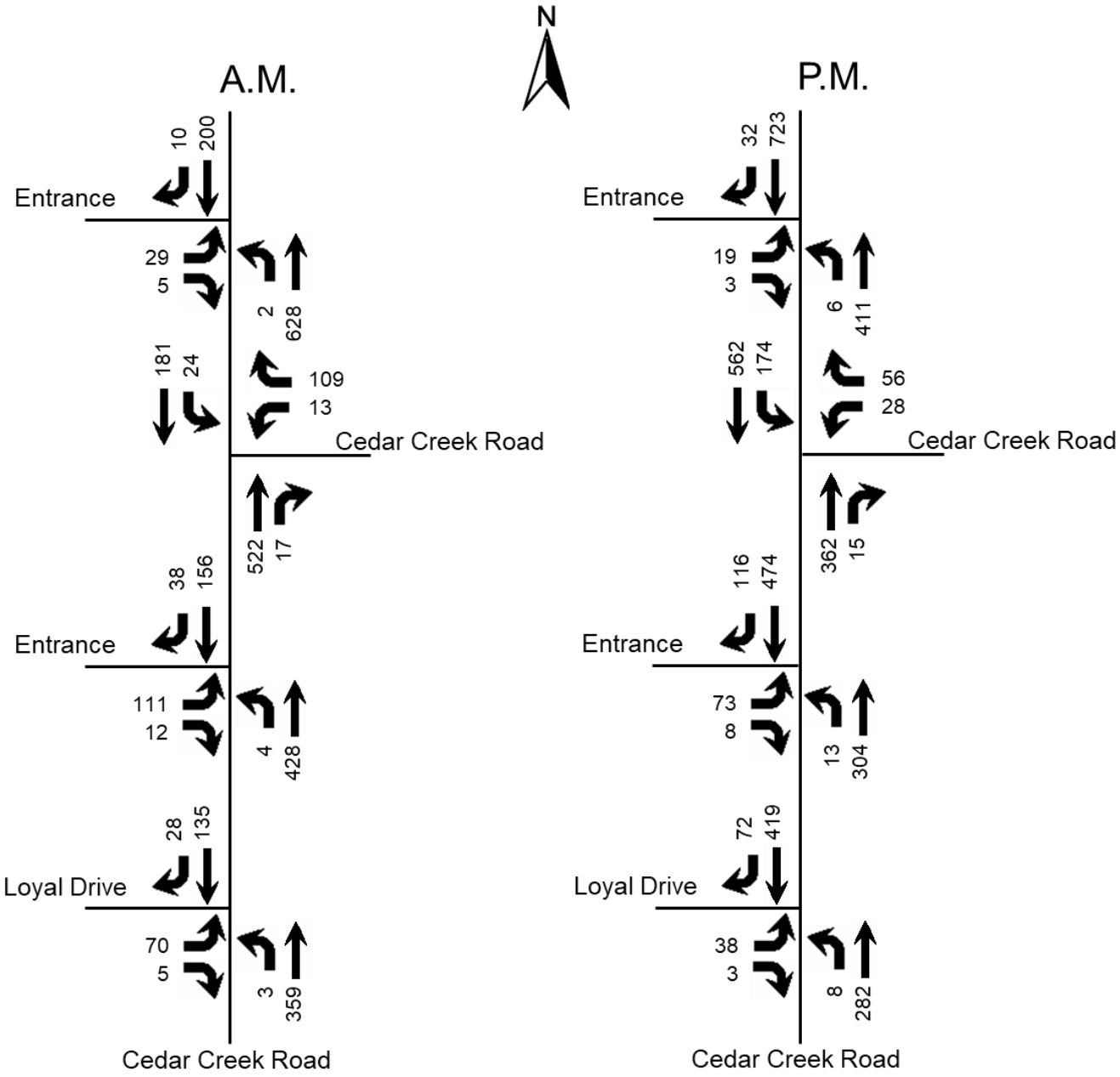


Figure 6. 2024 Build Peak Hour Volumes

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 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, 6th edition. Future delays and Level of Service were determined for the intersections using the HCS Streets (version 7.9) software. The delays and Level of Service are summarized in **Table 2**.

Table 2. Peak Hour Level of Service

	A.M.			P.M.		
Approach	2020 Existing	2024 No Build	2024 Build	2020 Existing	2024 No Build	2024 Build
Cooper Chapel Road at Entrance (N)						
Entrance Eastbound			C 15.1			C 18.2
Cooper Chapel Road Northbound (left)			A 7.7			A 9.8
Cooper Chapel Road at Cedar Creek Road						
Cedar Creek Road Westbound	B 10.7	B 14.0	B 16.7	B 12.1	B 14.8	C 18.2
Cooper Chapel Road Southbound (left)	A 7.9	A 8.6	A 9.0	A 7.9	A 8.6	A 9.0
Cedar Creek Road at Loyal Drive						
Loyal Drive Eastbound	B 11.0	B 14.4	B 14.8	B 12.3	C 17.6	C 18.3
Cedar Creek Road Northbound (left)	A 7.4	A 7.6	A 7.6	A 7.9	A 8.6	A 8.6
Cedar Creek Road at Entrance						
Entrance Eastbound			C 18.7			C 22.8
Cedar Creek Road Northbound (left)			A 7.7			A 9.0

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 2034. The 2034 volumes were determined by using 2% annual growth from the 2020 volumes and adding trip generation for all the recently approved lots (770 total). See appendix for trip generation. Figure 7 is the 2034 No Build and Figure 8 is the Build. The volumes in Figure 8 were utilized to determine turn lane requirements. The south entrance will require a southbound right turn lane. Table 3 displays the level of service results for 2034.

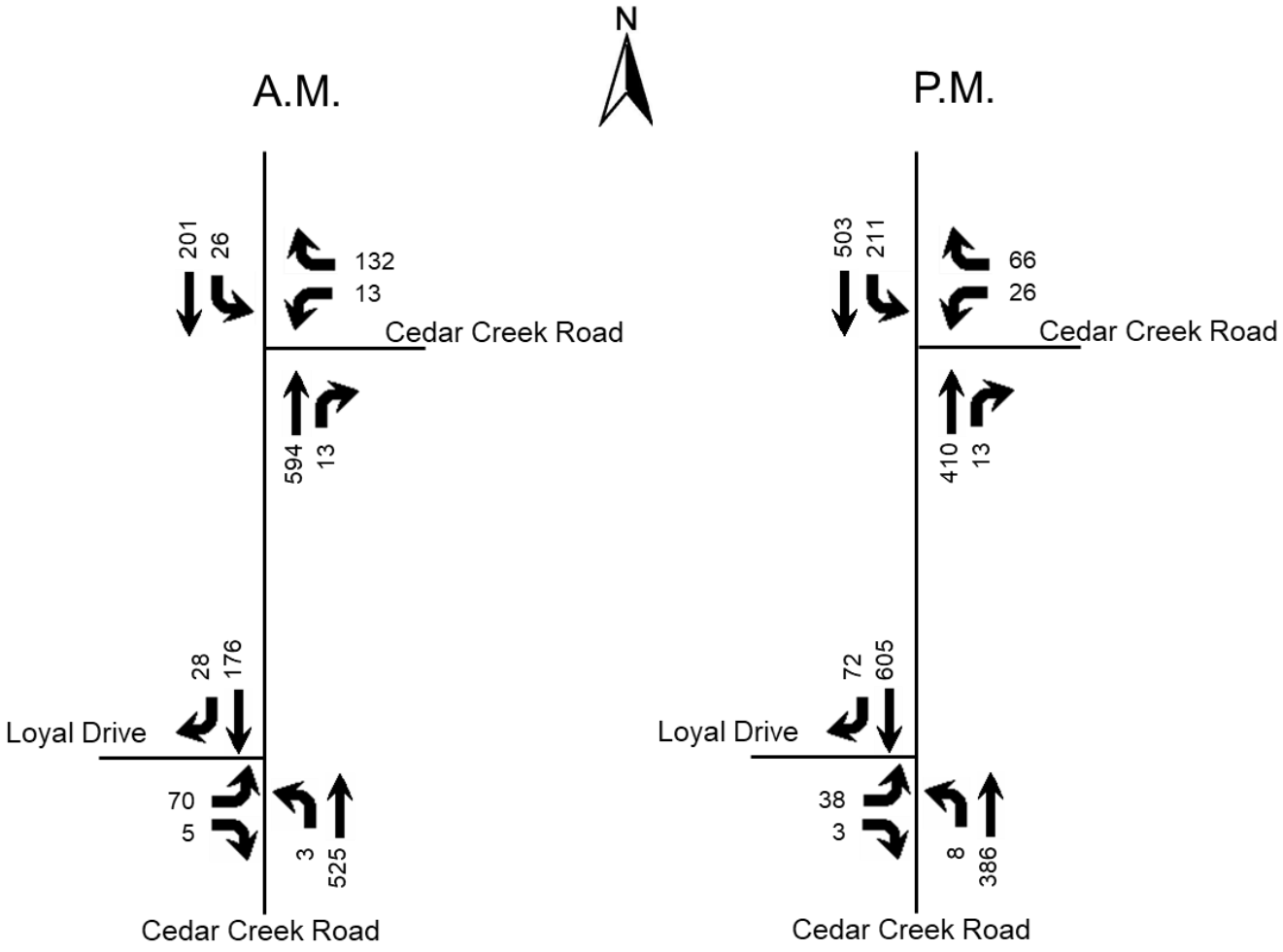


Figure 7. 2034 No Build Peak Hour Volumes

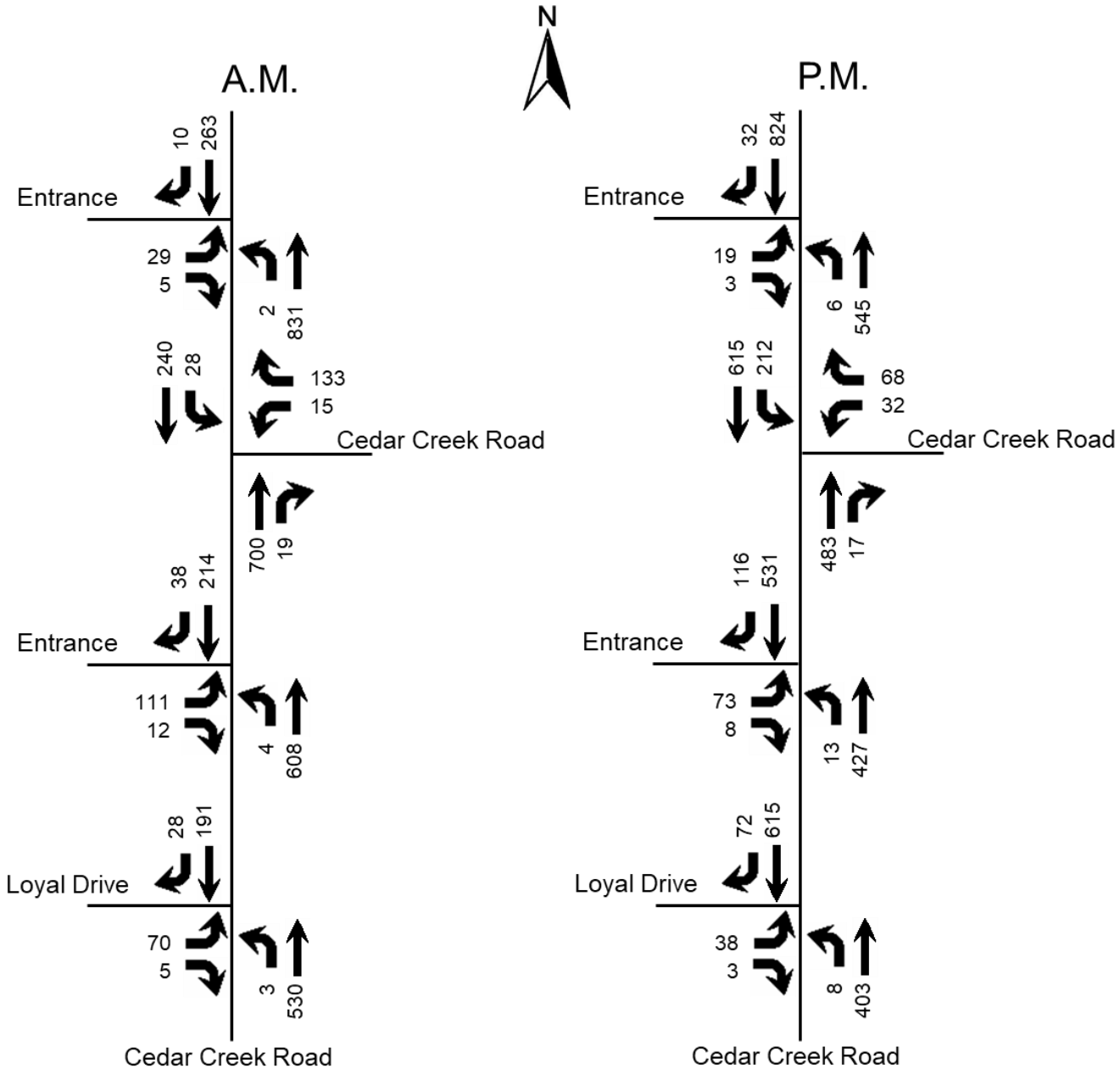


Figure 8. 2034 Build Peak Hour Volumes

Table 3. Peak Hour Level of Service 2034

	A.M.			P.M.		
Approach	2020 Existing	2034 No Build	2034 Build	2020 Existing	2034 No Build	2034 Build
Cooper Chapel Road at Entrance (N)						
Entrance Eastbound			C 18.8			C 21.4
Cooper Chapel Road Northbound (left)			A 7.9			B 10.3
Cooper Chapel Road at Cedar Creek Road						
Cedar Creek Road Westbound	B 10.7	C 20.5	D 27.0	B 12.1	C 19.1	D 25.1
Cooper Chapel Road Southbound (left)	A 7.9	A 9.4	A 10.0	A 7.9	A 9.5	A 10.0
Cedar Creek Road at Loyal Drive						
Loyal Drive Eastbound	B 11.0	C 20.2	C 21.0	B 12.3	D 28.8	D 30.2
Cedar Creek Road Northbound (left)	A 7.4	A 7.7	A 7.8	A 7.9	A 9.4	A 9.4
Cedar Creek Road at Entrance						
Entrance Eastbound			D 32.1			D 32.8
Cedar Creek Road Northbound (left)			A 7.9			A 9.3

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2034, there will be a slight impact to the existing highway network. A southbound right-turn lane will be required at the south entrance. No other improvements are required.

APPENDIX

Traffic Counts

Jefferson County, KY
Classified Turn Movement Count

Site 6 of 6
KY-864 Cedar Creek Rd (North)

KY-864 Cedar Creek Rd (South)
Loyal Dr

Lat/Long
38.099388°, -85.614268°

Weather
Cloudy
51°F

Date
Wednesday, January 15, 2020

Marr Traffic
Transportation Data Collection

41 Peabody Street, Nashville, TN 37210
10 Glenlake Parkway, Suite 130, Atlanta, GA 30328
555 Fayetteville Street, Suite 201, Raleigh, NC 27601
1229 South Shelby Street, Louisville, KY 40203
6565 North MacArthur Boulevard, Suite 225, Dallas, TX 75039

hello@marrtraffic.com
www.marrtraffic.com

1 (800) 615-3765

	Southbound					Northbound					Eastbound					
	KY-864 Cedar Creek Rd (North)					KY-864 Cedar Creek Rd (South)					Loyal Dr					
	U-Turn	Thru	Right	Peds	App	U-Turn	Left	Thru	Peds	App	U-Turn	Left	Right	Peds	App	Int
0700 - 0715	0	11	6	0	17	0	0	64	0	64	0	18	1	0	19	100
0715 - 0730	0	19	4	0	23	0	1	69	0	70	0	11	0	0	11	104
0730 - 0745	0	12	2	0	14	0	0	30	0	30	0	3	0	0	3	47
0745 - 0800	0	28	5	0	33	0	1	45	0	46	0	5	0	0	5	84
0800 - 0815	0	17	4	0	21	0	0	45	0	45	0	7	0	0	7	73
0815 - 0830	0	21	3	0	24	0	0	40	0	40	0	7	1	0	8	72
0830 - 0845	0	12	1	0	13	0	0	41	0	41	0	4	0	0	4	58
0845 - 0900	0	14	5	0	19	0	1	31	0	32	0	7	1	0	8	59
1600 - 1615	0	46	12	0	58	0	0	35	0	35	0	4	0	0	4	97
1615 - 1630	0	51	5	0	56	0	0	24	0	24	0	4	0	0	4	84
1630 - 1645	0	55	10	0	65	0	1	38	0	39	0	9	0	0	9	113
1645 - 1700	0	65	11	0	76	0	1	33	0	34	0	2	0	0	2	112
1700 - 1715	0	54	5	0	59	0	1	74	0	75	0	4	0	2	6	140
1715 - 1730	0	59	8	0	67	0	0	33	0	33	0	4	0	0	4	104
1730 - 1745	0	68	12	0	80	0	2	28	0	30	0	6	0	0	6	116
1745 - 1800	0	52	5	1	58	0	1	38	0	39	0	7	4	0	11	108

0700 - 0715	0	11	6	0	17	0	0	64	0	64	0	18	1	0	19	100
0715 - 0730	0	19	4	0	23	0	1	69	0	70	0	11	0	0	11	104
0730 - 0745	0	12	2	0	14	0	0	30	0	30	0	3	0	0	3	47
0745 - 0800	0	28	5	0	33	0	1	45	0	46	0	5	0	0	5	84
AM PEAK TOTAL	**0**	**70**	**17**	**0**	**87**	**0**	**2**	**208**	**0**	**210**	**0**	**37**	**1**	**0**	**38**	**335**
1645 - 1700	0	65	11	0	76	0	1	33	0	34	0	2	0	0	2	112
1700 - 1715	0	54	5	0	59	0	1	74	0	75	0	4	0	2	6	140
1715 - 1730	0	59	8	0	67	0	0	33	0	33	0	4	0	0	4	104
1730 - 1745	0	68	12	0	80	0	2	28	0	30	0	6	0	0	6	116
PM PEAK TOTAL	**0**	**246**	**36**	**0**	**282**	**0**	**4**	**168**	**0**	**172**	**0**	**16**	**0**	**2**	**18**	**472**

PROJECT: Widen Beulah Church Rd
ITEM NUMBER: 5-481.00
MARS NUMBER: 8631301D
REQUEST DATE: 12/1/2012
ANALYST: J. Reynolds
SCENARIO: 2012 ADT and Design Hour Volumes
INTERSECTION: T4: Cooper Chapel Rd / Cedar Creek Rd
NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2008 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.
**DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS
2012 ADT
Cooper Chapel Rd From N
Cedar Creek Rd from S
Cedar Creek Rd frm E
Note : Individual Turns Not Necessarily Reflective of Precision Shown
2012 AM Design Hour
Note : Individual Turns Not Necessarily Reflective of Precision Shown. Movements displayed are 30th highest hour of the year estimates. Multiply each maneuver by "K*TM "/F1408" for a Peak Hour Analysis. Movements
2012 PM Design Hour
Note : Individual Turns Not Necessarily Reflective of Precision Shown. Movements displayed are 30th highest
Location Map

PROJECT: Widen Beulah Church Rd
ITEM NUMBER: 5-481.00
MARS NUMBER: 8631301D
REQUEST DATE: 12/1/2012
ANALYST: J. Reynolds
SCENARIO: 2035 ADT and Design Hour Volumes
INTERSECTION: T4: Cooper Chapel Rd / Cedar Creek Rd
NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2008 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.
**DHV TURN MOVEMENT FORECASTS SHOULD NOT BE USED FOR SIGNAL TIMING OR WARRANT ANALYSIS
2035 ADT
Cooper Chapel Rd From N
Cedar Creek Rd frm E
Cedar Creek Rd from S
5500
4100
2035 AM Design Hour
470
370
2035 PM Design Hour
670
240
Note : Individual Turns Not Necessarily Reflective of Precision Shown
*Note : Individual Turns Not Necessarily Reflective of Precision Shown. Movements displayed are 30th highest hour of the year estimates. Multiply each maneuver by "&TM "IF140&" for a Peak Hour Analysis. Movements
Location Map

TRIP GENERATION NEARBY SUBDIVISIONS

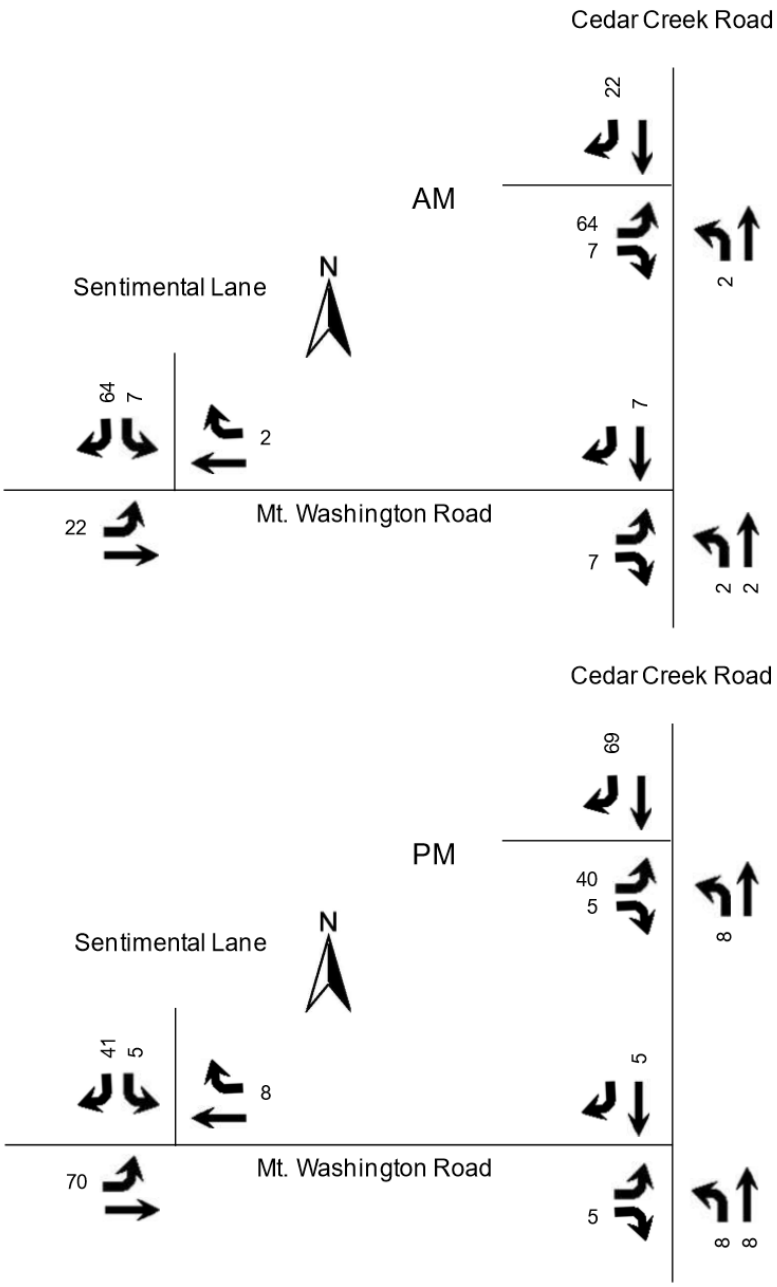
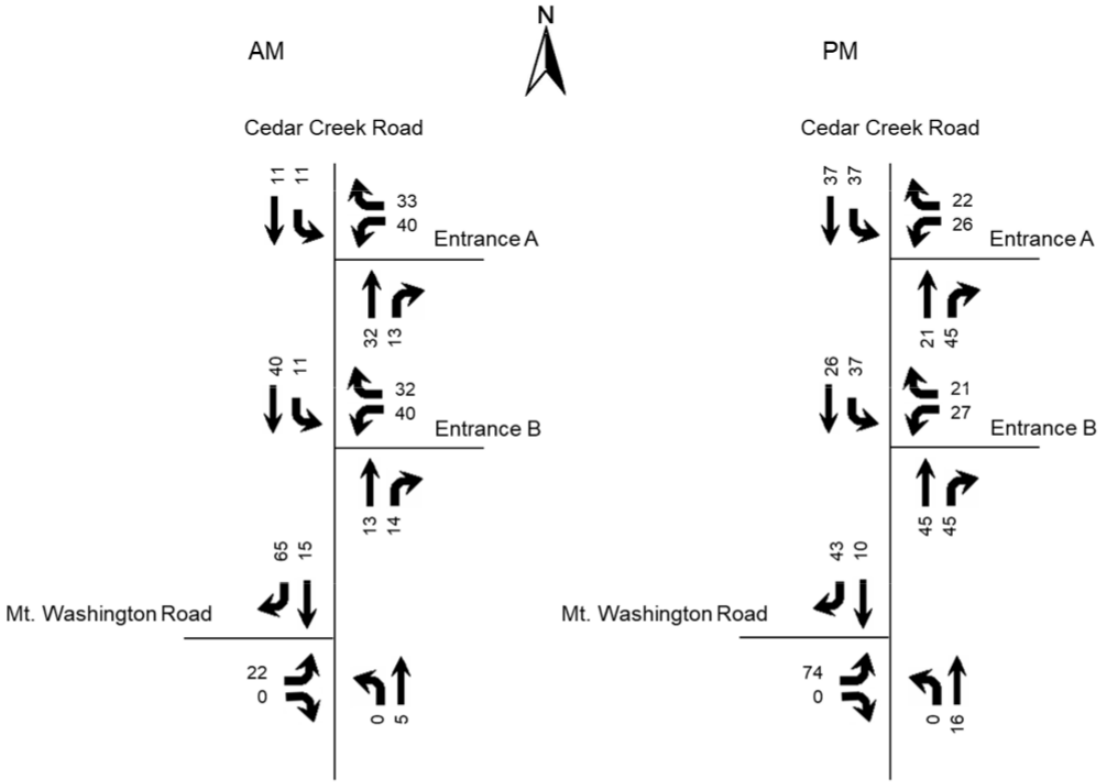


Figure 5. Peak Hour Trips Generated by Site

Cedar Creek Conservation Subdivision
10803 Cedar Creek Road
Traffic Impact Study



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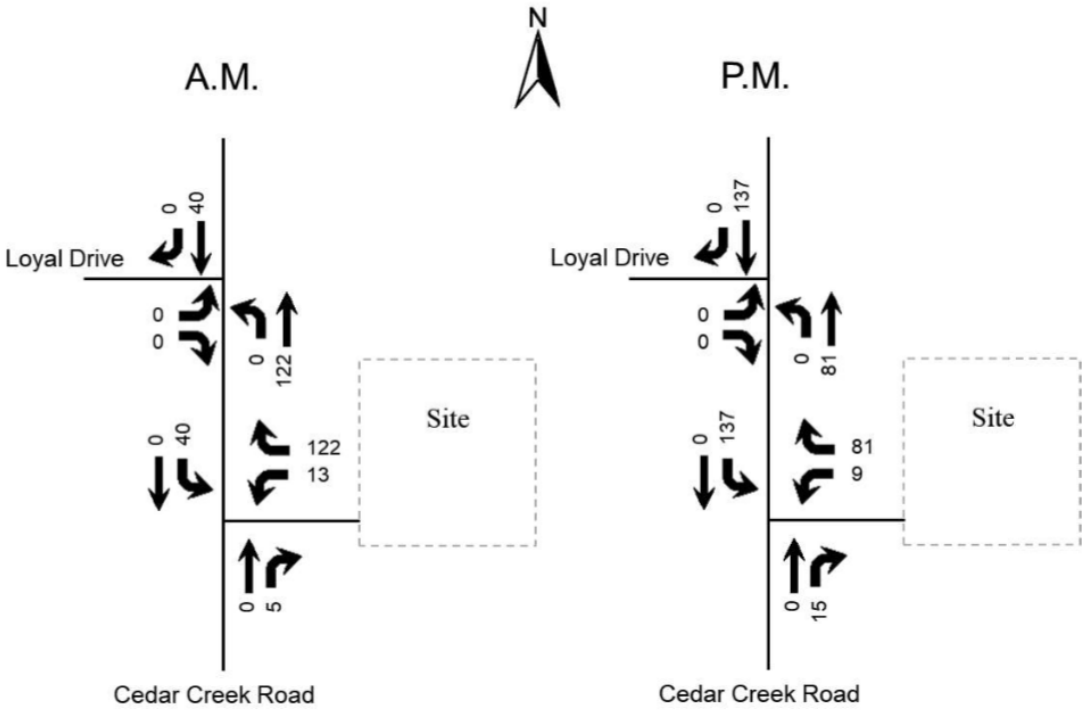


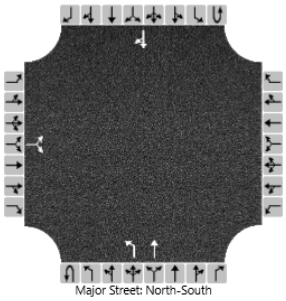
Figure 5. Peak Hour Trips Generated by Site

HCS Reports

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Ent N
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Entrance North
Analysis Year	2024	North/South Street	Cooper Chapel Road
Time Analyzed	AM Peak	Peak Hour Factor	0.81
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cooper Chapel		

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	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		29		5						2	628				200	10
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			42							2						
Capacity, c (veh/h)			399							1317						
v/c Ratio			0.11							0.00						
95% Queue Length, Q_{95} (veh)			0.4							0.0						
Control Delay (s/veh)			15.1							7.7						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		15.1								0.0						
Approach LOS		C														

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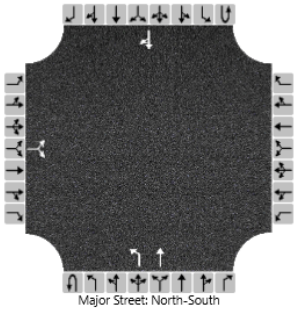
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Ent N
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Entrance North
Analysis Year	2034	North/South Street	Cooper Chapel Road
Time Analyzed	AM Peak	Peak Hour Factor	0.81
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cooper Chapel		

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	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		29		5						2	831				263	10
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			42							2						
Capacity, c (veh/h)			303							1233						
v/c Ratio			0.14							0.00						
95% Queue Length, Q_{95} (veh)			0.5							0.0						
Control Delay (s/veh)			18.8							7.9						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		18.8								0.0						
Approach LOS		C														

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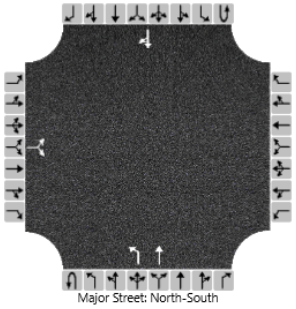
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Ent N
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Entrance North
Analysis Year	2024	North/South Street	Cooper Chapel Road
Time Analyzed	PM Peak	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cooper Chapel		

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	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		19		3						6	411				723	32
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			26							7						
Capacity, c (veh/h)			298							764						
v/c Ratio			0.09							0.01						
95% Queue Length, Q_{95} (veh)			0.3							0.0						
Control Delay (s/veh)			18.2							9.8						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		18.2								0.1						
Approach LOS		C														

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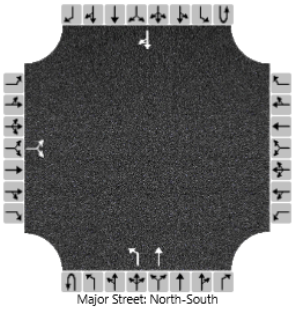
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Ent N
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Entrance North
Analysis Year	2034	North/South Street	Cooper Chapel Road
Time Analyzed	PM Peak	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cooper Chapel		

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	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		19		3						6	545				824	32
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			26							7						
Capacity, c (veh/h)			246							689						
v/c Ratio			0.11							0.01						
95% Queue Length, Q_{95} (veh)			0.4							0.0						
Control Delay (s/veh)			21.4							10.3						
Level of Service (LOS)			C							B						
Approach Delay (s/veh)		21.4								0.1						
Approach LOS		C														

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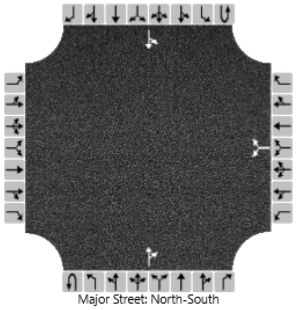
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Cedar Cr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Cedar Creek Road
Analysis Year	2020	North/South Street	Cooper Chapel Road
Time Analyzed	AM Peak	Peak Hour Factor	0.81
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

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)						10		90			210	10		20	60	
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)							123							25		
Capacity, c (veh/h)							750							1286		
v/c Ratio							0.16							0.02		
95% Queue Length, Q_{95} (veh)							0.6							0.1		
Control Delay (s/veh)							10.7							7.9		
Level of Service (LOS)							B							A		
Approach Delay (s/veh)						10.7								2.1		
Approach LOS						B										

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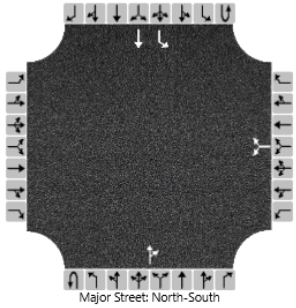
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Cedar Cr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Cedar Creek Road
Analysis Year	2024	North/South Street	Cooper Chapel Road
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.81
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume (veh/h)						11		108			416	11		22	142	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		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)							147							27		
Capacity, c (veh/h)							545							1035		
v/c Ratio							0.27							0.03		
95% Queue Length, Q_{95} (veh)							1.1							0.1		
Control Delay (s/veh)							14.0							8.6		
Level of Service (LOS)							B							A		
Approach Delay (s/veh)						14.0								1.2		
Approach LOS						B										

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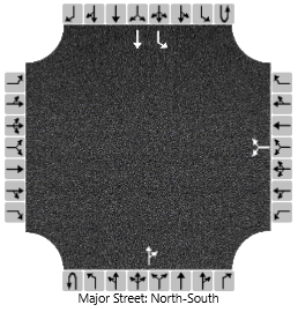
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Cedar Cr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Cedar Creek Road
Analysis Year	2024	North/South Street	Cooper Chapel Road
Time Analyzed	AM Peak Build	Peak Hour Factor	0.81
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume (veh/h)						13		109			522	17		24	181	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		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)							151							30		
Capacity, c (veh/h)							456							919		
v/c Ratio							0.33							0.03		
95% Queue Length, Q_{95} (veh)							1.4							0.1		
Control Delay (s/veh)							16.7							9.0		
Level of Service (LOS)							C							A		
Approach Delay (s/veh)						16.7								1.1		
Approach LOS						C										

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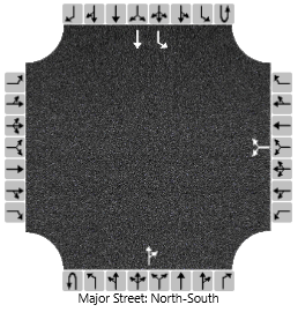
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Cedar Cr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Cedar Creek Road
Analysis Year	2034	North/South Street	Cooper Chapel Road
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.81
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume (veh/h)						13		132			594	13		26	201	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		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)							179							32		
Capacity, c (veh/h)							409							855		
v/c Ratio							0.44							0.04		
95% Queue Length, Q_{95} (veh)							2.2							0.1		
Control Delay (s/veh)							20.5							9.4		
Level of Service (LOS)							C							A		
Approach Delay (s/veh)						20.5								1.1		
Approach LOS						C										

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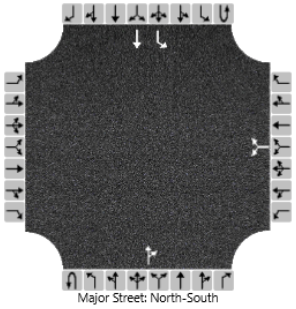
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Cedar Cr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Cedar Creek Road
Analysis Year	2034	North/South Street	Cooper Chapel Road
Time Analyzed	AM Peak Build	Peak Hour Factor	0.81
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume (veh/h)						15		133			700	19		28	240	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		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)							183							35		
Capacity, c (veh/h)							342							759		
v/c Ratio							0.53							0.05		
95% Queue Length, Q_{95} (veh)							3.0							0.1		
Control Delay (s/veh)							27.0							10.0		
Level of Service (LOS)							D							A		
Approach Delay (s/veh)						27.0								1.0		
Approach LOS						D										

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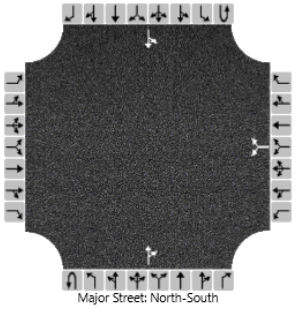
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Cedar Cr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Cedar Creek Road
Analysis Year	2020	North/South Street	Cooper Chapel Road
Time Analyzed	PM Peak	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

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)						20		50			110	10		150	230	
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)							83							179		
Capacity, c (veh/h)							590							1434		
v/c Ratio							0.14							0.12		
95% Queue Length, Q_{95} (veh)							0.5							0.4		
Control Delay (s/veh)							12.1							7.9		
Level of Service (LOS)							B							A		
Approach Delay (s/veh)						12.1								3.8		
Approach LOS						B										

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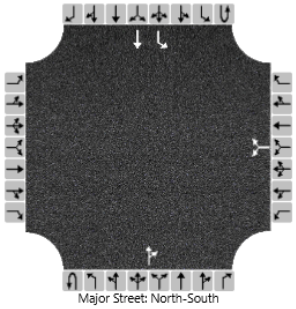
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Cedar Cr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Cedar Creek Road
Analysis Year	2024	North/South Street	Cooper Chapel Road
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume (veh/h)						22		54			289	11		173	450	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		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)							90							206		
Capacity, c (veh/h)							457							1196		
v/c Ratio							0.20							0.17		
95% Queue Length, Q_{95} (veh)							0.7							0.6		
Control Delay (s/veh)							14.8							8.6		
Level of Service (LOS)							B							A		
Approach Delay (s/veh)						14.8								2.4		
Approach LOS						B										

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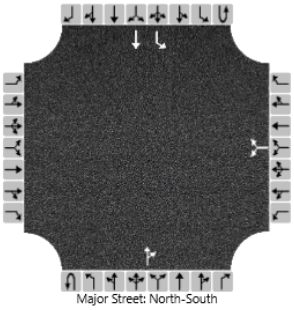
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Cedar Cr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Cedar Creek Road
Analysis Year	2024	North/South Street	Cooper Chapel Road
Time Analyzed	PM Peak Build	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume (veh/h)						28		56			362	15		174	562	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		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)							100							207		
Capacity, c (veh/h)							372							1106		
v/c Ratio							0.27							0.19		
95% Queue Length, Q_{95} (veh)							1.1							0.7		
Control Delay (s/veh)							18.2							9.0		
Level of Service (LOS)							C							A		
Approach Delay (s/veh)						18.2								2.1		
Approach LOS						C										

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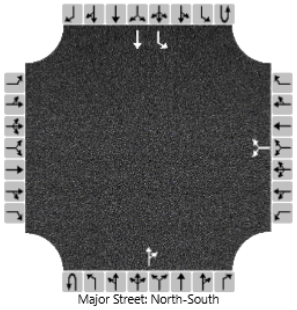
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Cedar Cr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Cedar Creek Road
Analysis Year	2034	North/South Street	Cooper Chapel Road
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume (veh/h)						26		66			410	13		211	503	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		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)							110							251		
Capacity, c (veh/h)							364							1056		
v/c Ratio							0.30							0.24		
95% Queue Length, Q_{95} (veh)							1.2							0.9		
Control Delay (s/veh)							19.1							9.5		
Level of Service (LOS)							C							A		
Approach Delay (s/veh)						19.1								2.8		
Approach LOS						C										

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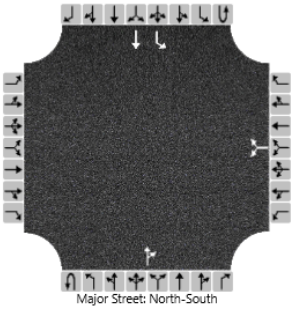
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Cedar Cr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Cedar Creek Road
Analysis Year	2034	North/South Street	Cooper Chapel Road
Time Analyzed	PM Peak Build	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume (veh/h)						32		68			483	17		212	615	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		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)							119							252		
Capacity, c (veh/h)							296							976		
v/c Ratio							0.40							0.26		
95% Queue Length, Q_{95} (veh)							1.9							1.0		
Control Delay (s/veh)							25.1							10.0		
Level of Service (LOS)							D							A		
Approach Delay (s/veh)						25.1								2.6		
Approach LOS						D										

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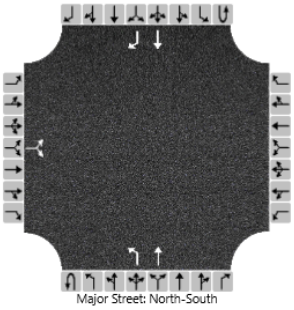
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Ent S
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Entrance South
Analysis Year	2024	North/South Street	Cooper Chapel Road
Time Analyzed	AM Peak	Peak Hour Factor	0.81
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cooper Chapel		

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	0	0	0	1	1	0	0	0	1	1
Configuration			LR							L	T				T	R
Volume (veh/h)		111		12						4	428				156	38
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized														No		
Median Type | Storage		Undivided														

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			152							5						
Capacity, c (veh/h)			412							1339						
v/c Ratio			0.37							0.00						
95% Queue Length, Q_{95} (veh)			1.7							0.0						
Control Delay (s/veh)			18.7							7.7						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		18.7								0.1						
Approach LOS		C														

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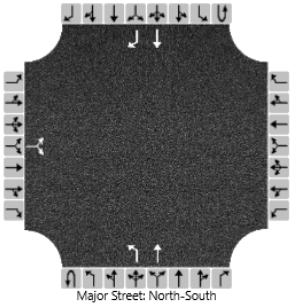
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Ent S
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Entrance South
Analysis Year	2034	North/South Street	Cooper Chapel Road
Time Analyzed	AM Peak	Peak Hour Factor	0.81
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cooper Chapel		

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	0	0	0	1	1	0	0	0	1	1
Configuration			LR							L	T				T	R
Volume (veh/h)		111		12						4	608				214	38
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized														No		
Median Type | Storage		Undivided														

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			152							5						
Capacity, c (veh/h)			280							1261						
v/c Ratio			0.54							0.00						
95% Queue Length, Q_{95} (veh)			3.0							0.0						
Control Delay (s/veh)			32.1							7.9						
Level of Service (LOS)			D							A						
Approach Delay (s/veh)		32.1								0.1						
Approach LOS		D														

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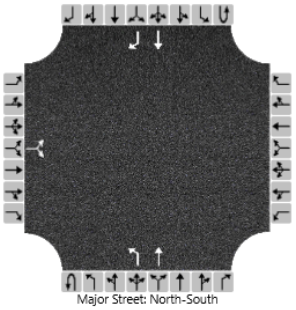
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Ent S
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Entrance South
Analysis Year	2024	North/South Street	Cooper Chapel Road
Time Analyzed	PM Peak	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cooper Chapel		

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	0	0	0	1	1	0	0	0	1	1
Configuration			LR							L	T				T	R
Volume (veh/h)		73		8						13	304				474	116
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized														No		
Median Type | Storage		Undivided														

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			96							15						
Capacity, c (veh/h)			297							904						
v/c Ratio			0.32							0.02						
95% Queue Length, Q_{95} (veh)			1.4							0.1						
Control Delay (s/veh)			22.8							9.0						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		22.8								0.4						
Approach LOS		C														

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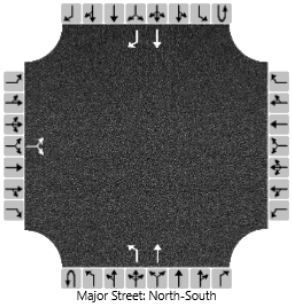
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cooper Chapel at Ent S
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Entrance South
Analysis Year	2034	North/South Street	Cooper Chapel Road
Time Analyzed	PM Peak	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cooper Chapel		

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	0	0	0	1	1	0	0	0	1	1
Configuration			LR							L	T				T	R
Volume (veh/h)		73		8						13	427				531	116
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized														No		
Median Type | Storage		Undivided														

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			96							15						
Capacity, c (veh/h)			223							853						
v/c Ratio			0.43							0.02						
95% Queue Length, Q_{95} (veh)			2.0							0.1						
Control Delay (s/veh)			32.8							9.3						
Level of Service (LOS)			D							A						
Approach Delay (s/veh)		32.8								0.3						
Approach LOS		D														

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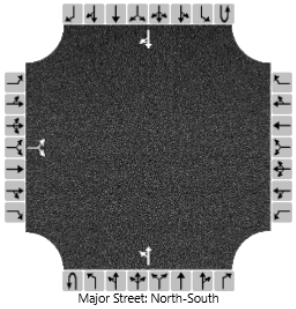
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cedar Creek at Loyal Dr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Loyal Dr
Analysis Year	2020	North/South Street	Cedar Creek Rd
Time Analyzed	AM Peak	Peak Hour Factor	0.81
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cedar Creek		

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	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		37		1						2	208				70	17
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			47							2						
Capacity, c (veh/h)			648							1496						
v/c Ratio			0.07							0.00						
95% Queue Length, Q_{95} (veh)			0.2							0.0						
Control Delay (s/veh)			11.0							7.4						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		11.0								0.1						
Approach LOS		B														

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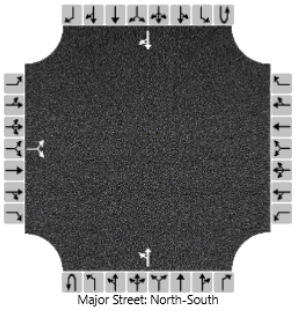
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cedar Creek at Loyal Dr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Loyal Dr
Analysis Year	2024	North/South Street	Cedar Creek Rd
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.81
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cedar Creek		

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	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		70		5						3	354				120	28
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			93							4						
Capacity, c (veh/h)			475							1405						
v/c Ratio			0.20							0.00						
95% Queue Length, Q_{95} (veh)			0.7							0.0						
Control Delay (s/veh)			14.4							7.6						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		14.4								0.1						
Approach LOS		B														

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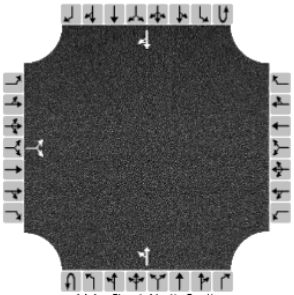
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cedar Creek at Loyal Dr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Loyal Dr
Analysis Year	2024	North/South Street	Cedar Creek Rd
Time Analyzed	AM Peak Build	Peak Hour Factor	0.81
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cedar Creek		

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	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		70		5						3	359				135	28
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			93							4						
Capacity, c (veh/h)			459							1383						
v/c Ratio			0.20							0.00						
95% Queue Length, Q_{95} (veh)			0.7							0.0						
Control Delay (s/veh)			14.8							7.6						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		14.8								0.1						
Approach LOS		B														

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Loyal AM 24 B.xtw
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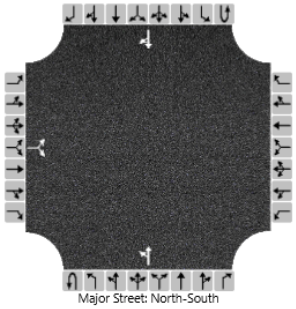
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cedar Creek at Loyal Dr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Loyal Dr
Analysis Year	2034	North/South Street	Cedar Creek Rd
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.81
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cedar Creek		

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	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		70		5						3	525				176	28
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			93							4						
Capacity, c (veh/h)			328							1325						
v/c Ratio			0.28							0.00						
95% Queue Length, Q_{95} (veh)			1.1							0.0						
Control Delay (s/veh)			20.2							7.7						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		20.2								0.1						
Approach LOS		C														

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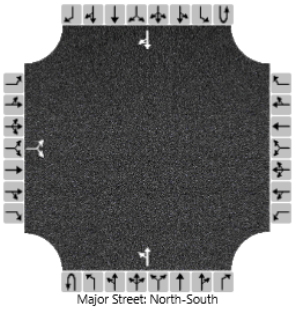
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cedar Creek at Loyal Dr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Loyal Dr
Analysis Year	2034	North/South Street	Cedar Creek Rd
Time Analyzed	AM Peak Build	Peak Hour Factor	0.81
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cedar Creek		

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	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		70		5						3	530				191	28
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			93							4						
Capacity, c (veh/h)			317							1305						
v/c Ratio			0.29							0.00						
95% Queue Length, Q_{95} (veh)			1.2							0.0						
Control Delay (s/veh)			21.0							7.8						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		21.0								0.1						
Approach LOS		C														

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Loyal AM 34 B.xtw
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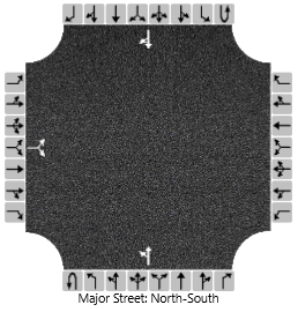
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cedar Creek at Loyal Dr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Loyal Dr
Analysis Year	2020	North/South Street	Cedar Creek Rd
Time Analyzed	PM Peak	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cooper Chapel		

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	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		16		0						4	168				246	36
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			19							5						
Capacity, c (veh/h)			515							1235						
v/c Ratio			0.04							0.00						
95% Queue Length, Q_{95} (veh)			0.1							0.0						
Control Delay (s/veh)			12.3							7.9						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		12.3								0.2						
Approach LOS		B														

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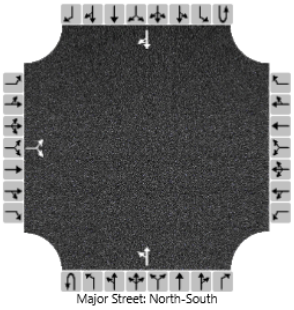
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cedar Creek at Loyal Dr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Loyal Dr
Analysis Year	2024	North/South Street	Cedar Creek Rd
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cooper Chapel		

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	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		38		3						8	265				409	72
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			49							10						
Capacity, c (veh/h)			334							1010						
v/c Ratio			0.15							0.01						
95% Queue Length, Q_{95} (veh)			0.5							0.0						
Control Delay (s/veh)			17.6							8.6						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		17.6								0.3						
Approach LOS		C														

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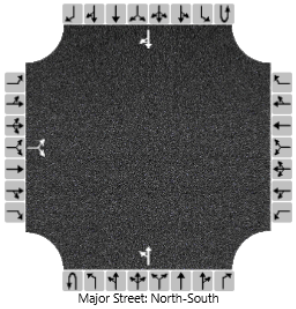
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cedar Creek at Loyal Dr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Loyal Dr
Analysis Year	2024	North/South Street	Cedar Creek Rd
Time Analyzed	PM Peak Build	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cooper Chapel		

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	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		38		3						8	282				419	72
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			49							10						
Capacity, c (veh/h)			320							1000						
v/c Ratio			0.15							0.01						
95% Queue Length, Q_{95} (veh)			0.5							0.0						
Control Delay (s/veh)			18.3							8.6						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		18.3								0.3						
Approach LOS		C														

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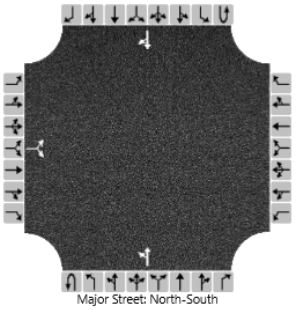
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cedar Creek at Loyal Dr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Loyal Dr
Analysis Year	2034	North/South Street	Cedar Creek Rd
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cooper Chapel		

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	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		38		3						8	386				605	72
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			49							10						
Capacity, c (veh/h)			200							828						
v/c Ratio			0.24							0.01						
95% Queue Length, Q_{95} (veh)			0.9							0.0						
Control Delay (s/veh)			28.8							9.4						
Level of Service (LOS)			D							A						
Approach Delay (s/veh)		28.8								0.3						
Approach LOS		D														

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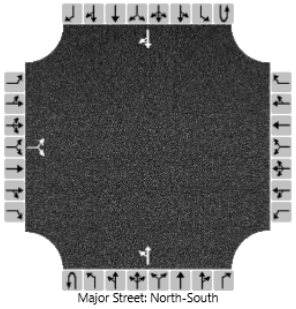
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Cedar Creek at Loyal Dr
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	8/26/2020	East/West Street	Loyal Dr
Analysis Year	2034	North/South Street	Cedar Creek Rd
Time Analyzed	PM Peak Build	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	8300 Cooper Chapel		

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	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		38		3						8	403				615	72
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			49							10						
Capacity, c (veh/h)			191							819						
v/c Ratio			0.26							0.01						
95% Queue Length, Q_{95} (veh)			1.0							0.0						
Control Delay (s/veh)			30.2							9.4						
Level of Service (LOS)			D							A						
Approach Delay (s/veh)	30.2								0.3							
Approach LOS	D															

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