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January 3, 2022

Traffic Impact Study

Echo Trail Subdivision 2605 Echo Trail Louisville, KY

Prepared for

Louisville Metro Planning Commission



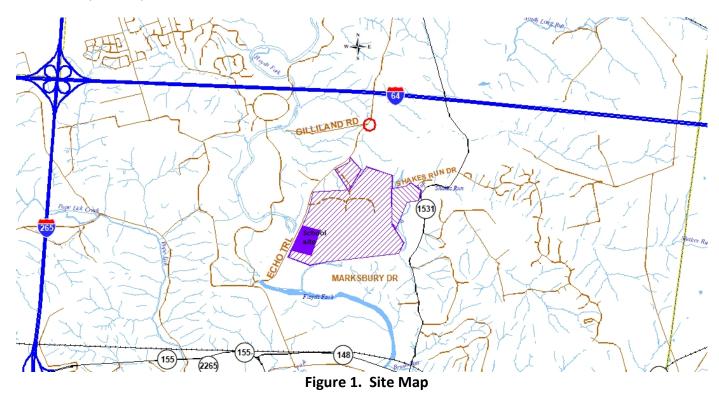


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INTRODUCTION

The development plan for a new section of a previously approved subdivision on Echo Trail in Louisville, KY shows 103 new single-family lots, which brings the total to 680 single-family lots. Figure 1 displays a map of the site. Access to the subdivision will be from two entrances on Echo Trial and an entrance on Eastwood Fisherville Road. There will not be a bridge over Long Run Creek. This study focuses on 103 lots proposed at the southern entrance (Street A). 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 Echo Trail with the two entrances.



EXISTING CONDITIONS

Echo Trail, is a Metro-maintained road with an estimated 2022 ADT of 1,000 vehicles per day between South English Station Road and Eastwood Cutoff Road, as estimated from the Kentucky Transportation Cabinet 2019 count at station 366. The road is a two-lane highway with nine-foot lanes with two-foot shoulders through the study area. The speed limit is 35 mph. There are no sidewalks. The intersection with South English Station Road, is controlled as an all-way stop. There are no turn lanes.

Peak hour traffic counts for the intersection of Gilliland Road and Echo Trail were obtained on September 28, 2022. The a.m. peak hour is 8:00 to 9:00 and the p.m. peak hour is 5:00 to 6:00. Figure 2 illustrates the existing a.m. and p.m. peak hour traffic volumes. The Appendix contains the full count data for each intersection.

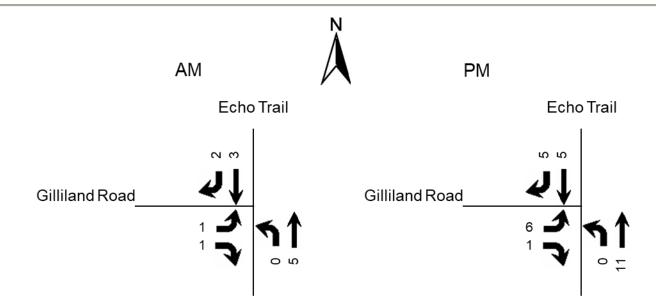


Figure 2. Existing Peak Hour Volumes

FUTURE CONDITIONS

The project completion date is 2033. Trip generation for the previously approved 577 lots with access to Echo Trail and middle school are included. The trip distribution for the previously approved lots is taken from the Echo Trail Subdivision Traffic Impact Study, October 22, 2018. Figure 3 displays the 2033 No Build peak hour volumes.

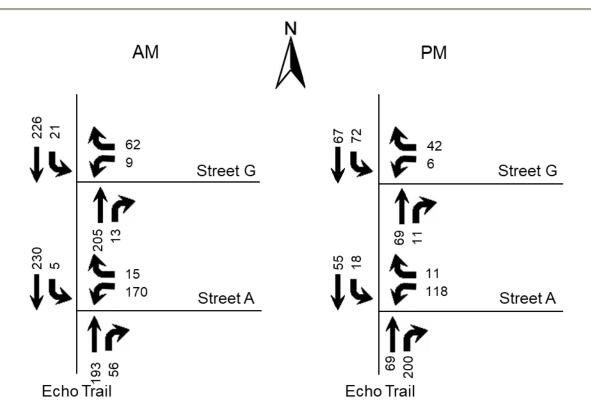


Figure 3. 2033 No Build Peak Hour Volumes

TRIP GENERATION

The Institute of Transportation Engineers <u>Trip Generation Manual</u>, 11th Edition contains trip generation rates for a wide range of developments. The land use of "Single Family Detached (210)" was reviewed and determined to be the best match. The trip generation results are listed in **Table 1**. The trips were assigned to the highway network with the percentages shown in **Figure 4**. **Figure 5** shows the trips generated by this development and distributed throughout the road network during the peak hours. **Figure 6** displays the individual turning movements for the peak hours when the development is completed.

Table 1. Peak Hour Trips Generated by Site

	A.M. I	Peak	Hour	P.M. F	Peak	Hour
Land Use	Trips	In	Out	Trips	In	Out
Single-Family Detached (103 lots)	77	19	58	102	64	38

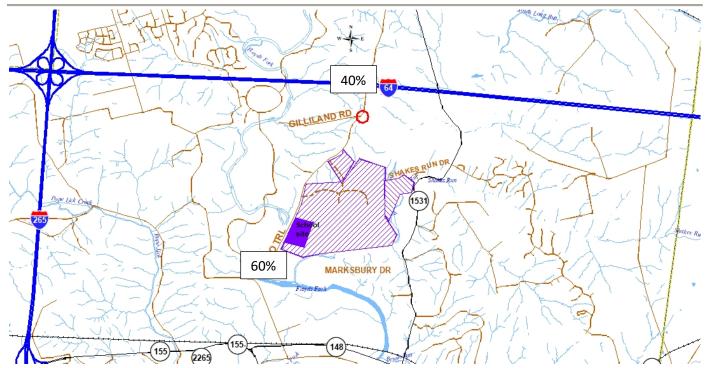


Figure 4. Trip Distribution Percentages

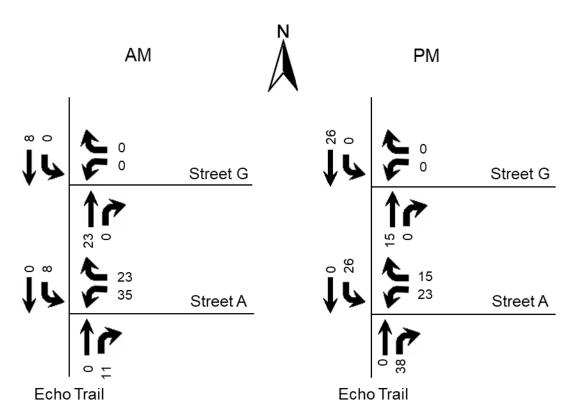


Figure 5. Peak Hour Trips Generated by Site

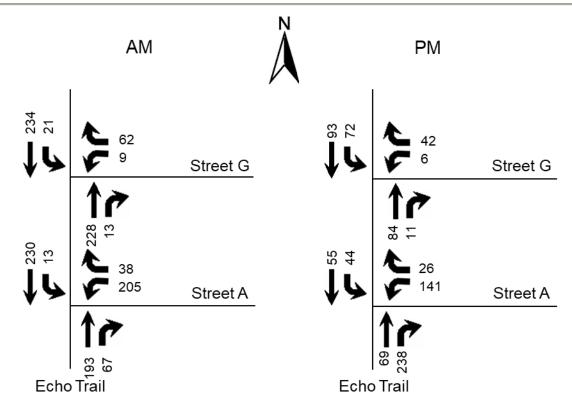


Figure 6. 2033 Build Peak Hour Volumes

ANALYSIS

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

To evaluate the impact of the proposed development, the vehicle delays at the intersections were determined using procedures detailed in the Highway Capacity Manual, 7th edition. Future delays and Level of Service were determined for the intersections using the HCS Streets (version 2023) 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	2033	2033	2022	2033	2033
Approach	Existing	No Build	Build	Existing	No Build	Build
Echo Trail at Street A						
Street A Westbound		С	С		В	В
Street A Westbourid		17.0	20.7		11.7	13.6
Echo Trail Southbound		Α	Α		Α	Α
Echo Hali Soulibound		7.8	7.9		7.9	8.1
Echo Trail at Street G						
Street G Westbound		В	В		Α	Α
Street G Westbourid		10.6	10.8		9.2	9.4
Echo Trail Southbound		Α	Α		Α	Α
ECHO Fraii Southbourid		7.8	7.9		7.5	7.6

Key: Level of Service, Delay in seconds per vehicle

Both entrances were evaluated for turn lanes using the Kentucky Transportation Cabinet Highway Design Guidance Manual dated July, 2020. Using the volumes in Figure 6, no turn lanes will be required at either entrance. The development plan shows a stub to a residual tract south and east of the middle school, which potentially will provide a third street connection to Echo Trail. This will reduce the turning traffic at both Street A and G upon completion.

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2033, there will be an impact to the existing highway network. No turn lanes will be required at the entrances.

APPENDIX

Traffic Counts

Marr Traffic DATA COLLECTION

www.marrtraffic.com

Site 1 of 1
Echo Trail Rd

Louisville, KY

Echo Trail Rd Gilliland Rd Driveway Date

Wednesday, September 28, 2022

Weather Fair 56°F

Lat/Long

38.217683°, -85.460465°

0700 - 0900 (Weekday 2h Session) (09-28-2022)

All vehicles

		No	rthbou	nd			So	uthbou	nd			E	astbour	ıd			W	/estbou	nd		1
		E	cho Tra	il			Ec	ho Trail	Rd			G	iilliland F	₹d				Drivewa	У		
	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Int
TIME	1.1	1.2	1.3	1.4	Total	1.5	1.6	1.7	1.8	Total	1.9	1.10	1.11	1.12	Total	1.13	1.14	1.15	1.16	Total	Total
0700 - 0715	0	1	0	0	1	0	1	0	0	1	2	0	0	0	2	0	0	0	0	0	4
0715 - 0730	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
0730 - 0745	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
0745 - 0800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	2	0	0	2	0	1	0	0	1	4	0	0	0	4	0	0	0	0	0	7
0800 - 0815	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
0815 - 0830	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
0830 - 0845	0	2	0	0	2	0	1	0	0	1	1	1	0	0	2	0	0	0	0	0	5
0845 - 0900	0	2	0	0	2	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	4
Hourly Total	0	5	0	0	5	0	3	2	0	5	1	1	0	0	2	0	0	0	0	0	12
Grand Total	0	7	0	0	7	0	4	2	0	6	5	1	0	0	6	0	0	0	0	0	19
Approach %	0.00	100.00	0.00	0.00	-	0.00	66.67	33.33	0.00	-	83.33	16.67	0.00	0.00	-	0.00	0.00	0.00	0.00	-	
Intersection %	0.00	36.84	0.00	0.00	36.84	0.00	21.05	10.53	0.00	31.58	26.32	5.26	0.00	0.00	31.58	0.00	0.00	0.00	0.00	0.00	
·																					
PHF	0.00	0.63	0.00	0.00	0.63	0.00	0.75	0.25	0.00	0.63	0.25	0.25	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.60

1600 - 1800 (Weekday 2h Session) (09-28-2022)

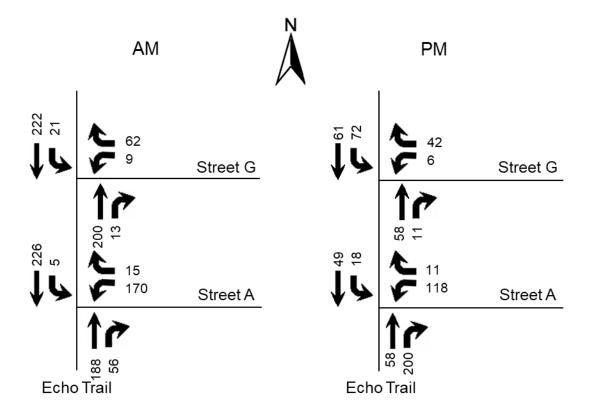
All vehicles

		No	orthbou	nd			So	uthbou	nd			Е	astbour	ıd			W	/estbou	nd		ı
		Е	cho Tra	il			Ec	ho Trail	Rd			G	iilliland F	≀d			I	Drivewa	у		
	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Int
TIME	1.1	1.2	1.3	1.4	Total	1.5	1.6	1.7	1.8	Total	1.9	1.10	1.11	1.12	Total	1.13	1.14	1.15	1.16	Total	Total
1600 - 1615	0	0	1	0	1	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	3
1615 - 1630	0	0	0	0	0	1	2	1	0	4	0	0	0	0	0	0	0	0	0	0	4
1630 - 1645	0	1	0	0	1	0	0	2	1	3	0	0	0	0	0	0	0	0	0	0	4
1645 - 1700	0	0	0	0	0	1	4	1	0	6	0	0	0	0	0	0	0	0	0	0	6
Hourly Total	0	1	1	0	2	2	6	6	1	15	0	0	0	0	0	0	0	0	0	0	17
1700 - 1715	0	3	0	0	3	1	1	2	1	5	2	0	0	0	2	0	0	0	0	0	10
1715 - 1730	0	3	0	0	3	0	1	2	0	3	1	0	1	0	2	0	0	0	0	0	8
1730 - 1745	0	2	1	0	3	0	0	1	1	2	1	0	0	0	1	0	0	0	0	0	6
1745 - 1800	0	3	0	0	3	0	3	0	0	3	2	0	0	0	2	0	0	0	0	0	8
Hourly Total	0	11	1	0	12	1	5	5	2	13	6	0	1	0	7	0	0	0	0	0	32
Grand Total	0	12	2	0	14	3	11	11	3	28	6	0	1	0	7	0	0	0	0	0	49
Approach %	0.00	85.71	14.29	0.00		10.71	39.29	39.29	10.71	-	85.71	0.00	14.29	0.00		0.00	0.00	0.00	0.00	-	
Intersection %	0.00	24.49	4.08	0.00	28.57	6.12	22.45	22.45	6.12	57.14	12.24	0.00	2.04	0.00	14.29	0.00	0.00	0.00	0.00	0.00	1
PHF	0.00	0.92	0.25	0.00	1.00	0.25	0.42	0.63	0.50	0.65	0.75	0.00	0.25	0.00	0.88	0.00	0.00	0.00	0.00	0.00	0.80

TRIP GENERATION AND DISTRIBUTION FOR 577 LOTS AND MIDDLE SCHOOL

The Echo Trail Subdivision TIS assigned 30% to/from the north. For the middle school 60% to/from the north was used.

	A.M.	Peak H	lour	P.M. F	Peak H	our
Land Use	Trips	In	Out	Trips	In	Out
Single-Family Detached (532 lots)	341	85	256	478	301	177
Middle School (1,000 student)	670	362	308	150	72	78



HCS Reports

		ŀ	ICS T	Гwo-	Way	Stop	-Cor	ntrol	Repo	ort						
General Information							Site	Inforr	natio	n						7
Analyst	DBZ						Inters	ection			Echo	Trail at S	treet A			_
Agency/Co.	Diane	B. Zimn	nerman i	Traffic Er	ngineerir	ng LLC	Jurisd	liction								
Date Performed	1/5/2	023					East/\	Nest Stre	eet		Echo	Trail				
Analysis Year	2033						North	/South S	Street		Street	t A				
Time Analyzed	AM P	eak No E	Build				Peak	Hour Fac	tor		0.85					
Intersection Orientation	North	n-South					Analy	sis Time	Period (hrs)	0.25					
Project Description	Echo	Trail														
Lanes																
					Major	Street: No	th-South									
Vehicle Volumes and Ad	iustme	nts				22.00										
Approach	Т		ound			West	bound			North	bound			South	bound	_
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	П
Priority	$\overline{}$	10	11	12		7	8	9	10	1	2	3	4U	4	5	Г
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	Т
Configuration	\top						LR					TR		LT		Г
Volume (veh/h)						170		15			193	56		5	230	Г
Percent Heavy Vehicles (%)	\top					1		1						1		Г
Proportion Time Blocked																Г
Percent Grade (%)	\top						0									
Right Turn Channelized																
Median Type Storage	$\overline{}$			Undi	vided											
	1															
Critical and Follow-up H	eadwa	ys														
Critical and Follow-up H Base Critical Headway (sec)	eadwa	ys				7.1		6.2						4.1		
Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec)	eadwa	ys				7.1 6.41		6.2						4.11		
Base Critical Headway (sec)	eadwa	ys				_								_		
Base Critical Headway (sec) Critical Headway (sec)	eadwa	ys				6.41		6.21						4.11		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec)			ervice			6.41 3.5		6.21 3.3						4.11 2.2		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)			ervice			6.41 3.5	218	6.21 3.3						4.11 2.2		
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an			ervice			6.41 3.5	218	6.21 3.3						4.11 2.2 2.21		
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Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio			ervice			6.41 3.5	515 0.42	6.21 3.3						4.11 2.2 2.21 6 1274 0.00	0.0	
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Pelay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q _{as} (veh)			ervice			6.41 3.5	515 0.42 2.1	6.21 3.3						4.11 2.2 2.21 6 1274 0.00 0.0	0.0 A	
Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Qas (veh) Control Delay (s/veh)			ervice			6.41 3.5 3.51	515 0.42 2.1 17.0	6.21 3.3						4.11 2.2 2.21 6 1274 0.00 0.0 7.8 A	_	

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		ŀ	ICS T	wo-	Way	Stop	-Cor	ntrol	Repo	ort						
General Information							Site	Inforn	natio	1						_
Analyst	DBZ						Inters	ection			Echo	Trail at S	treet A			
Agency/Co.	Diane	B. Zimn	nerman '	Traffic Er	ngineerir	ng LLC	Jurisd	liction								
Date Performed	1/5/2	023					East/\	Nest Stre	eet		Echo	Trail				
Analysis Year	2033						North	/South S	Street		Stree	t A				
Time Analyzed	AM P	eak Build	d				Peak	Hour Fac	tor		0.85					
Intersection Orientation	North	-South					Analy	sis Time	Period (hrs)	0.25					
Project Description	Echo	Trail														
Lanes																
					Major	Street: Nor	th-South									
Vehicle Volumes and Ad	iustme	nts														
Approach	<u> </u>		ound			West	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	F
Priority	+	10	11	12	l –	7	8	9	10	1	2	3	4U	4	5	- 6
Number of Lanes	+	0	0	0		0	1	0	0	0	1	0	0	0	1	-
	+	-	l °	Ů		-	LR		-		<u> </u>	TR		LT		_
Configuration		_			_	205	E/(38			193	67		13	230	
Configuration Volume (veh/h)	\top					1 205										
Volume (veh/h)						205					100			1		
Volume (veh/h) Percent Heavy Vehicles (%)						1		1						1		
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked						1								1		
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%)						1)							1		
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized				Undi	vided	1)							1		
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage	loadwa			Undi	vided	1)							1		
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Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec)	leadwa	ys		Undi	vided	7.1		6.2						4.1		
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec)	leadwa	ys		Undi	vided	7.1		6.2						4.1		
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Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio			ervice		vided	7.1 6.41 3.5	286	6.2 6.21 3.3						4.1 4.11 2.2 2.21		
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh)			ervice		vided	7.1 6.41 3.5	286	6.2 6.21 3.3						4.1 4.11 2.2 2.21 15 1261		
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh) Control Delay (s/veh)			ervice		vided	7.1 6.41 3.5	286 510 0.56 3.4 20.7	6.2 6.21 3.3						4.1 4.11 2.2 2.21 15 1261 0.01	0.1	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh)			ervice		vided	7.1 6.41 3.5	286 510 0.56 3.4	6.2 6.21 3.3						4.1 4.11 2.2 2.21 15 1261 0.01 0.0	0.1 A	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh) Control Delay (s/veh)			ervice		vided	7.1 6.41 3.5 3.51	286 510 0.56 3.4 20.7	6.2 6.21 3.3						4.1 4.11 2.2 2.21 15 1261 0.01 0.0 7.9 A		

		ŀ	HCS	wo-	Way	Stop	-Cor	ntrol	Repc	ort						
General Information							Site	Inforn	natior	n						_
Analyst	DBZ						Inters	ection			Echo	Trail at S	treet A			
Agency/Co.	Diane	B. Zimr	nerman	Traffic Er	gineerir	ng LLC	Jurisd	liction								
Date Performed	1/5/2	023					East/\	West Stre	eet		Echo	Trail				
Analysis Year	2033						North	/South S	Street		Street	t A				
Time Analyzed	PM P	eak No E	Build				Peak	Hour Fac	tor		0.85					
Intersection Orientation	North	n-South					Analy	sis Time	Period (l	hrs)	0.25					
Project Description	Echo	Trail														
Lanes																
Vehicle Volumes and Adj	justme	nts			Majo	r Street: Nor	th-South									
Approach			ound			West	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	\top	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)						118		11			69	200		18	55	
Percent Heavy Vehicles (%)						1		1						1		
Drawautian Time Blacked																
Proportion Time Blocked	\neg					(0									
Percent Grade (%)																
·																
Percent Grade (%)				Undi	vided											
Percent Grade (%) Right Turn Channelized	eadwa	ys		Undi	vided											
Percent Grade (%) Right Turn Channelized Median Type Storage	eadwa	ys		Undi	vided	7.1		6.2						4.1		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H	eadwa	ys		Undi	vided	7.1 6.41		6.2						4.1 4.11		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec)	eadwa	ys		Undi	vided									_		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec)	eadwa	ys		Undi	vided	6.41		6.21						4.11		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec)			ervice		vided	6.41 3.5		6.21 3.3						4.11 2.2		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)			ervice		vided	6.41 3.5	152	6.21 3.3						4.11 2.2		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an			ervice		vided	6.41 3.5	152	6.21 3.3						4.11 2.2 2.21		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h)			ervice		vided	6.41 3.5		6.21 3.3						4.11 2.2 2.21		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h)			ervice		vided	6.41 3.5	688	6.21 3.3						4.11 2.2 2.21 21 1249		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio			ervice		vided	6.41 3.5	688 0.22	6.21 3.3						2.2 2.21 21 1249 0.02	0.1	
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Qas (veh)			ervice		vided	6.41 3.5	688 0.22 0.8	6.21 3.3						2.2 2.21 21 1249 0.02 0.1	0.1 A	
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Qas (veh) Control Delay (s/veh)			ervice		vided	6.41 3.5 3.51	688 0.22 0.8 11.7	6.21 3.3						2.21 2.21 21 1249 0.02 0.1 7.9	-	

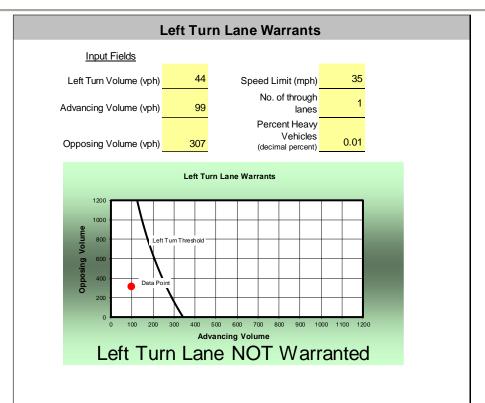
		ŀ	HCS	wo-	Way	Stop	-Cor	ntrol	Repc	ort						
General Information							Site	Inforn	nation	n						_
Analyst	DBZ						Inters	ection			Echo	Trail at S	treet A			_
Agency/Co.	Diane	B. Zimr	nerman	Traffic Er	ngineerir	ng LLC	Jurisd	liction								
Date Performed	1/5/2	023					East/\	West Stre	et		Echo	Trail				
Analysis Year	2033						North	n/South S	Street		Street	t A				
Time Analyzed	PM P	eak Build	d				Peak	Hour Fac	tor		0.85					
Intersection Orientation	North	n-South					Analy	sis Time	Period (hrs)	0.25					
Project Description	Echo	Trail														
Lanes																
					Majo	r Street: Nor										
Vehicle Volumes and Adj	iustme	nts														
Approach	<u> </u>		oound			West	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	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
							LR					TR		LT		
Configuration		_				141		26			69	238		44	55	
Configuration Volume (veh/h)						1-71					0.5			44		_
						1		1			03			1		
Volume (veh/h)								1			03					
Volume (veh/h) Percent Heavy Vehicles (%)						1		1			03					
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked						1	0	1			03					
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%)				Undi	vided	1	0	1			03					
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage	eadwa	ys		Undi	vided	1	0	1			03					
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized	eadwa	ys		Undi	vided	1	0	6.2								
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H	eadwa	ys		Undi	vided	1	0							1		
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec)	eadwa	ys		Undi	vided	7.1	0	6.2						4.1		
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec)	eadwa	ys		Undi	vided	7.1	0	6.2						4.1		
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec)			ervice		vided	7.1 6.41 3.5	0	6.2 6.21 3.3						4.1 4.11 2.2		
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)			ervice		vided	7.1 6.41 3.5	196	6.2 6.21 3.3						4.1 4.11 2.2		
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an			ervice		vided	7.1 6.41 3.5		6.2 6.21 3.3						4.1 4.11 2.2 2.21		
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h)			ervice		vided	7.1 6.41 3.5	196	6.2 6.21 3.3						4.1 4.11 2.2 2.21		
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h)			ervice		vided	7.1 6.41 3.5	196 616	6.2 6.21 3.3						4.1 4.11 2.2 2.21 52 1203		
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio			ervice		vided	7.1 6.41 3.5	196 616 0.32	6.2 6.21 3.3						4.1 4.11 2.2 2.21 52 1203 0.04	0.4	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh)			ervice		vided	7.1 6.41 3.5	196 616 0.32 1.4	6.2 6.21 3.3						4.1 4.11 2.2 2.21 52 1203 0.04 0.1		
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Qas (veh) Control Delay (s/veh)			ervice		vided	7.1 6.41 3.5 3.51	196 616 0.32 1.4 13.6	6.2 6.21 3.3						4.1 4.11 2.2 2.21 52 1203 0.04 0.1 8.1 A	0.4	

		ŀ	ICS T	ا-owآ	Way	Stop	-Cor	itrol	Repo	ort						
General Information							Site	Inforn	natio	n						
Analyst	DBZ						Inters	ection			Echo	Trail at S	treet G			
Agency/Co.	Diane	B. Zimn	nerman	Traffic Er	ngineerin	ng LLC	Jurisd	liction								
Date Performed	1/5/2	023					East/\	Nest Stre	et		Echo	Trail				
Analysis Year	2033						North	/South S	Street		Street	t A				
Time Analyzed	AM P	eak No E	Build				Peak	Hour Fac	tor		0.85					
Intersection Orientation	North	n-South					Analy	sis Time	Period (hrs)	0.25					
Project Description	Echo	Trail														
Lanes																
																_
					Major	Street: Nor	th-South									
Vehicle Volumes and Ad	justme	nts														
Approach	Т		ound			Westk	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority		10	11	12		7	8	9	10	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		62			205	13		21	226	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Proportion fille blocked						-)									
Percent Grade (%)																
Percent Grade (%)				Undi	vided											
Percent Grade (%) Right Turn Channelized Median Type Storage	leadwa	vs		Undi	vided											
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H	leadwa	ys		Undi	vided	7.1		6.2						4.1		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec)	leadwa	ys		Undi	vided	7.1 6.41		6.2						4.1		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H	leadwa	ys		Undi	vided	-		-						_		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec)	leadwa	ys		Undi	vided	6.41		6.21						4.11		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)			ervice		vided	6.41 3.5		6.21 3.3						4.11 2.2		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and			ervice		vided	6.41 3.5		6.21 3.3						4.11 2.2 2.21		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an			ervice		vided	6.41 3.5	84	6.21 3.3						4.11 2.2 2.21		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h)			ervice		vided	6.41 3.5	84 731	6.21 3.3						2.2 2.21 2.5 1314		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio			ervice		vided	6.41 3.5	84 731 0.11	6.21 3.3						2.2 2.21 25 1314 0.02		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₃₅ (veh)			ervice		vided	6.41 3.5	84 731 0.11 0.4	6.21 3.3						2.2 2.21 25 1314 0.02 0.1	0.2	
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh) Control Delay (s/veh)			ervice		vided	6.41 3.5	84 731 0.11 0.4 10.6	6.21 3.3						2.2 2.21 25 1314 0.02 0.1 7.8	0.2 A	
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh) Control Delay (s/veh) Level of Service (LOS)			ervice		vided	6.41 3.5 3.51	84 731 0.11 0.4 10.6 B	6.21 3.3						2.21 2.21 2.5 1314 0.02 0.1 7.8 A	А	
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh) Control Delay (s/veh)			ervice		vided	6.41 3.5 3.51	84 731 0.11 0.4 10.6	6.21 3.3						2.2 2.21 25 1314 0.02 0.1 7.8 A		

		ŀ	HCS T	Two-	Way	Stop	-Cor	ntrol	Repo	ort						
General Information							Site	Inform	natio	1						_
Analyst	DBZ						Inters	ection			Echo	Trail at S	treet G			
Agency/Co.	Diane	B. Zimr	nerman i	Traffic Er	ngineerir	ng LLC	Jurisd	iction								
Date Performed	1/5/2	023					East/\	Nest Stre	eet		Echo	Trail				
Analysis Year	2033						North	/South S	Street		Street	: A				
Time Analyzed	AM P	eak Buil	d				Peak	Hour Fac	tor		0.85					
Intersection Orientation	North	n-South					Analy	sis Time	Period (hrs)	0.25					
Project Description	Echo	Trail														
Lanes																
Vehicle Volumes and Adj	iustme	nts			Majo	r Street: Nor	th-South									
Approach			oound			West	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	+	10	11	12		7	8	9	10	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		62			228	13		21	234	
Percent Heavy Vehicles (%)	1					1		1						1		
Proportion Time Blocked																
Percent Grade (%)	1)									
Right Turn Channelized																
	$\overline{}$			Undi	vided											
Median Type Storage																
Median Type Storage Critical and Follow-up H	eadwa	ys												4.1		
	eadwa	ys		П		7.1		6.2						_		
Critical and Follow-up H	eadwa	ys				7.1 6.41		6.2 6.21						4.11		
Critical and Follow-up H Base Critical Headway (sec)	eadwa	ys				_		_						4.11 2.2		
Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec)	eadwa	ys				6.41		6.21						_		
Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec)			ervice			6.41 3.5		6.21 3.3						2.2		
Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)			ervice			6.41 3.5	84	6.21 3.3						2.2		
Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an			ervice			6.41 3.5	84	6.21 3.3						2.2		
Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h)			ervice			6.41 3.5		6.21 3.3						2.2 2.21 25		
Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h)			ervice			6.41 3.5	704	6.21 3.3						2.2 2.21 25 1285		
Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio			ervice			6.41 3.5	704 0.12	6.21 3.3						2.2 2.21 25 1285 0.02	0.2	
Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh)			ervice			6.41 3.5	704 0.12 0.4	6.21 3.3						2.2 2.21 25 1285 0.02 0.1	0.2 A	
Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh) Control Delay (s/veh)			ervice			6.41 3.5 3.51	704 0.12 0.4 10.8	6.21 3.3						2.2 2.21 25 1285 0.02 0.1 7.9 A	_	

		ŀ	ICS T	wo-	Way	Stop	-Cor	ntrol	Repo	ort								
General Information							Site	Inforn	natio	1								
Analyst	DBZ						Intersection Echo Tra						ail at Street G					
Agency/Co.	Diane	B. Zimr	nerman '	Traffic Er	ngineerir	ng LLC	Jurisdiction											
Date Performed	1/5/2	023					East/\	West Stre	et		Echo Trail							
Analysis Year	2033						North	/South S	Street		Street A							
Time Analyzed	PM P	eak No E	Build				Peak	Hour Fac	tor		0.85							
Intersection Orientation	North	n-South					Analy	sis Time	Period (
Project Description	Echo	Trail																
Lanes																		
						Street: Nor												
Vehicle Volumes and Ad	justme	nts																
Approach	/		ound			Westk	oound			North	bound			South	bound			
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	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)						6		42			69	11		72	67			
Percent Heavy Vehicles (%)						1		1						1				
Proportion Time Blocked																		
Percent Grade (%)							0											
	+																	
Right Turn Channelized				Unali														
Right Turn Channelized Median Type Storage	+			Unai	vided													
Median Type Storage	leadwa	VS		Undi	vided													
Median Type Storage Critical and Follow-up H	leadwa	ys		Ondr	vided	7.1		6.2						4.1		П		
Median Type Storage Critical and Follow-up H Base Critical Headway (sec)	leadwa	ys		Ondi	vided	7.1 6.41		6.2						4.11				
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec)	leadwa	ys		Ondi	vided	7.1 6.41 3.5		6.2 6.21 3.3						4.1 4.11 2.2				
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec)	leadwa	ys		Ondi	vided	6.41		6.21						4.11				
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)			ervice		vided	6.41 3.5		6.21 3.3						4.11 2.2				
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and			ervice		vided	6.41 3.5	56	6.21 3.3						4.11 2.2 2.21				
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h)			ervice		vided	6.41 3.5	56	6.21 3.3						4.11 2.2 2.21				
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h)			ervice		vided	6.41 3.5	909	6.21 3.3						4.11 2.2 2.21 85 1506				
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio			ervice		vided	6.41 3.5	909	6.21 3.3						4.11 2.2 2.21 85 1506 0.06				
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₃₅ (veh)			ervice		vided	6.41 3.5	909 0.06 0.2	6.21 3.3						4.11 2.2 2.21 85 1506 0.06	0.4			
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh) Control Delay (s/veh)			ervice		vided	6.41 3.5	909 0.06 0.2 9.2	6.21 3.3						85 1506 0.06 0.2 7.5	0.4 A			
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Qas (veh) Control Delay (s/veh) Level of Service (LOS)			ervice		vided	6.41 3.5 3.51	909 0.06 0.2 9.2 A	6.21 3.3						85 1506 0.06 0.2 7.5 A	А			
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, and Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh) Control Delay (s/veh)			ervice		vided	6.41 3.5 3.51	909 0.06 0.2 9.2	6.21 3.3						85 1506 0.06 0.2 7.5 A				

		ŀ	HCS	Two-	Way	Stop	-Cor	ntrol	Repc	ort							
General Information							Site	Inforn	nation	1							
Analyst	DBZ						Intersection Ec					Echo Trail at Street G					
Agency/Co.	Diane	B. Zimr	nerman	Traffic Er	ngineerir	ng LLC	Jurisd	liction									
Date Performed	1/5/2						East/\	Nest Stre	eet		Echo Trail						
Analysis Year	2033						North/South Street A Street A										
Time Analyzed	PM P	eak Build	d				Peak Hour Factor 0.85										
Intersection Orientation	North	n-South					Analy	sis Time	Period (hrs)	0.25						
Project Description	Echo	Trail															
Lanes																	
						_											
					Majo	r Street: Nor											
Vehicle Volumes and Adj	justme	nts															
Approach	Т	Easth	ound		П	West	oound			North	bound			South	bound		
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	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			
						6		42			84	11		72	93		
Volume (veh/h)						-		-						1			
Volume (veh/h) Percent Heavy Vehicles (%)						1		1						' '		-	
						1		'									
Percent Heavy Vehicles (%)							0	<u>'</u>									
Percent Heavy Vehicles (%) Proportion Time Blocked							0										
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%)				Undi	vided		0										
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized	eadwa	ys		Undi	vided		0										
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage	eadwa	ys		Undi	vided		0	6.2						4.1			
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H	eadwa	ys		Undi	vided		0										
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec)	eadwa	ys		Undi	vided	7.1	0	6.2						4.1			
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec)	eadwa	ys		Undi	vided	7.1 6.41	0	6.2						4.1			
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec)			ervice		vided	7.1 6.41 3.5	0	6.2 6.21 3.3						4.1 4.11 2.2			
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)			ervice		vided	7.1 6.41 3.5	56	6.2 6.21 3.3						4.1 4.11 2.2			
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an			ervice		vided	7.1 6.41 3.5		6.2 6.21 3.3						4.1 4.11 2.2 2.21			
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h)			ervice		vided	7.1 6.41 3.5	56	6.2 6.21 3.3						4.1 4.11 2.2 2.21			
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h)			ervice		vided	7.1 6.41 3.5	56	6.2 6.21 3.3						4.1 4.11 2.2 2.21 85 1484			
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio			ervice		vided	7.1 6.41 3.5	56 882 0.06	6.2 6.21 3.3						4.1 4.11 2.2 2.21 85 1484 0.06	0.5		
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh)			ervice		vided	7.1 6.41 3.5	56 882 0.06 0.2	6.2 6.21 3.3						4.1 4.11 2.2 2.21 85 1484 0.06 0.2	0.5 A		
Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh) Control Delay (s/veh)			ervice		vided	7.1 6.41 3.5 3.51	56 882 0.06 0.2 9.4	6.2 6.21 3.3						4.1 4.11 2.2 2.21 85 1484 0.06 0.2 7.6 A			



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.

