CHAMBERS AND HESS DEVELOPMENT

TRAFFIC IMPACT STUDY (TIS)

TOWN OF PARKER, CO

JANUARY 23, 2020

JOB NUMBER: 18633

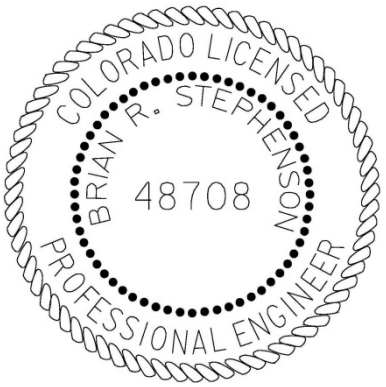
RICK ENGINEERING COMPANY

RICK
ENGINEERING COMPANY
rickengineering.com

CHAMBERS AND HESS DEVELOPMENT
TRAFFIC IMPACT STUDY (TIS)
TOWN OF PARKER, CO

JANUARY 23, 2020

PREPARED FOR:
VENTANA CAPITAL
9801 EAST EASTER AVENUE
CENTENNIAL, CO 80112



PREPARED BY:

TABLE OF CONTENTS

EXHIBITS

TABLES

APPENDICES

RICK ENGINEERING COMPANY

CHAMBERS AND HESS DEVELOPMENT
TRAFFIC IMPACT STUDY (TIS)
TOWN OF PARKER, CO
JANUARY 23, 2020

1.0- PROJECT BACKGROUND INFORMATION

1.1- INTRODUCTION

The following Traffic Impact Study (TIS) has been prepared to determine any traffic related impacts within the project area intersections and roadways due to the proposed Chambers and Hess Development, based on the Town of Parker's Traffic Impact Study Guidelines outlined within the Town's Roadway Design and Construction Manual Section 5. The project is located on the northeast corner of S. Chambers Road and E. Hess Road in the Town of Parker, Colorado.

Exhibit 1 shows the project vicinity map.

1.2- PROJECT DESCRIPTION

In coordination with the Town of Parker, Rick Engineering Company (RICK) developed the scope of the TIS, including the project study area, project trip generation rates, and trip distribution assumptions. The project proposes to construct a commercial development on a currently vacant 14 acre parcel. To be conservative, this traffic study assumes the maximum commercial size that is allowed on this parcel (0.5 maximum Floor Area Ratio (FAR)) per the Douglas County 234 planned development. With the allowed 0.5 FAR on this parcel, the traffic study assumes this project to entail approximately 304,920 square feet of shopping center. The project proposes one full access at S. Red Sky Drive, and one right-in/right-out access at E. Hess Road. The Project opening year is assumed to be in 2021 and with no phasing of development.

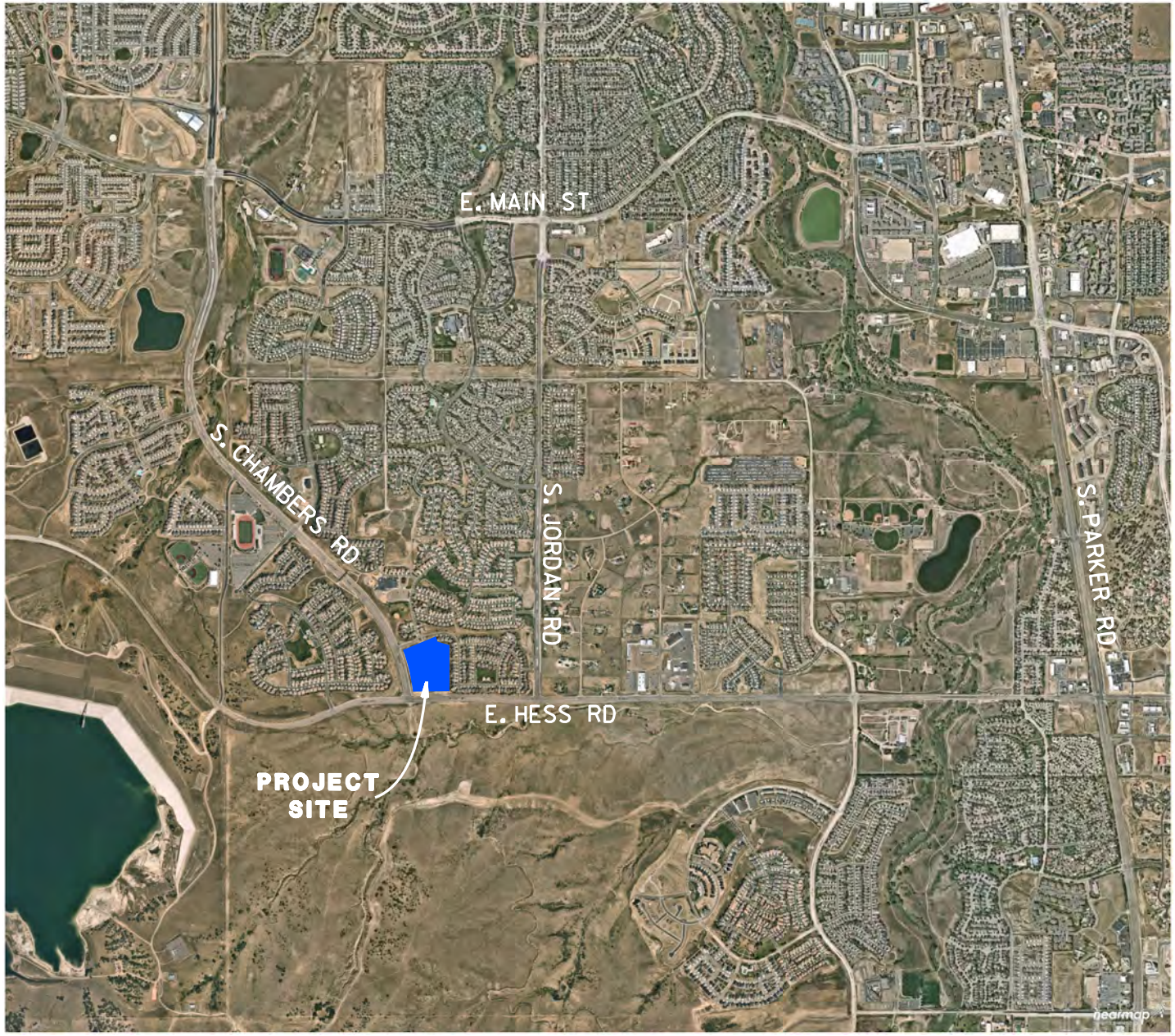
Exhibit 2 shows the project site plan.

1.3- TRAFFIC ANALYSIS METHODOLOGY

The intersections and roadways within the project were analyzed for the following scenarios:

- Existing (2019)
- Opening Year (2021) without Project (Short-Term Background)
- Opening Year (2021) with Project (Short-Term Background + Project)
- Project Design Year (20 years from project opening) without Project (Long-Term Background)
- Project Design Year (20 years from project opening) with Project (Long-Term Background + Project)

The Level of Service (LOS) for signalized intersections was calculated using the methodologies described in Chapter 19 of the 6th Edition Highway Capacity Manual (HCM 6). The LOS for signalized intersections is defined in terms of control delay, which is made up of several factors that relate to right-of-way control, geometrics and traffic volumes. The signalized intersection analysis also considers intersection spacing and coordination.



NOT TO SCALE

RICK ENGINEERING COMPANY

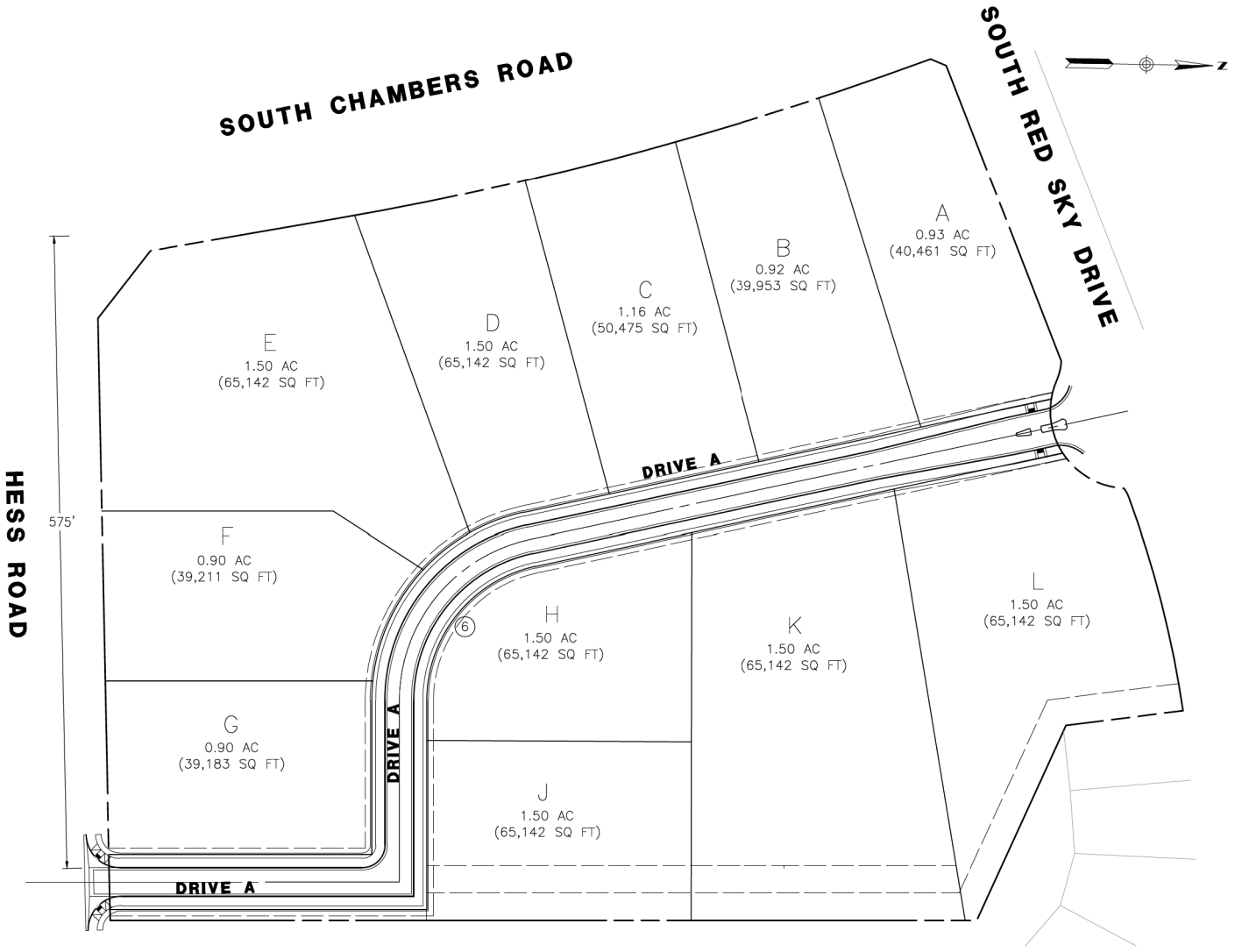
EXHIBIT 1

VICINITY MAP

CHAMBERS AND HESS DEVELOPMENT

\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\18633_01_Exhibit_ProjectVicinity.dgn
\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\SD CorpStds 2005.dscript

21-JAN-2020 17:10



RICK ENGINEERING COMPANY

EXHIBIT 2

PROJECT SITE PLAN

CHAMBERS AND HESS DEVELOPMENT

\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\18633_02_Exhibit_Projectsiteplan.dgn
\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\SD CorpStds 2005.dscript

21-JAN-2020 17:28

The LOS for two-way and all-way stop controlled intersections was calculated using the methodologies described in Chapters 20 and 21 of the 6th Edition HCM. The LOS for an unsignalized (two-way stop controlled) intersection is determined by the computed control delay for critical movement with corresponding LOS. The LOS for an unsignalized (all-way stop controlled) intersection is determined by the computed control delay for the intersection as a whole with corresponding LOS.

The operational conditions for the roadway segments were established utilizing Douglas County 2040 Transportation Plan's Recommended Traffic Volume Thresholds per Table 4, dated June 2019 to evaluate the overall performance.

LOS for roundabouts was calculated using SIDRA software which incorporates the methodologies described in Chapter 22 of the 6th Edition HCM. Roundabout LOS is defined in terms of control delay, similar to that of signalized or all-way stop-controlled intersections, while accounting for yield-controlled approaches.

Synchro 10 was used for the computation of the stop controlled, and signalized intersections per the methodologies described above.

The studied intersections were analyzed under the Traffic Signal Warrants as noted in the *Manual of Uniform Traffic Control Devices (MUTCD)* based on the existing and forecasted intersection peak hour traffic volumes.

Signal warrants, intersection, and roadway operation results are reported under their respective scenario sections.

2.0 EXISTING TRAFFIC CONDITIONS

The following is a brief description of the existing roadways and intersections as identified in the Town of Parker Transportation Master Plan, dated December 2018.

Existing Roadways

S. Chambers Road is a north-south roadway that is classified as a Principal Arterial. In the project vicinity, it is currently built as a four-lane divided roadway providing two travel lanes with acceleration/deceleration lanes and bicycle lanes in each direction. The posted speed limit is 45 miles per hour (MPH). Per the Town of Parker's 2035 Transportation Master Plan, this roadway segment is ultimately a six-lane roadway.

E. Hess Road is an east-west roadway that is classified as a four-lane Arterial and currently built as a four-lane divided roadway providing two travel lanes with acceleration/deceleration lanes as well as bicycle lanes in each direction. The posted speed limit is 45 miles per hour (MPH).

S. Red Sky Drive is an east-west roadway that is functioning as an undivided two-lane Residential Collector that provides access to residential homes with one travel lane in each direction and a Roundabout at its intersection with S. Swift Fox Way. The posted speed limit is 25 miles per hour (MPH).

Existing Intersections

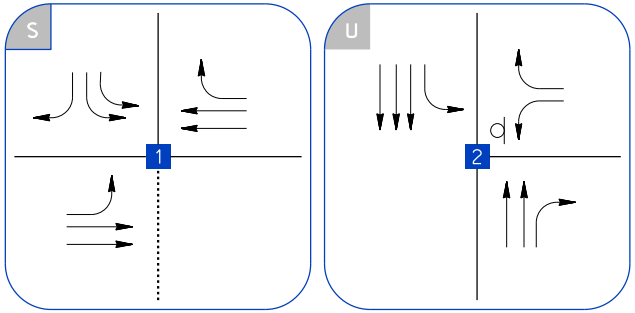
S. Chambers Road/E. Hess Road is currently built as a three-legged signalized intersection, consisting of the following lane configurations; two left turn lanes, and an exclusive right turn lane for the southbound approach; exclusive left turn lane and two through lanes for the eastbound approach; and two through lanes and exclusive right-turn lane for the westbound approach. Per the Town's 2035 Transportation Plan, this intersection will ultimately become a 4-legged intersection.

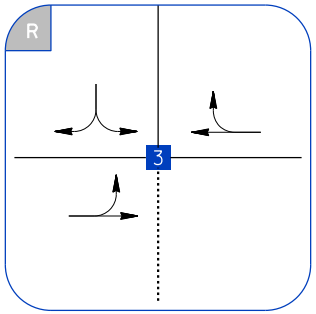
S. Chambers Road/S. Red Sky Drive is currently built as a three-legged unsignalized intersection with stop control for the westbound approach consisting of the following lane configurations; two through lanes and an exclusive right-turn lane for the northbound approach; three through lanes and exclusive left turn lane for the southbound approach; and exclusive left and right turn lanes for the westbound approach.

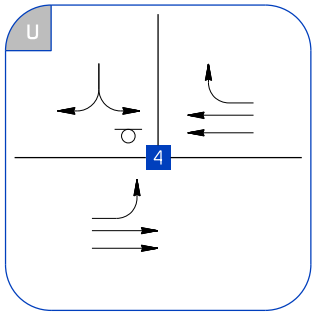
S. Red Sky Drive/S. Swift Fox Way is currently built as a three-legged roundabout intersection with single travel lanes for the eastbound, westbound and southbound approaches. This intersection is proposed to serve as a full 4-legged access to the project site.

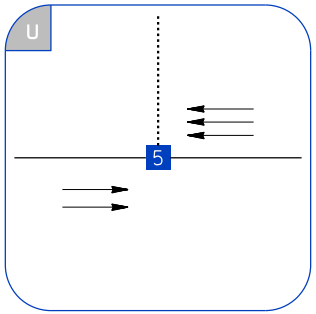
E. Hess Road/Firefly Lane is currently built as a three-legged unsignalized intersection with stop control for the southbound approach, consisting of the following lane configurations; two through lanes and exclusive left turn lane for the eastbound approach; two through lanes and exclusive right turn lane for the westbound approach; and a shared left-right turn lane for the southbound approach.

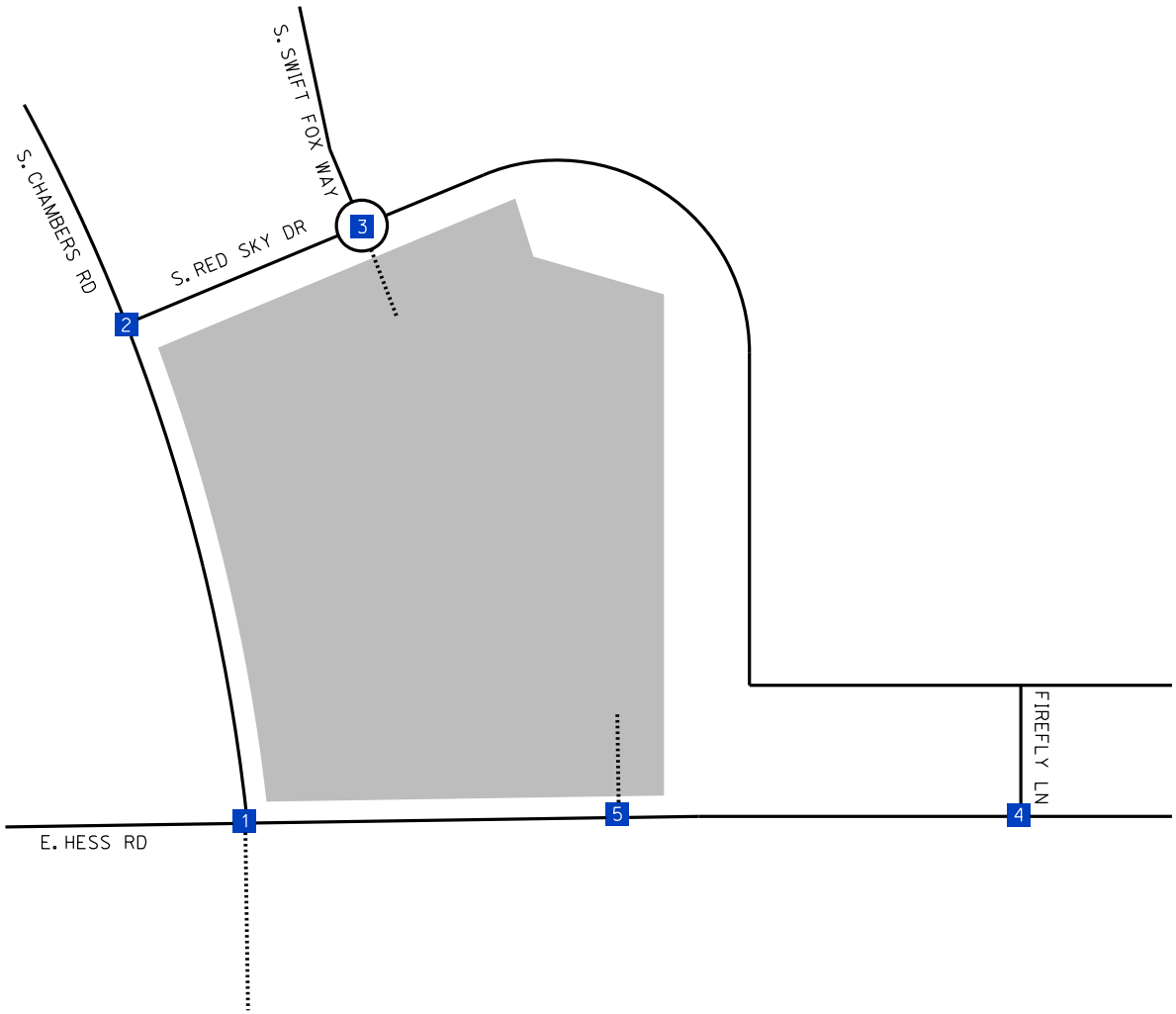
Exhibit 3 illustrates the existing transportation conditions within the project area as described above.











NOT TO SCALE

RICK ENGINEERING COMPANY

EXHIBIT 3

EXISTING CONDITIONS

CHAMBERS AND HESS DEVELOPMENT

LEGEND

- U =UNSIGNALIZED
- S =SIGNALIZED
- R =ROUNDABOUT
- 1 = INTERSECTION NUMBER
- = PROJECT SITE
- = STOP CONTROLLED
- = FUTURE ROAD/DRIVEWAY

\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\18633_03_Exhibit_ExistingTranspoConditions.dgn
\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\SD CorpStds 2005.dscript

06-JAN-2020 09:53

2.1- EXISTING TRAFFIC VOLUMES

The traffic study was analyzed for the following intersections within the project area:

1. S. Chambers Road and E. Hess Road
2. S. Chambers Road and S. Red Sky Drive
3. S. Red Sky Drive and S. Swift Fox Way-Future Project Dwy
4. E. Hess Road and Firefly Lane
5. E. Hess Road and Future Project Dwy

The following roadway segments were also analyzed:

1. S. Chambers Road between S. Red Sky Drive and E. Hess Road
2. E. Hess Road between S. Chambers Road and Firefly Lane
3. S. Red Sky Drive east of S. Chambers Road

Existing traffic data at the study intersections and roadways was obtained from traffic counts conducted by All Traffic Data Services, Inc. on Wednesday, August 21st 2019. The turning movement counts were conducted during the weekday AM (7-9) and PM (4-6) peak periods. During the same day, twenty-four hour tube counts were conducted in order to document the average daily traffic (ADT) and 85th percentile speeds along the studied roadways.

Exhibit 4 shows the existing intersection turning movement counts and ADT's within the study area.

Appendix A contains the intersection turning movement and roadway segment count sheets.

Based on existing traffic data and signal warrant methodologies contained within the MUTCD, none of the unsignalized study intersections are warranted for signalization based on the peak hour warrants.

Appendix B contains the signal warrant worksheets and a summary table of all the unsignalized intersections for all scenarios.

2.2- EXISTING TRAFFIC OPERATIONS

The existing intersection and roadway operations results are based on existing traffic volumes collected and existing intersection and roadway geometry. In accordance with the Town of Parker's benchmark for intersections and roadway segments, LOS D or better shall be maintained for all scenarios.

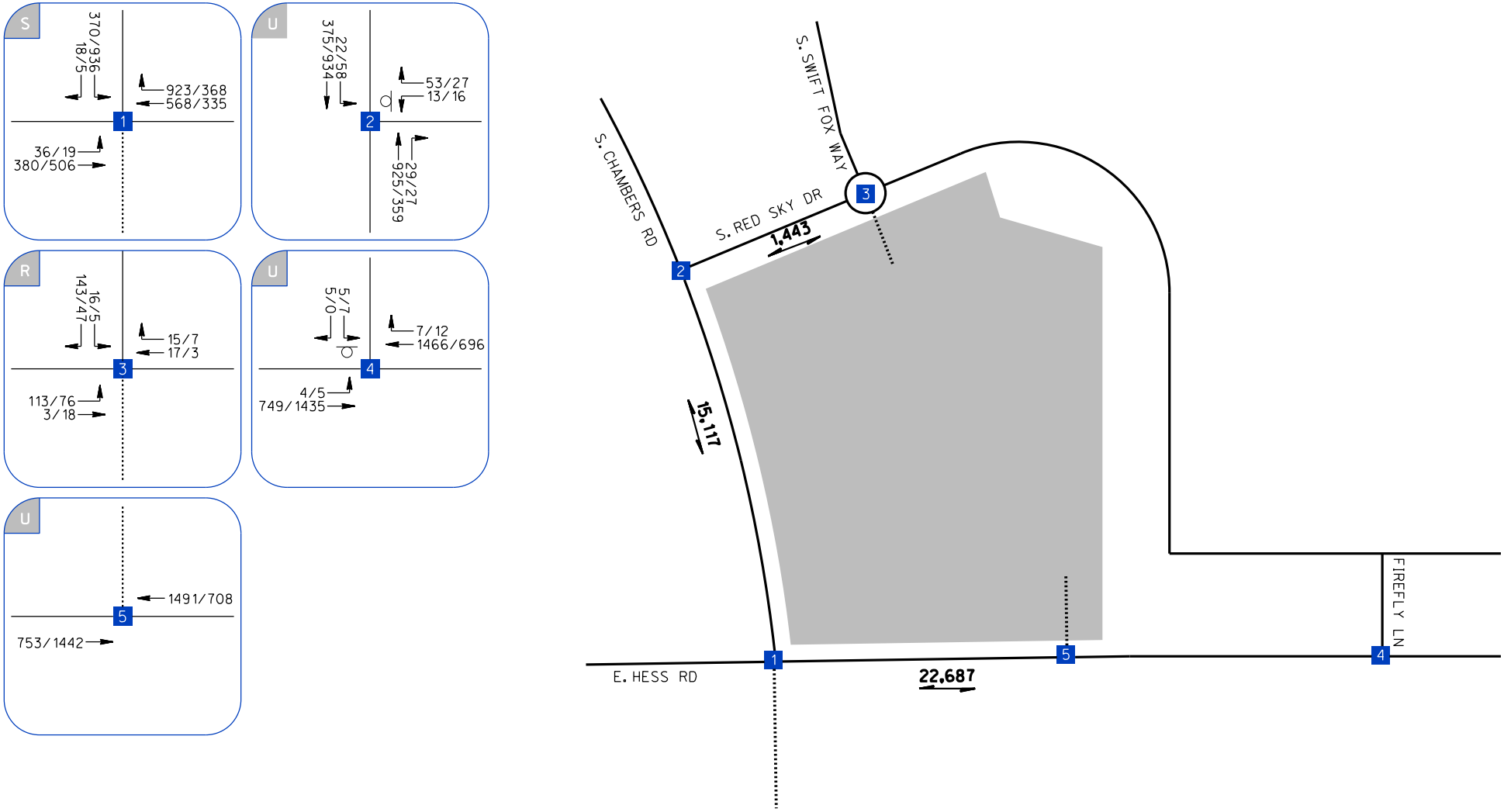
Table 1 shows that all the studied intersections currently operate at acceptable levels of service (LOS D or better) for existing conditions, with the exception of the following intersection:

- E. Hess Road/Firefly Lane (LOS F, AM peak hour; and LOS E, PM peak hour)

Table 2 shows that all the studied roadway segments currently operate at acceptable levels of service (LOS B or better) for existing conditions.

Appendix C contains the intersection capacity analysis worksheets for all scenarios.

Appendix D contains Douglas County's roadway segment thresholds.



RICK ENGINEERING COMPANY

EXHIBIT 4

EXISTING (2019) TRAFFIC VOLUMES

CHAMBERS AND HESS DEVELOPMENT

LEGEND

AM/PM=PEAK HOUR VOLUMES

X,XXX =TWO-WAY ADT

1 =INTERSECTION NUMBER

=PROJECT SITE

= FUTURE ROAD/DRIVEWAY

\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\18633_04_Exhibit_ExistingVolumes.dgn
\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\SD CorpStds 2005.dscript

06-JAN-2020 10:07

TABLE 1
EXISTING INTERSECTION OPERATIONS
CHAMBERS AND HESS DEVELOPMENT

#	INTERSECTION	CONTROL	DIR.	EXISTING (2019)			
				AM Peak		PM Peak	
				DELAY [1]	LOS [2]	DELAY [1]	LOS [2]
1	**S. Chambers Rd/E. Hess Rd**	**(S)**	Overall	16.0	B	11.4	B
2	**S. Chambers Rd/S. Red Sky Dr**	**(OWSC)**	WB-L	28.1	D	17.5	C
			WB-R	13.6	B	9.5	A
			SB-L	11.1	B	8.3	A
3	**S. Red Sky Dr/S. Swift Fox Way**	**(R)**	Overall	3.7	A	3.2	A
4	**E. Hess Rd/Firefly Ln**	**(OWSC)**	EB-L	14.6	B	9.2	A
			SB-LR	**>50**	**F**	**39.1**	**E**

Footnotes:
Results calculated utilizing the methodologies described in Chapters 19, 20, 21, and 22 in the 6th edition of the HCM .
1) Delay is measured in seconds per vehicle.
2) Level of Service
(S)=Signalized, (TWSC)=Two-Way Stop Controlled, (OWSC)=One-Way Stop Controlled, (AWSC)=All-Way Stop Controlled, (R)=Roundabout.
NB=Northbound, WB=Westbound, etc.
L=Left-turn movement, T=Thru movement, R= Right-turn movement, etc.
LT=Left-Through lane, LTR=Left-Through-Right lane , etc.

TABLE 2
EXISTING ROADWAY SEGMENT OPERATIONS
CHAMBERS AND HESS DEVELOPMENT

ROADWAY SEGMENT	ULTIMATE ROADWAY CLASSIFICATION	ULTIMATE CAPACITY (LOS D)[1]	FUNCTIONAL CLASSIFICATION	CAPACITY (LOS D)[1]	EXISTING (2019)		
					ADT	V/C	LOS
S. Chambers Road between S. Red Sky Drive and E. Hess Road	Principal Arterial (6L)	55,000	Arterial (4L)	40,000	15,117	0.38	A
E. Hess Road between S. Chmabers Road and Firefly Lane	Arterial (4L)	40,000	Arterial (4L)	40,000	22,687	0.57	B
S. Red Sky Drive east of S. Chambers Road	Residential Collector (2L)	12,000	Residential Collector (2L)	12,000	1,443	0.12	A

Footnote:

[1] Source: Douglas County 2040 Transportation Plan *Table 4, Recommended Traffic Volume Thresholds* Dated June 2019

3.0- DEVELOPMENT SITE CHARACTERISTICS

The following is a brief description of the proposed Project characteristics such as intended access points and geometric layouts of the roadways being proposed.

3.1- PROJECT ROADWAYS

As illustrated in Exhibit 2, the project proposes three access points; one at S. Red Sky Drive, one at S. Chambers Road and one at E. Hess Road.

S. Chambers Road, between S. Red Sky Drive and E. Hess Road is a north-south roadway that is currently built as a four-lane divided roadway providing two travel lanes with acceleration/deceleration lanes and bicycle lanes in each direction. Per the Town of Parker's 2035 Transportation Master Plan, this roadway segment is ultimately a six-lane roadway.

E. Hess Road between S. Chambers Road and Firefly Lane is an east-west roadway that is currently built as a four-lane divided roadway providing two travel lanes with acceleration/deceleration lanes as well as bicycle lanes in each direction. The project proposes a right-in/right-out only access within this segment.

S. Red Sky Drive east of S. Chambers Road is an east-west roadway that is functioning as an undivided two-lane Residential Collector that provides access to residential homes with one travel lane in each direction. The project proposes a full access with a new fourth leg at the existing roundabout at S. Swift Fox Way intersection.

3.2- PROJECT INTERSECTIONS

S. Red Sky Drive/S. Swift Fox Way-Future Project Dwy intersection will provide northerly access to the project, with a proposed fourth driveway at the existing roundabout and a yield control for the northbound approach matching the southbound, eastbound and westbound approaches. Lane configurations for this intersection are described under the short-term and long-term conditions sections within this report.

E. Hess Road/Future Project Dwy intersection will provide the southerly access to the project, and is proposed as right-in/right-out intersection with stop control for the southbound approach. Lane configurations for this intersection are described under the short-term and long-term conditions sections within this report.

3.3- PROJECT TRIP GENERATION

The project traffic volumes generated by the proposed development were estimated using the nationally published trip generation rates from the Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition. The project is anticipated to generate a total of 12,831 daily weekday trips, of which 304 trips (188 inbound and 116 outbound) are anticipated to be generated during the AM peak hour, and 1,240 trips (595 inbound and 645 outbound) during the PM peak hour. After applying a maximum of 15% Pass-by trips allowed by the Town's standards, the total primary trips anticipated by the project are 10,907 weekday trips with 259 (159 inbound and 98 outbound) AM and 1,054 (506 inbound and 548 outbound) PM peak hour trips.

Table 3 summarizes the calculated trips generated by the project.

3.4- PROJECT TRIP DISTRIBUTION

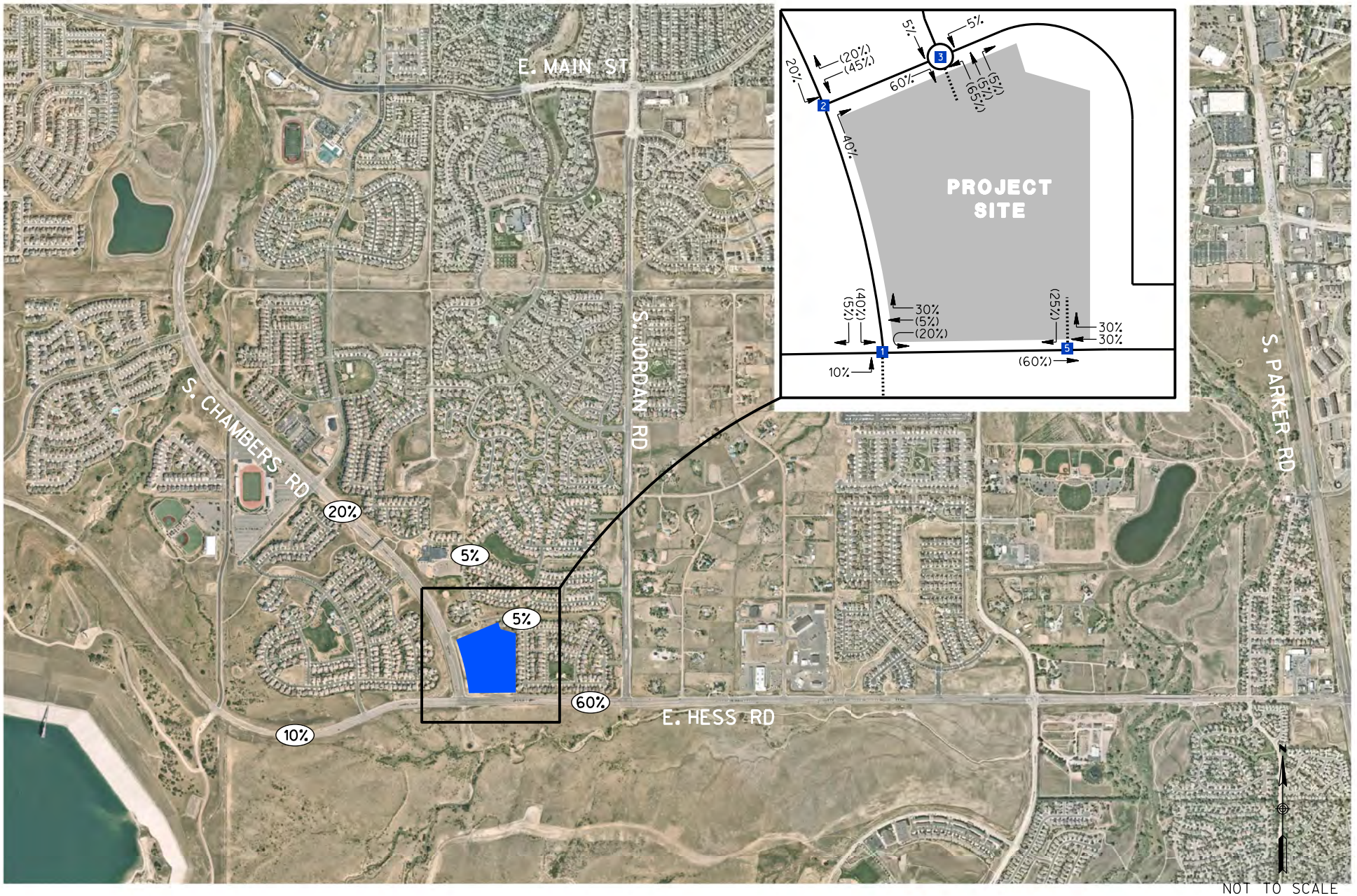
The project traffic distribution was estimated based on the site's proximity to the nearby major roadways, existing and future traffic patterns, as well as adjacent land uses. Based on the information contained within the Town of Parker's Transportation Plan, the various roadways and intersections analyzed are planned to be improved by the year 2035. With the anticipated improvements to the network circulation, it is important for the project distribution to accurately represent the study year conditions, for both short-term and long-term conditions.

Exhibit 5 illustrates the project distribution percentages.

TABLE 3
PROJECT TRIP GENERATION SUMMARY
CHAMBERS & HESS

LAND USE	QUANTITY[1]		ITE Trip Gen. 10th Edition Code	DWY Rate	ADT	AM PEAK HOUR						PM PEAK HOUR					
						Peak Hr Rate	SPLIT		VOLUMES			Peak Hr Rate	SPLIT		VOLUMES		
							IN	OUT	IN	OUT	TOTAL		IN	OUT	IN	OUT	TOTAL
Shopping Center	304.920	TSF[2]	820	[3]		[4]						[5]					
Total Primary (85%)					10,907				159	98	259				506	548	1054
Total Pass-By (15%)					1,925				28	17	46				89	97	186
Total					12,831		62%	38%	188	116	304		48%	52%	595	645	1240

[1]Douglas 234 Approved Use (Maximum 0.5 F.A.R. Commercial Use on 14 Acre Parcel)
[2]TSF = Thousand Square Feet
[3]Fitted Curve Equation: ln(T) = 0.68 Ln(X) + 5.57
[4]Fitted Curve Equation: T = 0.50 (X)+ 151.78
[5]Fitted Curve Equation: ln(T) = 0.74 Ln(X) + 2.89



RICK ENGINEERING COMPANY

EXHIBIT 5

PROJECT TRIP DISTRIBUTION

CHAMBERS AND HESS DEVELOPMENT

LEGEND

(XX%) =PERCENT DISTRIBUTION
XX% =INBOUND PERCENT DISTRIBUTION
(XX%) =OUTBOUND PERCENT DISTRIBUTION

\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\18633_05_Exhibit_ProjectTripDistribution.dgn
\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\SD CorpStds 2005.dscript

06-JAN-2020 10:27

4.0- OFF-SITE TRAFFIC ANALYSIS

4.1- BACKGROUND TRAFFIC

Background traffic can be described as the ambient growth experienced on the roadway networks within the study area, plus any other applicable projects that are anticipated to be completed within the opening year and long-term scenario. To account for the projected increases in the background traffic, an annual growth rate of 4% was applied to the study area intersections and roadway segments consistent with the traffic volumes projected for this area per the Town of Parker for the short-term scenarios. For the long-term scenarios, background volumes projected in the Anthology study (Dated April, 2015) were utilized conservatively, as these volumes were higher than the volumes projected in the Town's Model for the year 2035. The 2035 Anthology total volumes were then increased by 2% per year at the study intersections and roadways to account for the 2041 base volumes.

Appendix E contains volumes from the Anthology study.

4.2- FUTURE SCENARIOS

Based on coordination with the Town of Parker, the following intersections and roadways segments were analyzed for the future scenarios:

Intersections:

1. S. Chambers Road and E. Hess Road
2. S. Chambers Road and S. Red Sky Drive
3. S. Red Sky Drive and S. Swift Fox Way – Future Project Dwy
4. E. Hess Road and Firefly Lane
5. E. Hess Road and Future Project Dwy

Segments:

1. S. Chambers Road between S. Red Sky Drive and E. Hess Road
2. E. Hess Road between S. Chambers Road and Firefly Lane
3. S. Red Sky Drive east of S. Chambers Road

4.3 SHORT-TERM SCENARIO

SHORT-TERM TRANSPORTATION CONDITIONS

The short-term intersections and roadways are reflective of the existing (2019) transportation conditions as well as the proposed project intersections and roadways. All intersections and roadway segments are assumed to operate under the same classification and conditions as previously noted under the existing traffic conditions section of this report, with the exception of the following:

S. Chambers Road/E. Hess Road is currently built as a three-legged signalized intersection. For the Plus Project scenarios, it is assumed that the signal and striping could be modified to allow westbound U-turn movements and consisting of the following lane configurations; two left turn lanes, and an exclusive right turn lane for the southbound approach; exclusive left turn lane and two through lanes for the eastbound approach; and an exclusive U-turn lane, two through lanes and exclusive right-turn lane for the westbound approach.

S. Red Sky Drive/S. Swift Fox Way-Future Project Dwy is currently built as a three-legged roundabout intersection. For the Plus Project scenarios, a fourth-leg/driveway is assumed to provide northerly access to the project, with the following lane configurations; shared left-through-right turn lane for all four approaches.

E. Hess Road/Future Project Dwy intersection will provide the southerly access to the project, and is proposed as right-in/right-out intersection with stop control for the southbound approach with the following lane configurations; two through lanes and one exclusive right turn lane for the westbound approach; two through lanes for the eastbound approach and one right turn lane for the southbound approach.

Exhibit 6 illustrates the anticipated short-term (2021) transportation conditions.

SHORT-TERM (2021) BACKGROUND AND TOTAL TRAFFIC VOLUMES

The short-term (2021) background intersection and roadway volumes include existing traffic volumes, and an average growth rate of 4% per year.

Exhibit 7 illustrates the short-term (2021) background traffic volumes.

The short-term total traffic intersection and roadway volumes are based on the forecasted traffic volumes for the year 2021 (short-term background) plus the project generated traffic volumes.

Exhibit 8 shows the project traffic volumes.

Exhibit 9 shows the short-term (2021) total traffic volumes.

SHORT-TERM (2021) BACKGROUND AND TOTAL TRAFFIC OPERATIONS

In accordance to the Town of Parker's benchmark for intersections and roadway segments, LOS D or better shall be maintained for all scenarios. Using the forecasted short-term (2021) background and total volumes with methodologies described in the 6th edition of the HCM and MUTCD, the following describes the anticipated intersection operations and warrants.

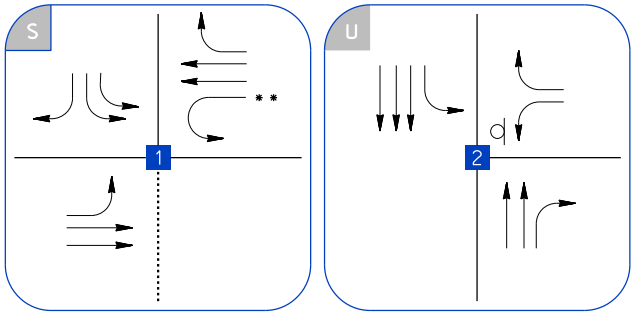
Table 4 shows that all the studied intersections currently operate at acceptable levels of service (LOS D or better) for short-term (2021) background and short-term (2021) background plus project scenarios, with the exception of the following intersections:

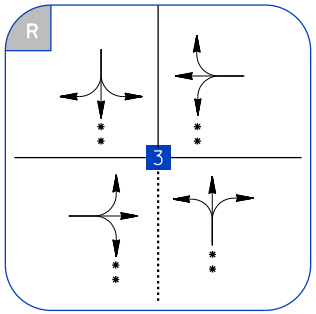
- S. Chambers Road/S. Red Sky Drive (Total – WBL movement LOS F for AM and LOS E for PM peak hours)
- E. Hess Road/Firefly Lane (Background – SB-LR movement LOS F for AM and LOS E for PM peak hours; Total – LOS F AM and PM peak hours).

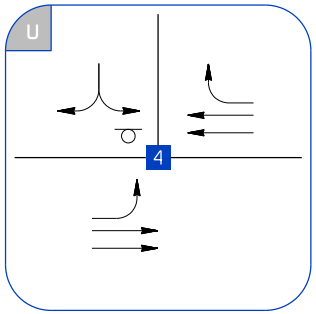
Based on the forecasted peak hour traffic volumes for the short-term (2021) background and short-term (2021) total scenarios and criteria found in the MUTCD, the following intersection is warranted for signalization:

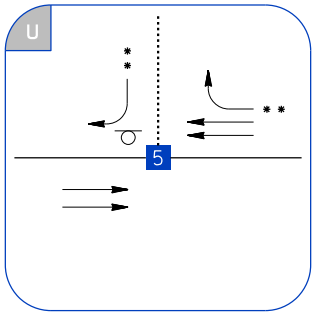
- S. Chambers Road/S. Red Sky Drive (Total scenario – eight hour (warrant 1), four-hour (warrant 2) and peak hour (warrant 3) met).

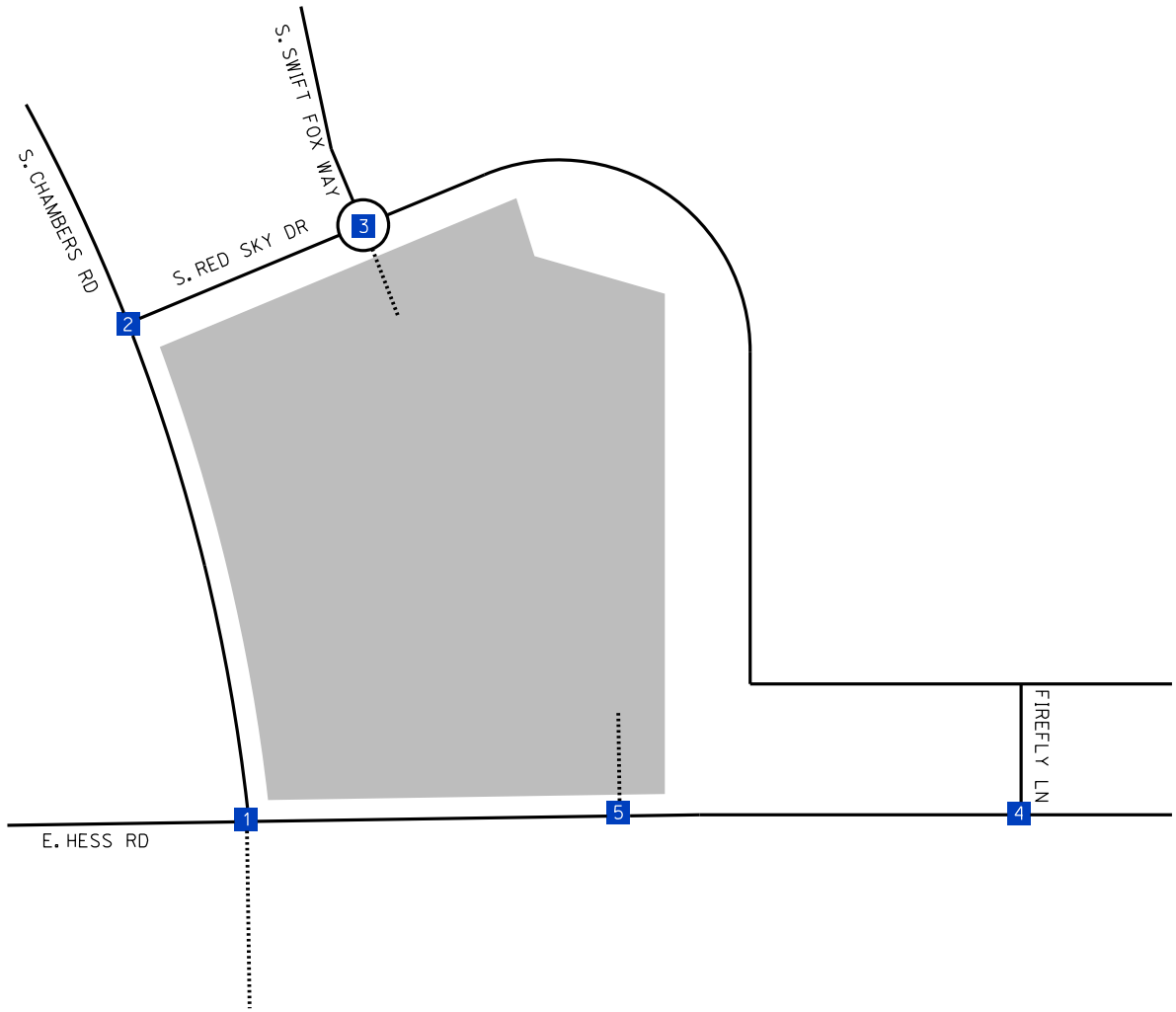
Although not warranted, the following intersection would also operate at acceptable levels of service (LOS D or better) with a signal installation (by others):











** ASSUMED FOR PLUS PROJECT SCENARIOS ONLY

N

NOT TO SCALE

RICK ENGINEERING COMPANY™

EXHIBIT 6

SHORT-TERM (2021) TRANSPORTATION CONDITIONS

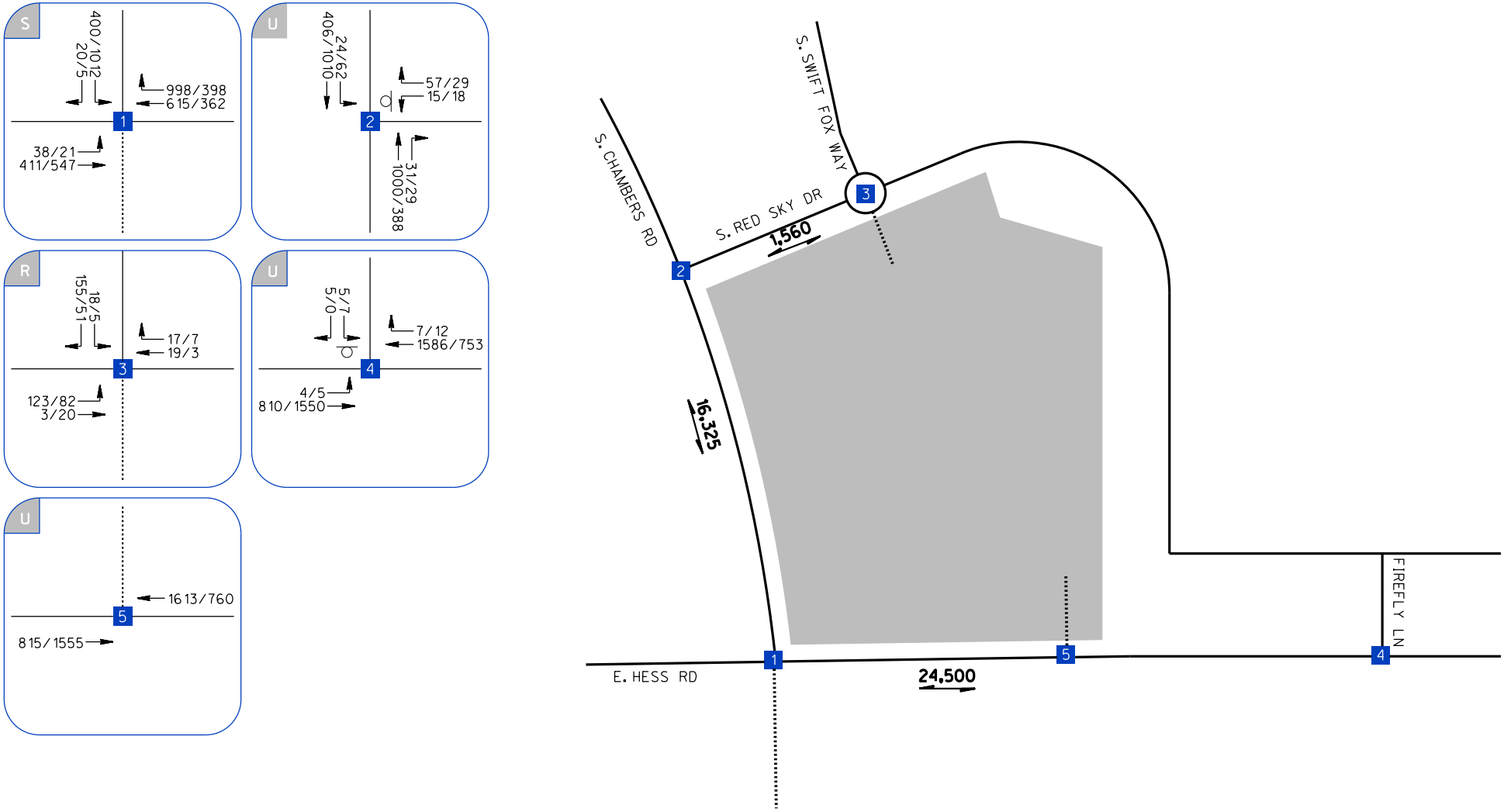
CHAMBERS AND HESS DEVELOPMENT

LEGEND

- U = UNSIGNALIZED
- S = SIGNALIZED
- R = ROUNDABOUT
- 1 = INTERSECTION NUMBER
- = PROJECT SITE
- = STOP CONTROLLED
- = FUTURE ROAD/DRIVEWAY

\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\18633_06_Exhibit_ST-TranspoConditions.dgn
\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\SD CorpStds 2005.dscript

06-JAN-2020 10:48



RICK ENGINEERING COMPANY

EXHIBIT 7

SHORT-TERM (2021) BACKGROUND TRAFFIC VOLUMES

CHAMBERS AND HESS DEVELOPMENT

LEGEND

AM/PM=PEAK HOUR VOLUMES

X,XXX =TWO-WAY ADT

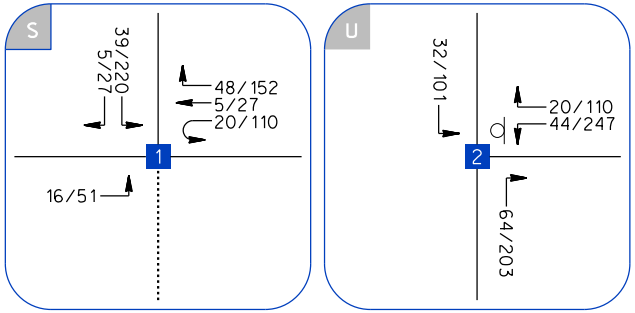
1 =INTERSECTION NUMBER

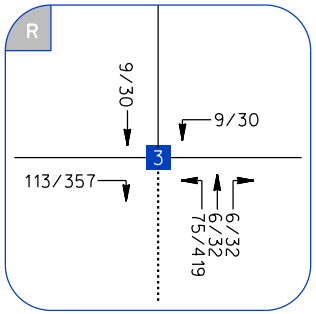
=PROJECT SITE

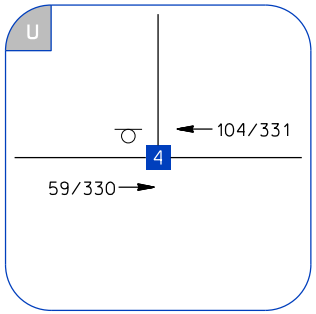
= FUTURE ROAD/DRIVEWAY

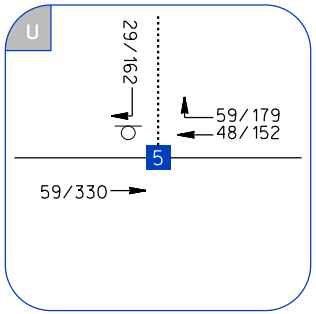
\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\18633_07_Exhibit_ST-BackgroundVolumes.dgn
\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\SD CorpStds 2005.dscript

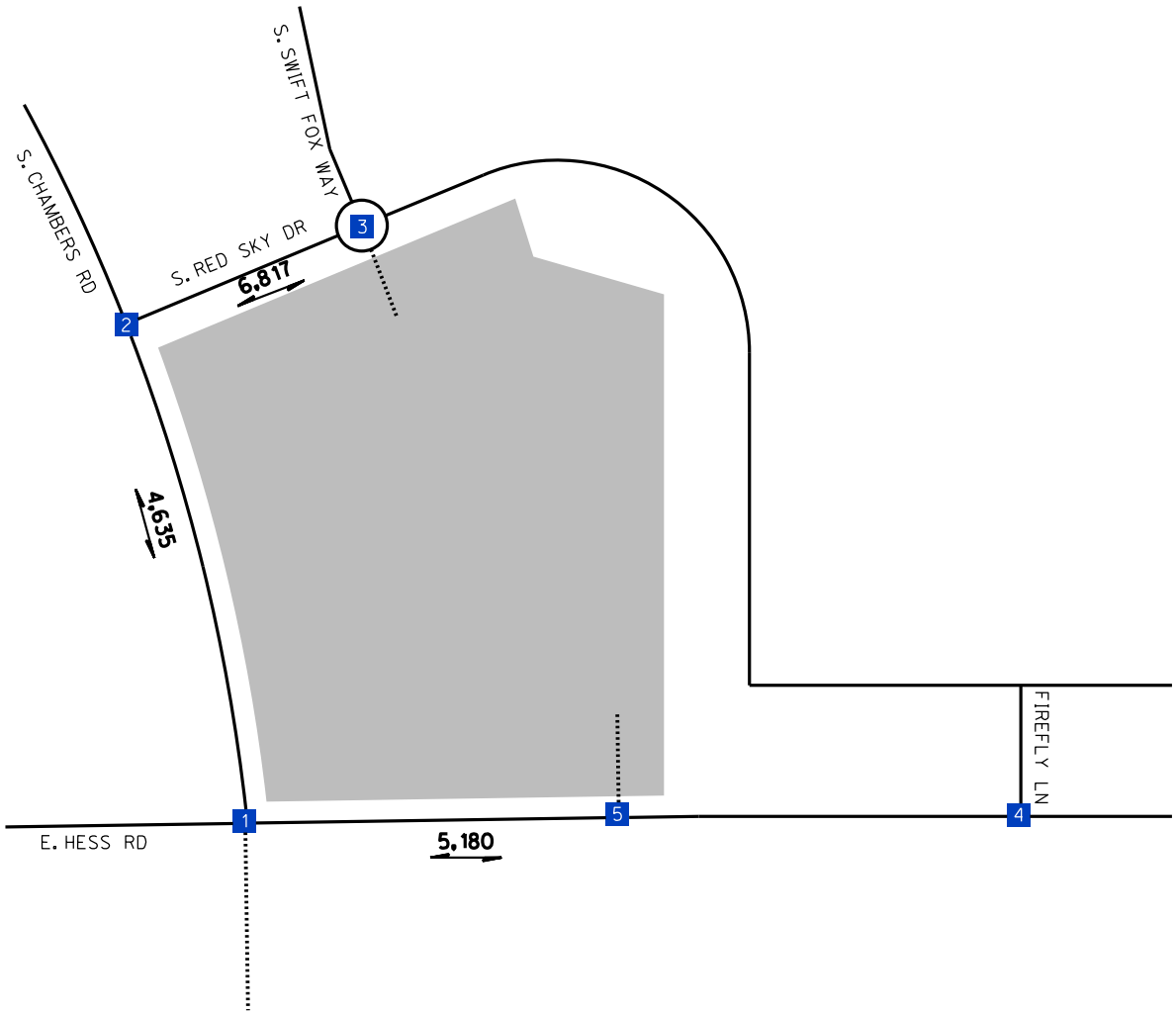
07-JAN-2020 15:40











NOT TO SCALE

RICK ENGINEERING COMPANY

EXHIBIT 8

PROJECT ONLY TRAFFIC VOLUMES

CHAMBERS AND HESS DEVELOPMENT

LEGEND

AM/PM=PEAK HOUR VOLUMES

X,XXX =TWO-WAY ADT

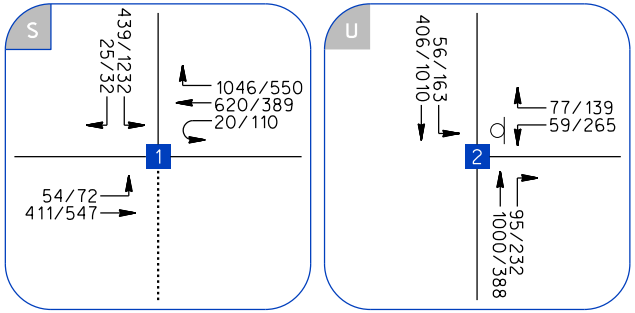
1 =INTERSECTION NUMBER

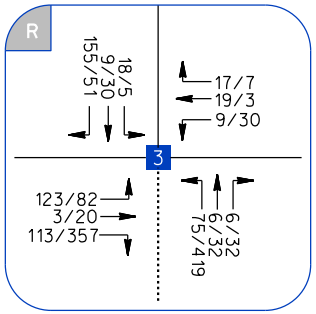
=PROJECT SITE

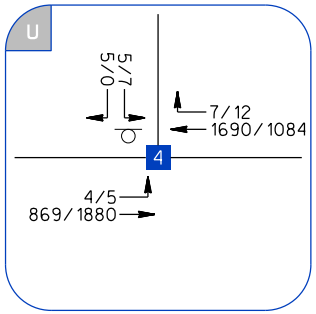
= FUTURE ROAD/DRIVEWAY

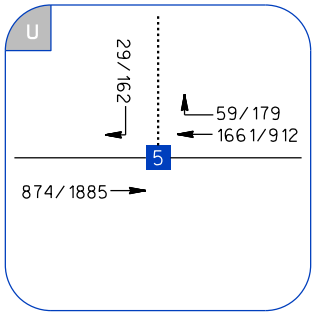
\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\18633_08_Exhibit_ProjOnlyVolumes.dgn
\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\SD CorpStds 2005.dscript

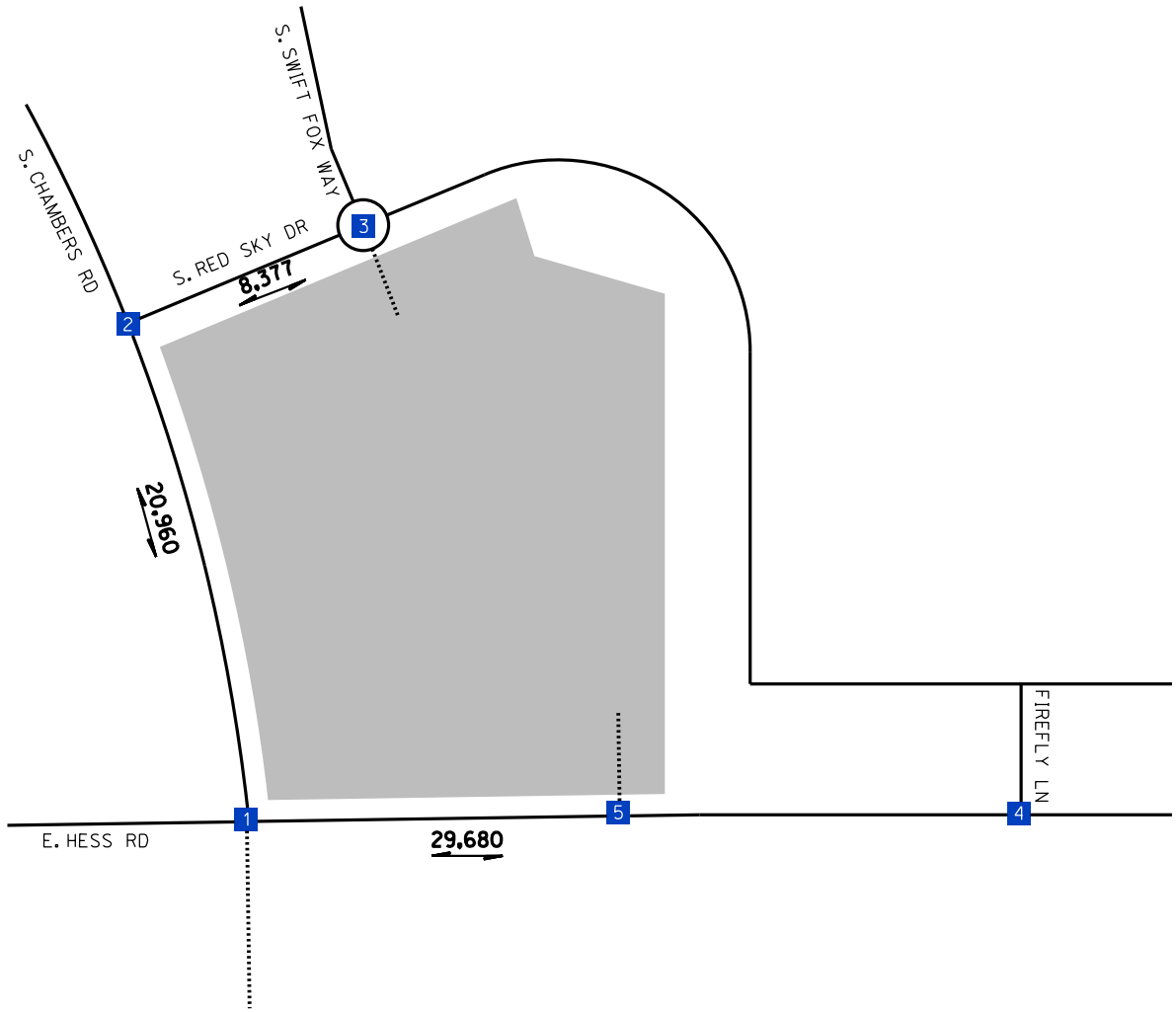
07-JAN-2020 15:41











NOT TO SCALE

RICK ENGINEERING COMPANY

EXHIBIT 9

SHORT-TERM BACKGROUND + PROJECT TRAFFIC VOLUMES (2021)

CHAMBERS AND HESS DEVELOPMENT

LEGEND

AM/PM=PEAK HOUR VOLUMES

X,XXX =TWO-WAY ADT

1 =INTERSECTION NUMBER

=PROJECT SITE

= FUTURE ROAD/DRIVEWAY

\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\18633_09_Exhibit_ST-Background+ProjVolumes.dgn
\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\SD CorpStds 2005.dscript

23-JAN-2020 16:36

TABLE 4
SHORT-TERM (2021) INTERSECTION OPERATIONS SUMMARY
CHAMBERS AND HESS DEVELOPMENT

#	INTERSECTION	CONTROL	DIR.	BACKGROUND (2021)				TOTAL[3] (2021)			
				AM Peak		PM Peak		AM Peak		PM Peak	
				DELAY [1]	LOS [2]	DELAY [1]	LOS [2]	DELAY [1]	LOS [2]	DELAY [1]	LOS [2]
1	**S. Chambers Rd/E. Hess Rd**	**(S)**	Overall	23.2	C	11.9	B	31.8	C	17.8	B
2	**S. Chambers Rd/S. Red Sky Dr**	**(OWSC)**	WB-L	32.8	D	18.9	C	**>50**	**F**	**>50**	**F**
			WB-R	14.3	B	9.6	A	15.0	C	10.4	B
			SB-L	11.6	B	8.4	A	12.7	B	9.7	A
	With Recommended Improvements - Signal	**(S)**	Overall	-	-	-	-	13.0	B	10.6	B
3	**S. Red Sky Dr/S. Swift Fox Way**	**(R)**	Overall	3.7	A	3.3	A	5.6	A	4.6	A
4	**E. Hess Rd/Firefly Ln**	**(OWSC)**	EB-L	15.9	C	9.5	A	17.1	C	11.0	B
			SB-LR	**>50**	**F**	**47.0**	**E**	**>50**	**F**	**>50**	**F**
	With Recommended Improvements - Signal (By Others)	**(S)**	Overall	-	-	-	-	9.2	A	7.5	A
5	**E. Hess Rd/Project Dwy**	**(OWSC)**	SB-R	**-**	**-**	**-**	**-**	19.5	C	13.4	B

Footnotes:

Results calculated utilizing the methodologies described in Chapters 19, 20, 21, and 22
in the 6th edition of the HCM .

1) Delay is measured in seconds per vehicle.

2) Level of Service

3) Total= 2021 with Project Traffic Operations

(S)=Signalized, (TWSC)=Two-Way Stop Controlled, (AWSC)=All-Way Stop Controlled, (R)=Roundabout.

NB=Northbound, WB=Westbound, etc.

L=Left-turn movement, R= Right-turn movement, LT=Left-Through lane, LTR=Left-Through-Right lane , etc.

* No conflicting movements. No Delays to report

- E. Hess Road/Firefly Lane

Table 5 shows that all the studied roadway segments currently operate at acceptable levels of service (LOS B or better) for short-term (2021) background and short-term (2021) total scenarios.

4.4 LONG-TERM SCENARIO

LONG-TERM (2041) TRANSPORTATION CONDITIONS

The long-term transportation conditions assume the planned 2035 roadway configuration contained within the City's Transportation Plan, and anticipated improvements by the surrounding projects. The following is a brief description of the anticipated roadway for the long-term scenario:

S. Chambers Road, between S. Red Sky Drive and E. Hess Road is a north-south roadway that is ultimately classified as a six-lane Principal Arterial. For this study scenario, this roadway is assumed to be built to its ultimate configuration with three travel lanes and acceleration/deceleration lanes in each direction, consistent with the Town of Parker's 2035 Transportation Master Plan.

E. Hess Road between S. Chambers Road and Firefly Lane is an east-west roadway that is currently built to its ultimate four-lane divided roadway configuration providing two travel lanes and acceleration/deceleration lanes in each direction. No additional lane changes were assumed from the short-term scenario.

S. Red Sky Drive east of S. Chambers Road is an east-west roadway that is built to its ultimate two-lane Residential Collector that is assumed to continue to provide access to residential homes with one travel lane in each direction. No additional lane changes were assumed from the short-term scenario.

S. Chambers Road/E. Hess Road is assumed to be built to its ultimate four-legged signalized intersection consistent with the lane configurations proposed by the Anthology Study. The lane configurations are as follows; two left turn lanes, three through lanes and an exclusive right turn lane for both the southbound and northbound approaches; two left turn lanes, two through lanes and exclusive right turn lane for both the eastbound and westbound approaches.

S. Chambers Road/S. Red Sky Drive is assumed to remain as a stop controlled intersection for the Background study scenario. However, it is assumed as a signalized intersection for the Plus Project scenario as warranted in 2021 with project scenario. The lane configurations are as follows; three through lanes and an exclusive right-turn lane for the northbound approach; three through lanes and exclusive left turn lane for the southbound approach; and exclusive left and right turn lanes for the westbound approach.

S. Red Sky Drive/S. Swift Fox Way-Future Project Dwy is assumed to remain as a three-legged roundabout intersection for the Background scenario and a fourth-leg/driveway providing northerly access to the project is assumed for the Plus Project scenario, with the following lane configurations; shared left-through-right turn lane for all four approaches.

E. Hess Road/Firefly Lane is assumed to be signalized in this study scenario per coordination with the Town. It is assumed to remain as a three-legged intersection consisting of the following lane configurations; two through lanes and exclusive left turn lane for the eastbound approach; two through

TABLE 5
SHORT-TERM (2021) ROADWAY SEGMENT OPERATIONS
CHAMBERS AND HESS DEVELOPMENT

ROADWAY SEGMENT	ULTIMATE ROADWAY CLASSIFICATION	ULTIMATE CAPACITY (LOS D)[1]	FUNCTIONAL CLASSIFICATION	CAPACITY (LOS D)[1]	BACKGROUND (2021)			TOTAL (2021)		
					ADT	V/C	LOS	ADT	V/C	LOS
S. Chambers Road between S. Red Sky Drive and E. Hess Road	Principal Arterial (6L)	55,000	Arterial (4L)	40,000	16,325	0.41	A	20,960	0.524	A
E. Hess Road between S. Chambers Road and Firefly Lane	Arterial (4L)	40,000	Arterial (4L)	40,000	24,500	0.61	B	29,680	0.742	B
S. Red Sky Drive east of S. Chambers Road	Residential Collector (2L)	12,000	Residential Collector (2L)	12,000	1,560	0.13	A	8,377	0.698	B

Footnote:

[1] Source: Douglas County 2040 Transportation Plan *Table 4, Recommended Traffic Volume Thresholds* Dated June 2019

lanes and exclusive right turn lane for the westbound approach; and a shared left-right turn lane for the southbound approach.

Exhibit 10 illustrates the anticipated long-term (2041) transportation conditions.

LONG-TERM (2041) BACKGROUND AND TOTAL TRAFFIC VOLUMES

The long-term background intersection and roadway operations volumes are based on the forecasted traffic volumes for the year 2041, other background projects anticipated to be developed, and the anticipated long-term transportation conditions as planned for the year 2035 under the Town of Parker Transportation Plan and the 2040 Douglas County Transportation Master Plan.

The long-term total traffic intersection and roadway volumes will be based on the forecasted traffic volumes for the year 2041 (long-term background) plus the project generated traffic volumes.

Exhibit 11 illustrates the long-term (2041) background traffic volumes.

Exhibit 12 illustrates the long-term (2041) total traffic volumes.

LONG-TERM (2041) BACKGROUND AND TOTAL TRAFFIC OPERATIONS

In accordance with the Town of Parker's benchmark for intersections and roadway segments, LOS D or better shall be maintained for all scenarios. Using the forecasted long-term background and total volumes and methodologies described in the 6th edition of the HCM and MUTCD the following will describe the anticipated intersection and roadway operations, as well as signal warrants.

The operational conditions for the roadway segments were established utilizing Douglas County 2040 Transportation Plan's Recommended Traffic Volume Thresholds per Table 4, dated June 2019 to evaluate the overall performance.

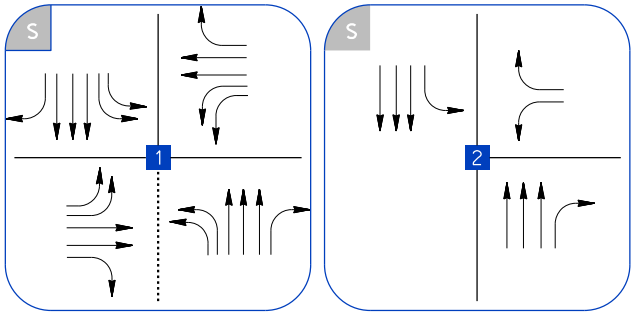
Table 6 shows that all the studied intersections currently operate at acceptable levels of service (LOS D or better) for long-term (2041) background and long-term (2041) total scenarios, with the exception of the following intersections:

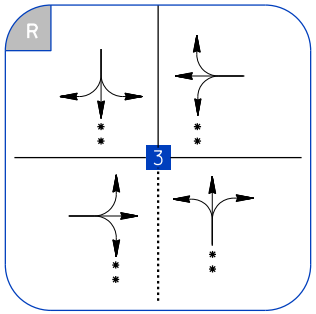
- S. Chambers Road/E. Hess Road (Background, LOS E for AM and LOS F PM peak hours and Total – LOS F for both AM and PM peak hours)
- S. Chambers Road/S. Red Sky Drive (Background – LOS F for all movements)

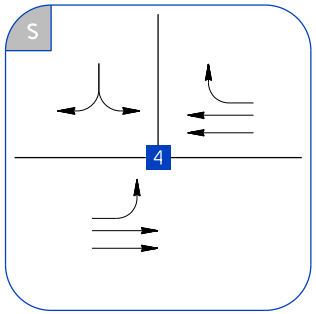
Due to the high volumes proposed by the near-by Anthology development assumed to be opened by 2041; the intersection of S. Chambers Road/E. Hess Road operates at LOS F. The Anthology study recommends a westbound and eastbound free-right turns to lessen the impacts to this intersection; however, the proposed mitigation measures has minimal improvements to the level of service and will continue to operate at LOS F.

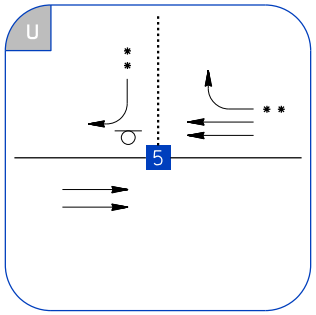
The installation of traffic signal at S. Chambers Road/S. Red Sky Drive would mitigate this intersection to operate at LOS B or better.

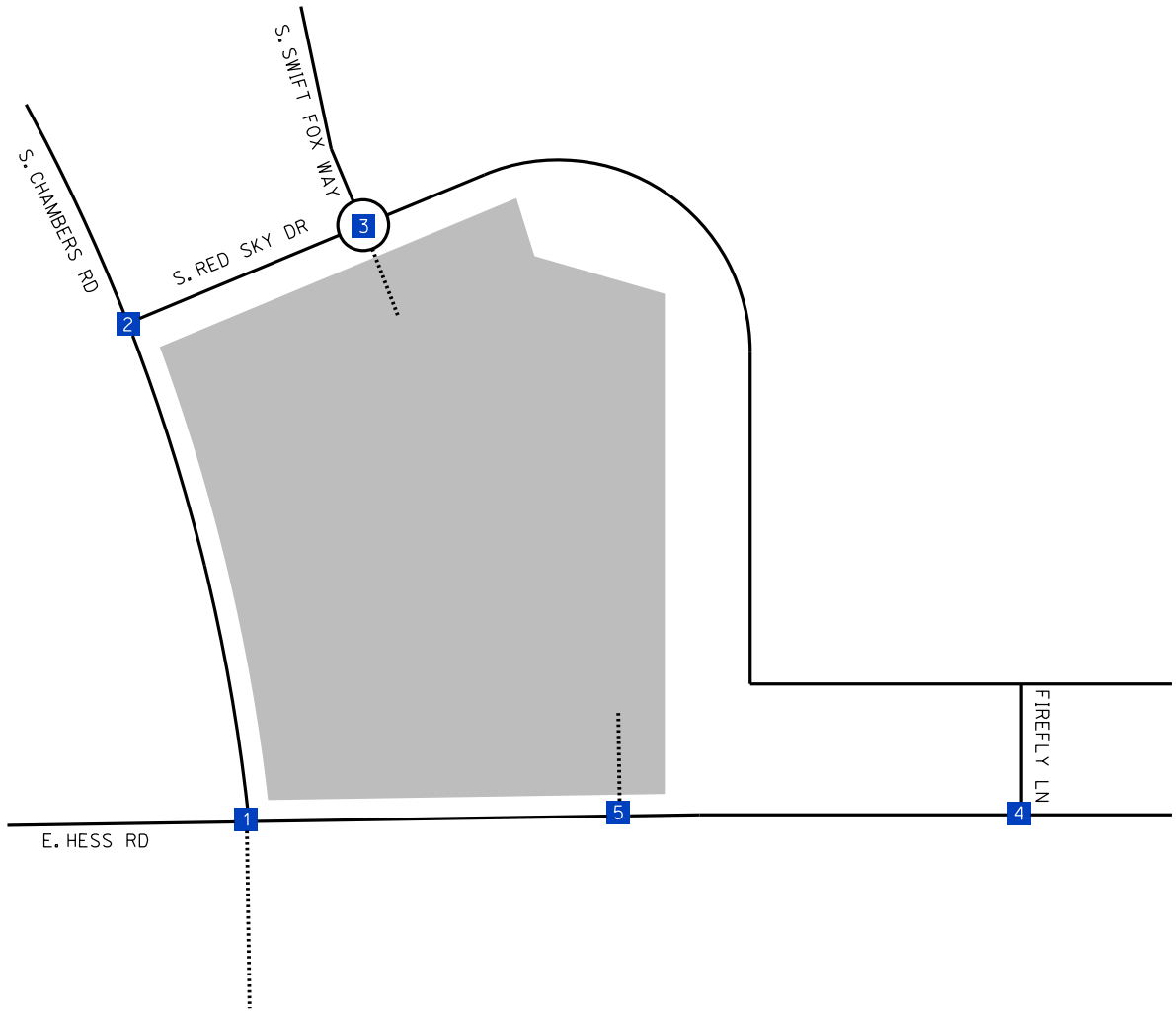
Based on the forecasted peak hour traffic volumes for the long-term (2041) background and long-term (2041) total scenarios, and criteria within the MUTCD, no additional intersections are warranted for signalization.











** ASSUMED FOR PLUS PROJECT SCENARIOS ONLY

NOT TO SCALE

RICK ENGINEERING COMPANY

EXHIBIT 10

LONG-TERM (2041) TRANSPORTATION CONDITIONS

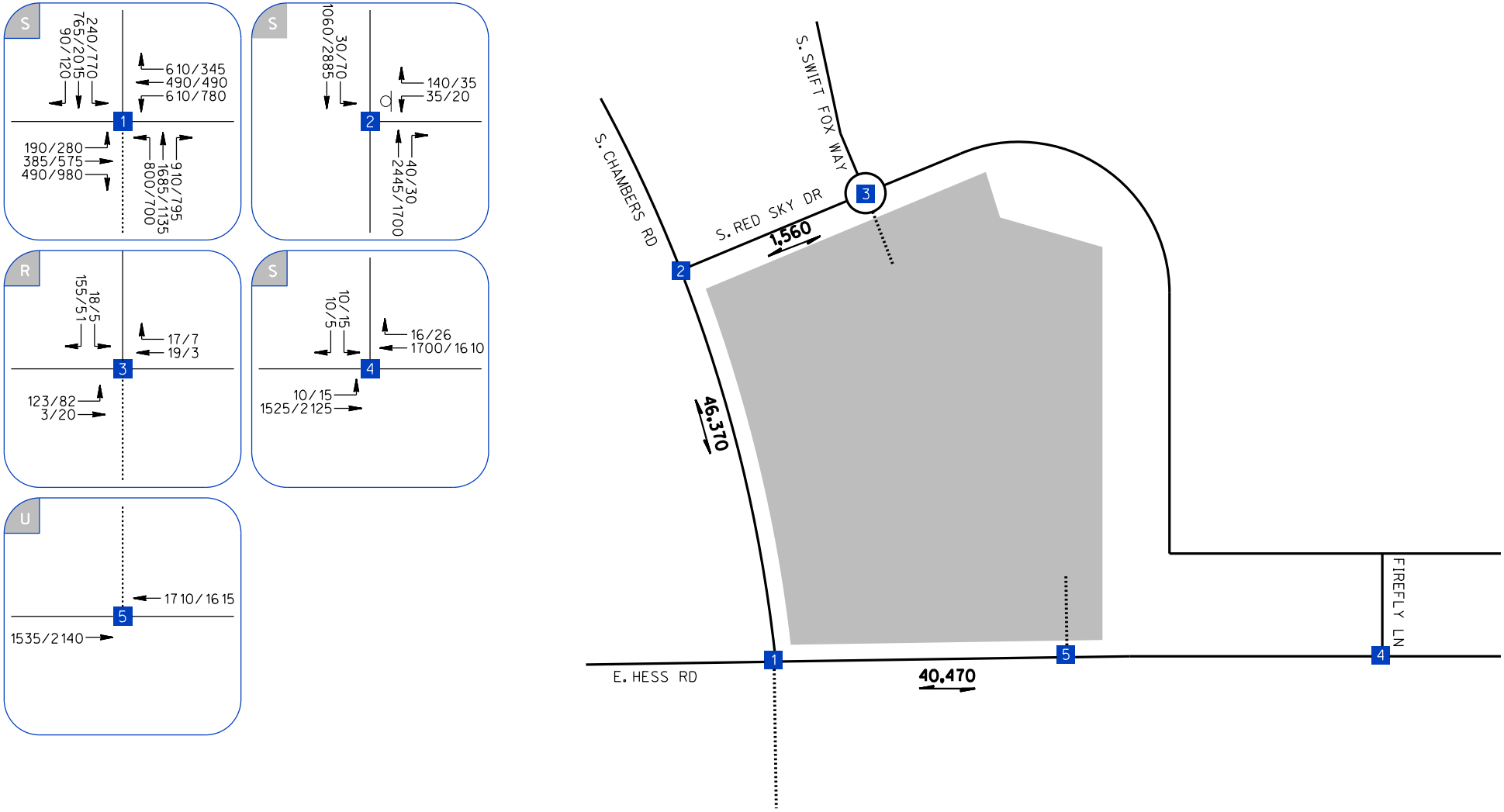
CHAMBERS AND HESS DEVELOPMENT

LEGEND

U =UNSIGNALIZED
S =SIGNALIZED
R =ROUNDABOUT
1 = INTERSECTION NUMBER
= PROJECT SITE
= STOP CONTROLLED
= FUTURE ROAD/DRIVEWAY

\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\18633_10_Exhibit_LT-TranspoConditions.dgn
\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\SD CorpStds 2005.dscript

14-JAN-2020 16:32



RICK ENGINEERING COMPANY

EXHIBIT 11

LONG-TERM BACKGROUND TRAFFIC VOLUMES (2041)

CHAMBERS AND HESS DEVELOPMENT

LEGEND

AM/PM=PEAK HOUR VOLUMES

X,XXX =TWO-WAY ADT

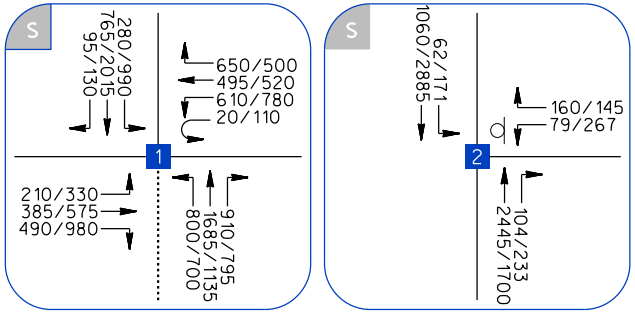
1 =INTERSECTION NUMBER

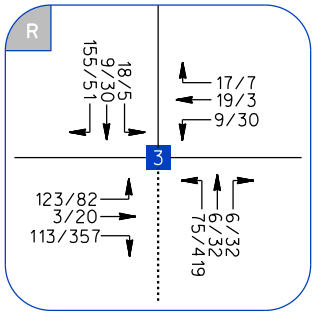
=PROJECT SITE

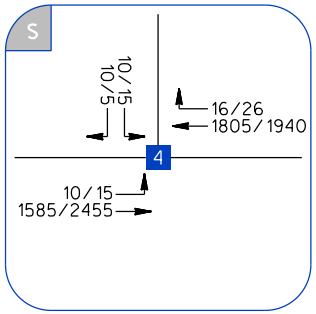
= FUTURE ROAD/DRIVEWAY

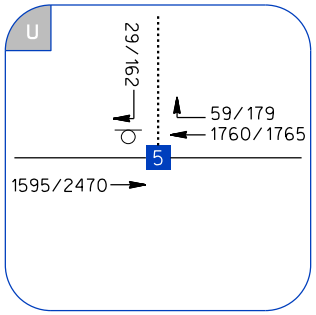
\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\18633_11_Exhibit_LT-BackgroundVolumes.dgn
\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\SD CorpStds 2005.dscript

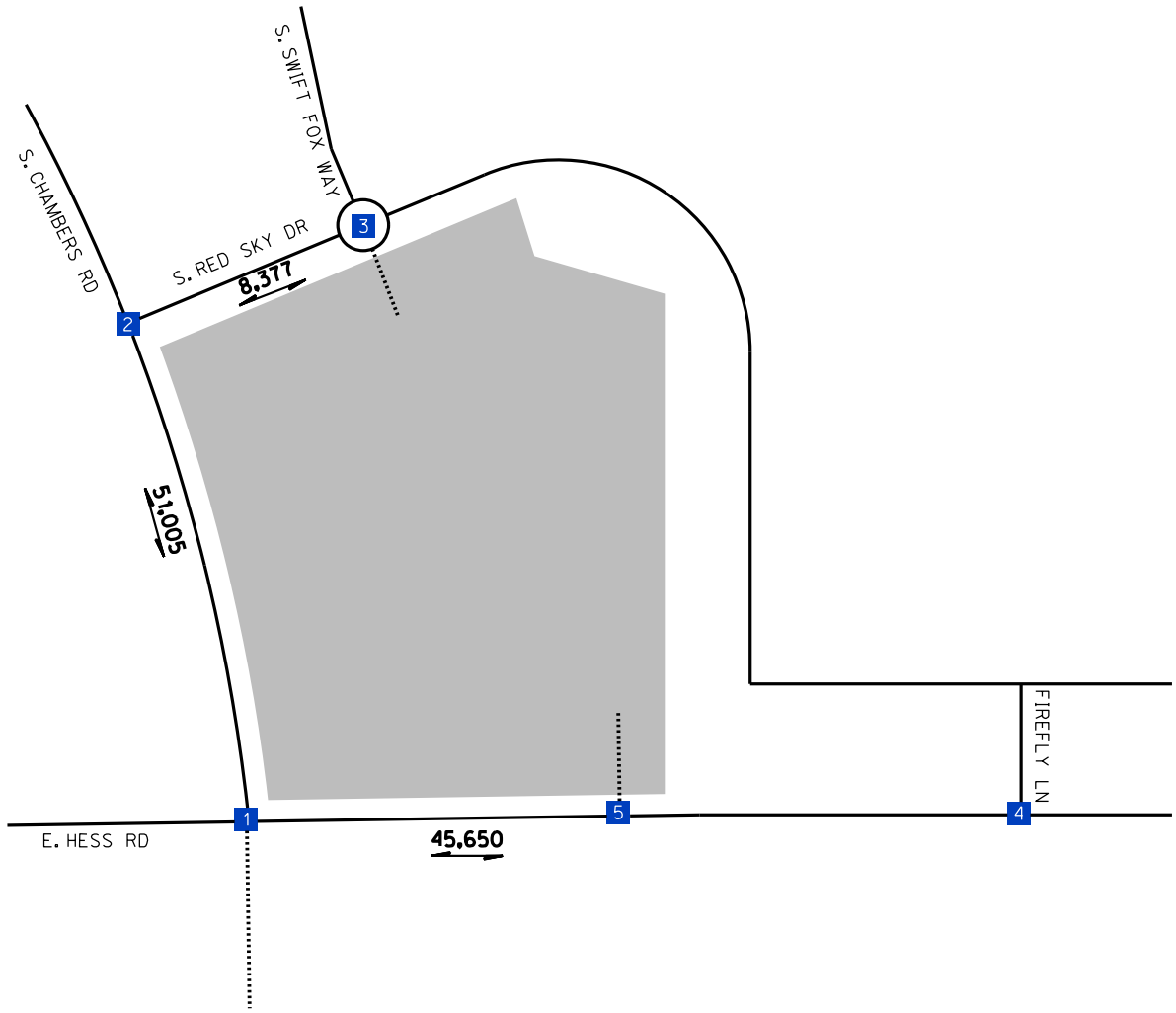
21-JAN-2020 15:29











NOT TO SCALE

RICK ENGINEERING COMPANY

EXHIBIT 12

LONG-TERM BACKGROUND + PROJECT TRAFFIC VOLUMES (2041)

CHAMBERS AND HESS DEVELOPMENT

LEGEND

AM/PM=PEAK HOUR VOLUMES

X,XXX =TWO-WAY ADT

1 =INTERSECTION NUMBER

=PROJECT SITE

= FUTURE ROAD/DRIVEWAY

\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\18633_12_Exhibit_LT-Background+ProjVolumes.dgn
\\cp.rickeng.com\projects\D_CEN_L\1173_Chambers&Hess\Traffic\Graphics\SD CorpStds 2005.dscript

21-JAN-2020 15:28

TABLE 6
LONG-TERM (2041) INTERSECTION OPERATIONS SUMMARY
CHAMBERS AND HESS DEVELOPMENT

#	INTERSECTION	CONTROL	DIR.	BACKGROUND (2041)				TOTAL[3] (2041)			
				AM Peak		PM Peak		AM Peak		PM Peak	
				DELAY [1]	LOS [2]	DELAY [1]	LOS [2]	DELAY [1]	LOS [2]	DELAY [1]	LOS [2]
1	**S. Chambers Rd/E. Hess Rd**	**(S)**	Overall	**55.1**	**E**	**>80.0**	**F**	**>80.0**	**F**	**>80.0**	**F**
2	**S. Chambers Rd/S. Red Sky Dr**	**(OWSC)**	WB-L	**>50**	**F**	**>50**	**F**	-	-	-	-
			WB-R	**>50**	**F**	23.4	C	-	-	-	-
			SB-L	**>50**	**F**	**>50**	**F**	-	-	-	-
	With Recommended Improvements - Signal	**(S)**	Overall	-	-	-	-	12.1	B	17.6	B
3	**S. Red Sky Dr/S. Swift Fox Way**	**(R)**	Overall	3.8	A	3.3	A	4.4	A	7.1	A
4	**E. Hess Rd/Firefly Ln**	**(S)**	Overall	9.9	A	10.9	B	11.0	B	12.1	B
5	**E. Hess Rd/Project Dwy**	**(OWSC)**	SB-R	-	-	-	-	20.0	C	32.2	D

Footnotes:

Results calculated utilizing the methodologies described in Chapters 19, 20, 21, and 22
in the 6th edition of the HCM .

1) Delay is measured in seconds per vehicle.

2) Level of Service

3) Total= 2041 with Project Traffic Operations

(S)=Signalized, (TWSC)=Two-Way Stop Controlled, (AWSC)=All-Way Stop Controlled, (R)=Roundabout.

NB=Northbound, WB=Westbound, etc.

L=Left-turn movement, R= Right-turn movement, LT=Left-Through lane, LTR=Left-Through-Right lane , etc.

* No conflicting movements. No Delays to report

Table 7 shows that all the studied roadway segments currently operate at acceptable levels of service (LOS D or better) for long-term (2041) background and short-term (2041) total scenarios with the exception of the following segment:

- E. Hess Road between S. Chambers Road and Firefly Lane (Background – LOS E and Total – LOS F)

Though this segment is classified as a four lane arterial, this roadway includes an acceleration/deceleration lane on the north side of the street between Chambers Road and Jordan Road, allowing it to function as a five lane roadway with higher capacity than a four lane roadway. Assuming a higher capacity, this roadway will operate at LOS D or better as shown in Table 7.

5.0- ADDITIONAL TRAFFIC ANAYSIS CONSIDERATIONS

5.1 QUEUING ANALYSIS

The 95th percentile queue lengths were analyzed to determine if the existing or proposed storage lengths at the intersections and roadways are sufficient. The long-term total (Year 2041) scenario queue lengths are used to calculate the anticipated queues at the intersection turn lanes, as this represents a "worst-case" scenario. The analysis is performed during the AM and PM peak hours, and the longer queue was then utilized for the recommendations presented in this report. Synchro 10 and SimTraffic, were used for the computation and modeling of the 95th percentile queue lengths.

Table 8 contains a summary of the anticipated queue lengths and the recommended minimum storage lengths for the turn lanes where existing or proposed show less than the calculated queue lengths.

Appendix F contains the 95th percentile queue results.

6.0- CONCLUSION AND RECOMMENDATIONS

Based on the analysis and results contained within this report, the traffic study evaluated any potential traffic impacts due to the proposed construction of the Chambers and Hess Development. In coordination with the Town of Parker, the study analyzed the nearby intersections and roadways based on the operational capabilities for the different study scenarios with and without the project generated traffic. The following recommendations are made for the project to be in accordance with the Town of Parker's benchmark for acceptable traffic operations where intersections and roadways shall operate at LOS D or better:

Based on the traffic generated by the project, and access roads requirements for the project site, the following are recommendations at the study area intersections and roadway segments:

- S. Chambers Road/E. Hess Road – Modify signal to allow for westbound U-turn movements for the short-term scenarios, until the ultimate four-legged intersection is installed (by others) in the future. However, due to the high volumes proposed by the near-by Anthology development assumed to be opened by 2041; this intersection operates at LOS F. The recommendations provided by the Anthology study to install free-right turns for the westbound and eastbound directions have minimal improvements to the level of service and the intersection is anticipated to continue to operate at LOS F in the long-term.
- S. Chambers Road/S. Red Sky Drive - Install a traffic signal as warranted in the 2021 plus project scenario.

TABLE 7
LONG_TERM (2041) ROADWAY SEGMENT OPERATIONS
CHAMBERS AND HESS DEVELOPMENT

ROADWAY SEGMENT	ULTIMATE ROADWAY CLASSIFICATION	ULTIMATE CAPACITY (LOS D)[1]	BACKGROUND (2041)			TOTAL (2041)		
			ADT	V/C	LOS	ADT	V/C	LOS
S. Chambers Road between S. Red Sky Drive and E. Hess Road	Principal Arterial (6L)	55,000	46,370	0.84	C	51,005	0.927	D
E. Hess Road between S. Chambers Road and Firefly Lane	Arterial (4L)	40,000	**40,470**	**1.01**	**E**	**45,650**	**1.141**	**F**
	Arterial (5L)[2]	47,500	40,470	0.85	C	45,650	0.961	D
S. Red Sky Drive east of S. Chambers Road	Residential Collector (2L)	12,000	1,560	0.13	A	8,377	0.698	B

Footnote:

[1] Source: Douglas County 2040 Transportation Plan *Table 4, Recommended Traffic Volume Thresholds* Dated June 2019

TABLE 8
LONG TERM (2041) 95TH PERCENTILE QUEUE SUMMARY
CHAMBERS AND HESS DEVELOPMENT

INTERSECTION				STORAGE [1]	TOTAL[3] (2041) AM Peak QUEUE [2]	TOTAL[3] (2041) PM Peak QUEUE [2]	RECOMMENDED MIN. STORAGE[4]
1	**S. Chambers Rd/E. Hess Rd**	**(S)**	EB-L	400	126	227	
			EB-R	400	**428**	**1624**	*
			WB-L	220	**445**	**770**	*
			WB-R	1100	817	537	-
			NB-L	535	435	484	-
			NB-R	435	**955**	**1005**	*
			SB-L	535	159	**846**	Dual left turn lanes at 535' each will accommodate
			SB-R	435	36	74	-
2	**S. Chambers Rd/S. Red Sky Dr**	**(S)**	WB-L	266	85	244	-
			WB-R	135	54	46	-
			NB-R	200	22	26	-
			SB-L	400	72	181	-
3	**S. Red Sky Dr/S. Swift Fox Way**	**(R)**	S	135	9	73	-
			E	270	5	6	-
			N	50	20	12	-
			W	300+	26	65	-
4	**E. Hess Rd/Firefly Ln**	**(S)**	EB-L	215	20	33	-
			SB-LR	110	32	41	-
			WB-R	220	12	15	-
5	**E. Hess Rd/Project Dwy**		SB-R	200	10	64	-

Footnotes:

1) Storage lengths based on existing storage or proposed storage lengths from project and near-by developments

2) Queue is equal to the 95th percentile queue length, in feet, based on Synchro 10 software results.

3) Total= 2041 with Project Traffic Operations

4) Min. recommended storage lengths for turn lanes where existing or proposed lanes are less than calculated queue lengths

(S)=Signalized, (TWSC)=Two-Way Stop Controlled,

(AWSC)=All-Way Stop Controlled, (R)=Roundabout.

NB=Northbound, WB=Westbound, etc.

L=Left-turn movement, T=Thru movement, R= Right-turn movement, etc.

LT=Left-Through movement group, LTR=Left-Through-Right lane movement group, etc.

* = Mitigation by others. Queuing issues occur based on background projects

- S. Red Sky Drive/S. Swift Fox Way-Future Project Dwy - Install a yield controlled fourth-leg to provide a full northerly project access driveway at the existing roundabout, with a shared left-through-right lane for the northbound approach.
- E. Hess Road/Future Project Dwy – Install a right-in/right-out driveway with stop control for the southbound approach to provide a southerly access to the project.

The following are additional monitoring and coordination recommendations related to the nearby study area intersections to be installed by others:

- E. Hess Road/Fire Fly Lane – Signal installation.

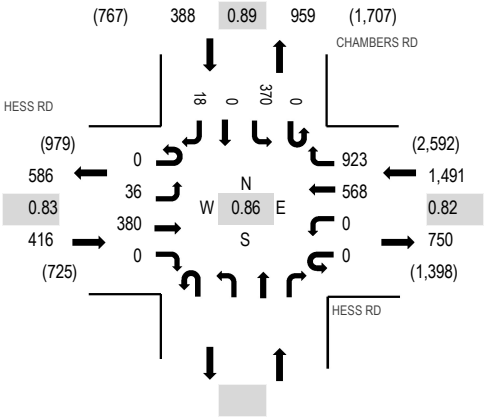
APPENDIX A

TRAFFIC COUNTS

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

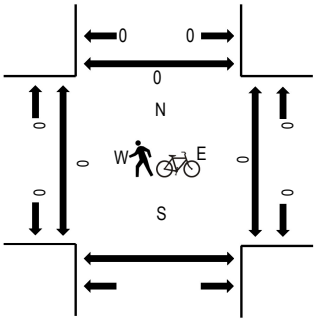
Location: 1 CHAMBERS RD & HESS RD AM
Date: Wednesday, August 21, 2019
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:15 AM - 07:30 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



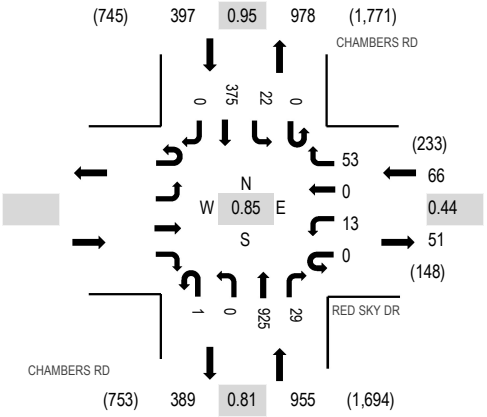
Traffic Counts

Interval Start Time	HESS RD Eastbound				HESS RD Westbound				Northbound				CHAMBERS RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	9	86	0	0	0	106	214					0	96	0	4	515	2,295	0	0		0
7:15 AM	0	9	97	0	0	0	171	286					0	104	0	2	669	2,271	0	0		0
7:30 AM	0	10	116	0	0	0	173	228					0	88	0	9	624	2,122	0	0		0
7:45 AM	0	8	81	0	0	0	118	195					0	82	0	3	487	1,931	0	0		0
8:00 AM	0	7	69	0	0	0	111	200					0	101	0	3	491	1,789	0	0		0
8:15 AM	0	7	84	0	0	0	103	214					0	106	0	6	520		0	0		0
8:30 AM	0	5	64	0	0	0	94	180					0	84	0	6	433		0	0		0
8:45 AM	0	2	71	0	0	0	66	133					0	69	0	4	345		0	0		0
Count Total	0	57	668	0	0	0	942	1,650					0	730	0	37	4,084		0	0		0
Peak Hour	0	36	380	0	0	0	568	923					0	370	0	18	2,295		0	0		0

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

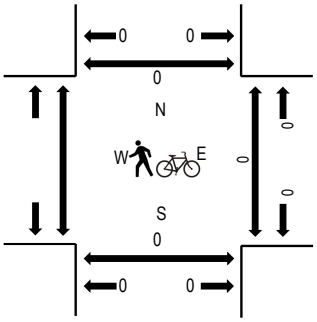
Location: 2 CHAMBERS RD & RED SKY DR AM
Date: Wednesday, August 21, 2019
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:15 AM - 07:30 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

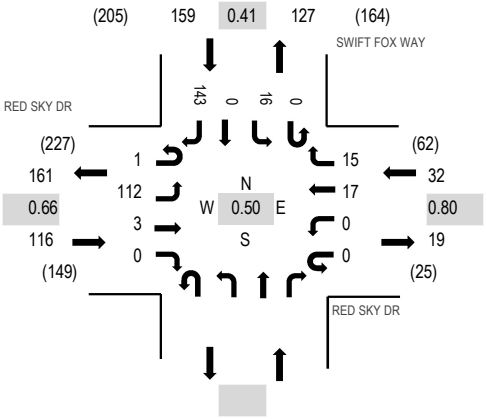
Interval Start Time	Eastbound				RED SKY DR Westbound				CHAMBERS RD Northbound				CHAMBERS RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM					0	5	0	22	0	0	217	5	0	6	93	0	348	1,418	0	0	0	0
7:15 AM					0	5	0	13	0	0	287	7	0	5	102	0	419	1,410	0	0	0	0
7:30 AM					0	2	0	11	0	0	232	3	0	5	93	0	346	1,391	0	0	0	0
7:45 AM					0	1	0	7	1	0	189	14	0	6	87	0	305	1,344	0	0	0	0
8:00 AM					0	7	0	21	0	0	181	24	0	16	91	0	340	1,254	0	0	0	0
8:15 AM					0	30	0	64	0	0	184	27	0	17	78	0	400		0	0	0	0
8:30 AM					0	16	0	19	0	0	180	5	1	6	72	0	299		1	0	0	0
8:45 AM					0	5	0	5	0	0	138	0	0	2	65	0	215		0	0	0	0
Count Total					0	71	0	162	1	0	1,608	85	1	63	681	0	2,672		1	0	0	0
Peak Hour					0	13	0	53	1	0	925	29	0	22	375	0	1,418		0	0	0	0

All Traffic Data Services Inc.

(303) 216-2439
www.alltrafficdata.net

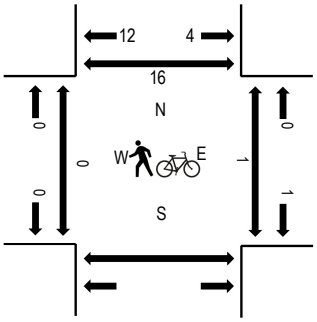
Location: 3 SWIFT FOX WAY & RED SKY DR AM
Date: Wednesday, August 21, 2019
Peak Hour: 07:45 AM - 08:45 AM
Peak 15-Minutes: 08:15 AM - 08:30 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

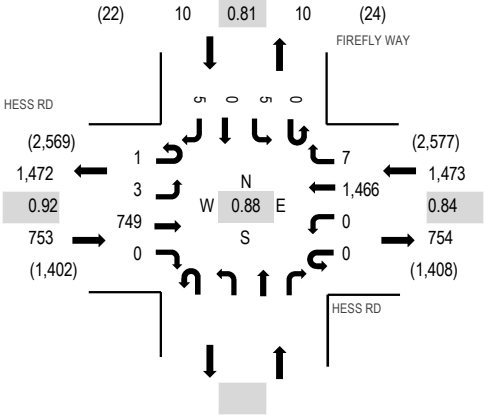
Interval Start Time	RED SKY DR Eastbound				RED SKY DR Westbound				Northbound				SWIFT FOX WAY Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	9	2	0	0	0	9	3					0	0	0	17	40	127	0	0		0
7:15 AM	0	12	0	0	0	0	6	1					0	2	0	12	33	158	0	0		0
7:30 AM	0	8	0	0	0	0	4	4					0	0	0	9	25	279	0	0		0
7:45 AM	0	19	1	0	0	0	5	1					0	0	0	3	29	307	0	0		0
8:00 AM	0	39	1	0	0	0	7	4					0	1	0	19	71	289	0	0		2
8:15 AM	1	43	0	0	0	0	4	6					0	12	0	88	154		0	1		10
8:30 AM	0	11	1	0	0	0	1	4					0	3	0	33	53		0	0		1
8:45 AM	0	0	2	0	0	0	3	0					0	0	0	6	11		0	0		0
Count Total	1	141	7	0	0	0	39	23					0	18	0	187	416		0	1		13
Peak Hour	1	112	3	0	0	0	17	15					0	16	0	143	307		0	1		13

All Traffic Data Services Inc.

(303) 216-2439
www.alltrafficdata.net

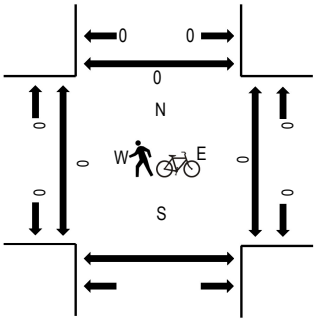
Location: 4 FIREFLY WAY & HESS RD AM
Date: Wednesday, August 21, 2019
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:15 AM - 07:30 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

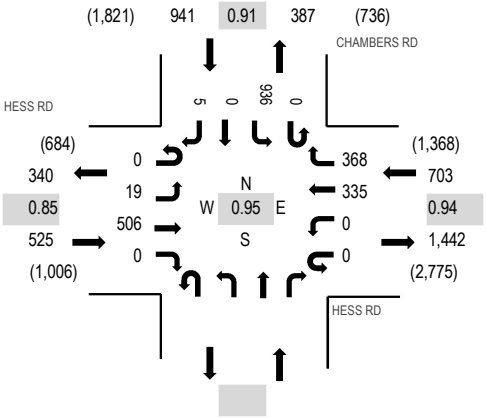
Interval Start Time	HESS RD Eastbound				HESS RD Westbound				Northbound				FIREFLY WAY Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	2	183	0	0	0	344	1					0	1	0	2	533	2,236	0	0		0
7:15 AM	0	0	196	0	0	0	437	1					0	0	0	3	637	2,199	0	0		0
7:30 AM	0	1	203	0	0	0	384	5					0	1	0	0	594	2,058	0	0		0
7:45 AM	1	0	167	0	0	0	301	0					0	3	0	0	472	1,896	0	0		0
8:00 AM	0	0	171	0	0	0	317	5					0	0	0	3	496	1,765	0	0		0
8:15 AM	0	0	189	0	0	0	299	5					0	3	0	0	496		0	0		0
8:30 AM	0	0	148	0	0	0	278	2					0	2	0	2	432		0	0		1
8:45 AM	0	1	140	0	0	0	197	1					0	1	0	1	341		0	0		0
Count Total	1	4	1,397	0	0	0	2,557	20					0	11	0	11	4,001		0	0		1
Peak Hour	1	3	749	0	0	0	1,466	7					0	5	0	5	2,236		0	0		0

All Traffic Data Services Inc.

(303) 216-2439
www.alltrafficdata.net

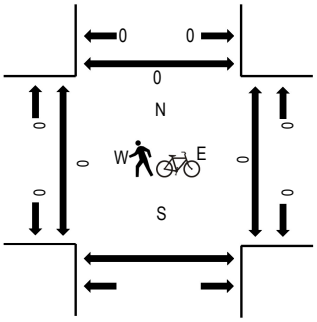
Location: 1 CHAMBERS RD & HESS RD PM
Date: Wednesday, August 21, 2019
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



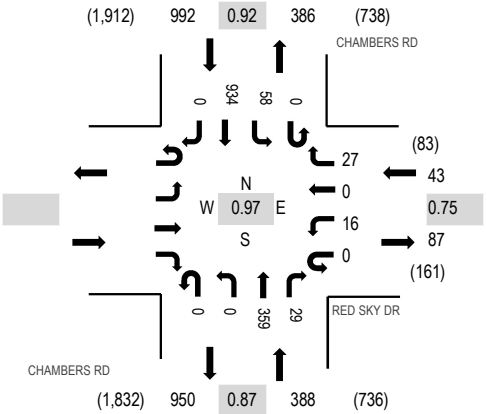
Traffic Counts

Interval Start Time	HESS RD Eastbound				HESS RD Westbound				Northbound				CHAMBERS RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	4	100	0	0	0	94	67					0	200	0	3	468	2,026	0	0		0
4:15 PM	0	5	124	0	0	0	72	111					0	202	0	2	516	2,094	0	0		0
4:30 PM	0	3	108	0	0	0	94	79					0	209	0	4	497	2,147	0	0		0
4:45 PM	0	5	132	0	0	0	73	75					0	258	0	2	545	2,158	0	0		0
5:00 PM	0	6	114	0	0	0	79	107					0	227	0	3	536	2,169	0	0		0
5:15 PM	0	7	147	0	0	0	93	84					0	238	0	0	569		0	0		0
5:30 PM	0	3	112	0	0	0	86	91					0	216	0	0	508		0	0		0
5:45 PM	0	3	133	0	0	0	77	86					0	255	0	2	556		0	0		0
Count Total	0	36	970	0	0	0	668	700					0	1,805	0	16	4,195		0	0		0
Peak Hour	0	19	506	0	0	0	335	368					0	936	0	5	2,169		0	0		0

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

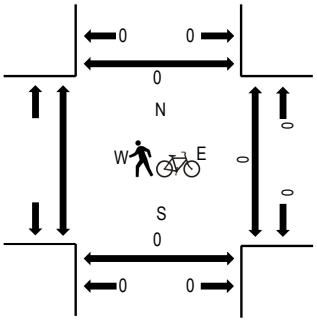
Location: 2 CHAMBERS RD & RED SKY DR PM
Date: Wednesday, August 21, 2019
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



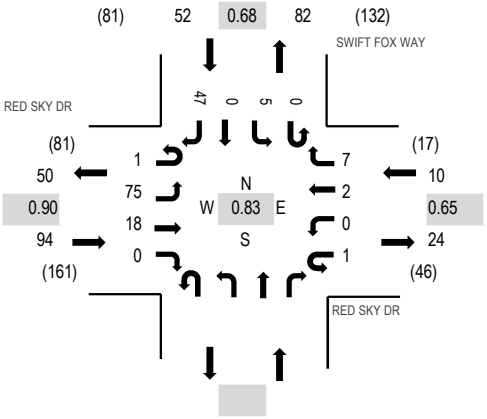
Traffic Counts

Interval Start Time	Eastbound				RED SKY DR Westbound				CHAMBERS RD Northbound				CHAMBERS RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM					0	8	0	8	1	0	68	3	0	10	195	0	293	1,308	0	0	0	0
4:15 PM					0	3	0	2	0	0	109	3	1	16	210	0	344	1,382	0	0	0	0
4:30 PM					0	4	0	4	0	0	78	5	2	22	218	0	333	1,396	0	0	0	0
4:45 PM					0	5	0	6	0	0	74	7	0	8	238	0	338	1,395	0	0	0	0
5:00 PM					0	8	0	9	0	0	100	12	0	15	223	0	367	1,423	0	0	0	0
5:15 PM					0	6	0	9	0	0	82	9	0	16	236	0	358		0	0	0	0
5:30 PM					0	1	0	6	0	0	87	6	0	18	214	0	332		0	0	0	0
5:45 PM					0	1	0	3	0	0	90	2	0	9	261	0	366		0	0	0	0
Count Total					0	36	0	47	1	0	688	47	3	114	1,795	0	2,731		0	0	0	0
Peak Hour					0	16	0	27	0	0	359	29	0	58	934	0	1,423		0	0	0	0

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

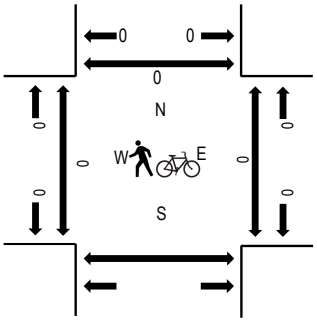
Location: 3 SWIFT FOX WAY & RED SKY DR PM
Date: Wednesday, August 21, 2019
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

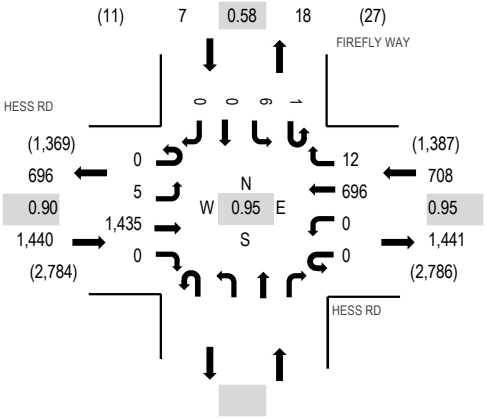
Interval Start Time	RED SKY DR Eastbound				RED SKY DR Westbound				Northbound				SWIFT FOX WAY Southbound					Rolling Hour	Pedestrian Crossings		
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South North
4:00 PM	0	8	5	0	0	0	1	0					1	0	0	14	29	116	0	0	0
4:15 PM	0	14	5	0	0	0	1	0					0	0	0	4	24	134	0	0	0
4:30 PM	0	19	7	0	0	0	1	0					0	1	0	7	35	156	0	0	0
4:45 PM	0	13	3	0	1	0	0	1					0	0	0	10	28	155	0	0	0
5:00 PM	1	22	3	0	0	0	0	2					0	3	0	16	47	143	0	0	0
5:15 PM	0	21	5	0	0	0	1	4					0	1	0	14	46		0	0	0
5:30 PM	1	18	5	0	0	0	2	2					0	1	0	5	34		0	0	0
5:45 PM	0	7	4	0	0	0	1	0					0	2	0	2	16		0	0	0
Count Total	2	122	37	0	1	0	7	9					1	8	0	72	259		0	0	0
Peak Hour	1	75	18	0	1	0	2	7					0	5	0	47	156		0	0	0

All Traffic Data Services Inc.

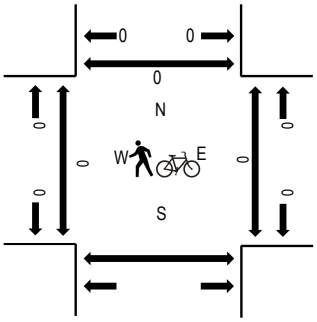
(303) 216-2439
www.alltrafficdata.net

Location: 4 FIREFLY WAY & HESS RD PM
Date: Wednesday, August 21, 2019
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	HESS RD Eastbound				HESS RD Westbound				Northbound				FIREFLY WAY Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	0	306	0	0	0	161	0					0	0	0	0	467	2,027	0	0		0
4:15 PM	0	2	311	0	0	0	188	2					0	0	0	0	503	2,089	0	0		0
4:30 PM	0	0	324	0	0	0	175	3					0	2	0	0	504	2,153	0	0		0
4:45 PM	0	0	401	0	0	0	148	2					0	1	0	1	553	2,144	0	0		0
5:00 PM	0	1	343	0	0	0	182	2					0	1	0	0	529	2,155	0	0		0
5:15 PM	0	0	380	0	0	0	180	6					0	1	0	0	567		0	0		0
5:30 PM	0	2	317	0	0	0	172	1					1	2	0	0	495		0	0		0
5:45 PM	0	2	395	0	0	0	162	3					0	2	0	0	564		0	0		0
Count Total	0	7	2,777	0	0	0	1,368	19					1	9	0	1	4,182		0	0		0
Peak Hour	0	5	1,435	0	0	0	696	12					1	6	0	0	2,155		0	0		0

All Traffic Data Services

Wheat Ridge, CO 80033

Site Code: 5
Station ID: 5
CHAMBERS RD S.O. RED SKY DR

Start Time	21-Aug-19 Wed	NB	SB							Total
12:00 AM		4	34							38
01:00		6	12							18
02:00		13	9							22
03:00		17	7							24
04:00		92	11							103
05:00		422	79							501
06:00		773	258							1031
07:00		**969**	**405**							**1374**
08:00		746	383							1129
09:00		471	290							761
10:00		369	272							641
11:00		345	310							655
12:00 PM		364	324							688
01:00		354	358							712
02:00		379	539							918
03:00		**466**	786							1252
04:00		354	878							1232
05:00		383	**925**							**1308**
06:00		320	670							990
07:00		240	452							692
08:00		129	342							471
09:00		76	245							321
10:00		37	120							157
11:00		12	67							79
Total		7341	7776							15117
Percent		48.6%	51.4%							
AM Peak	-	07:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	969	405	-	-	-	-	-	-	1374
PM Peak	-	15:00	17:00	-	-	-	-	-	-	17:00
Vol.	-	466	925	-	-	-	-	-	-	1308
Grand Total		7341	7776							15117
Percent		48.6%	51.4%							
ADT		ADT 14,606		AADT 14,606						

All Traffic Data Services

Wheat Ridge, CO 80033

Site Code: 6
Station ID: 6
RED SKY DR E.O. CHAMBERS RD

Start Time	21-Aug-19 Wed	EB	WB							Total
12:00 AM		1	1							2
01:00		1	0							1
02:00		0	0							0
03:00		0	0							0
04:00		1	7							8
05:00		2	10							12
06:00		19	77							96
07:00		53	66							119
08:00		**92**	**161**							**253**
09:00		11	23							34
10:00		18	19							37
11:00		32	34							66
12:00 PM		23	27							50
01:00		22	23							45
02:00		56	16							72
03:00		**93**	**120**							**213**
04:00		77	38							115
05:00		88	41							129
06:00		50	24							74
07:00		25	32							57
08:00		21	3							24
09:00		17	5							22
10:00		5	3							8
11:00		5	1							6
Total		712	731							1443
Percent		49.3%	50.7%							
AM Peak	-	08:00	08:00	-	-	-	-	-	-	08:00
Vol.	-	92	161	-	-	-	-	-	-	253
PM Peak	-	15:00	15:00	-	-	-	-	-	-	15:00
Vol.	-	93	120	-	-	-	-	-	-	213
Grand Total		712	731							1443
Percent		49.3%	50.7%							
ADT		ADT 1,443		AADT 1,443						

All Traffic Data Services

Wheat Ridge, CO 80033

Site Code: 7
Station ID: 7
HESS RD E.O. CHAMBERS RD

Start Time	21-Aug-19 Wed	EB	WB							Total
12:00 AM		40	9							49
01:00		22	7							29
02:00		11	14							25
03:00		10	19							29
04:00		17	106							123
05:00		99	487							586
06:00		375	1018							1393
07:00		**772**	**1423**							**2195**
08:00		673	1101							1774
09:00		463	677							1140
10:00		420	586							1006
11:00		482	519							1001
12:00 PM		487	528							1015
01:00		547	530							1077
02:00		731	563							1294
03:00		1274	**744**							2018
04:00		1335	655							1990
05:00		**1420**	695							**2115**
06:00		934	462							1396
07:00		605	365							970
08:00		477	208							685
09:00		309	132							441
10:00		167	61							228
11:00		87	21							108
Total		11757	10930							22687
Percent		51.8%	48.2%							
AM Peak	-	07:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	772	1423	-	-	-	-	-	-	2195
PM Peak	-	17:00	15:00	-	-	-	-	-	-	17:00
Vol.	-	1420	744	-	-	-	-	-	-	2115
Grand Total		11757	10930							22687
Percent		51.8%	48.2%							
ADT		ADT 22,606		AADT 22,606						

APPENDIX B

SIGNAL WARRANT WORKSHEETS

RICK ENGINEERING COMPANY
Traffic Division

SIGNAL WARRANT SUMMARY TABLE
CHAMBERS AND HESS DEVELOPMENT

#	INTERSECTION	EXISTING (2019)		2021 BACKGROUND		2021 TOTAL		2041 BACKGROUND		2041 TOTAL	
		Warrant Number		Warrant Number		Warrant Number		Warrant Number		Warrant Number	
		Met		Met		Met		Met		Met	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
2	S. Chambers Rd./S. Red Sky Dr.	No	No	No	No	1,2,3	1,2,3	No	No	2021	2021
4	E. Hess Rd./ Firefly Ln	No	No	No	No	No	No	No	No	No	No

Footnotes:

1= Eight-hour warrant, 2= Four-hour warrant, 3= Peak-hour warrant

2021 = Met in this year scenario

Signal Warrants Report For Intersection 2: S. Chambers Road and S. Red Sky Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	E
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	E
1	954	397	66
2	916	381	63
3	897	373	62
4	763	318	53
5	725	302	50
6	649	270	45
7	601	250	42
8	572	238	40
9	458	191	32
10	429	179	30
11	429	179	30
12	410	171	28
13	372	155	26
14	343	143	24
15	343	143	24
16	334	139	23
17	191	79	13
18	105	44	7
19	95	40	7
20	38	16	3
21	29	12	2
22	29	12	2
23	19	8	1
24	19	8	1

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	7	1351	2	66	No	No	No	No	No	No	No	Yes	No	No
2	7	1297	2	63	No	No	No	No	No	No	No	Yes	No	No
3	7	1270	2	62	No	No	No	No	No	No	No	Yes	No	No
4	7	1081	2	53	No	No	No	No	No	No	No	No	No	No
5	7	1027	2	50	No	No	No	No	No	No	No	No	No	No
6	7	919	2	45	No	No	No	No	No	No	No	No	No	No
7	7	851	2	42	No	No	No	No	No	No	No	No	No	No
8	7	810	2	40	No	No	No	No	No	No	No	No	No	No
9	7	649	2	32	No	No	No	No	No	No	No	No	No	No
10	7	608	2	30	No	No	No	No	No	No	No	No	No	No
11	7	608	2	30	No	No	No	No	No	No	No	No	No	No
12	7	581	2	28	No	No	No	No	No	No	No	No	No	No
13	7	527	2	26	No	No	No	No	No	No	No	No	No	No
14	7	486	2	24	No	No	No	No	No	No	No	No	No	No
15	7	486	2	24	No	No	No	No	No	No	No	No	No	No
16	7	473	2	23	No	No	No	No	No	No	No	No	No	No
17	7	270	2	13	No	No	No	No	No	No	No	No	No	No
18	7	149	2	7	No	No	No	No	No	No	No	No	No	No
19	7	135	2	7	No	No	No	No	No	No	No	No	No	No
20	7	54	2	3	No	No	No	No	No	No	No	No	No	No
21	7	41	2	2	No	No	No	No	No	No	No	No	No	No
22	7	41	2	2	No	No	No	No	No	No	No	No	No	No
23	7	27	2	1	No	No	No	No	No	No	No	No	No	No
24	7	27	2	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	3	0	0

Warrant 3 Condition A

Orientation	E
Total Stopped Delay Per Vehicle on Minor Approach (s)	15
Number of Lanes on Minor Street Approach	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:16
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	66
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	1417
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Signal Warrants Report For Intersection 4: E. Hess Road and Firefly Lane

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	E	W	N
1	1473	753	10
2	1414	723	10
3	1385	708	9
4	1178	602	8
5	1119	572	8
6	1002	512	7
7	928	474	6
8	884	452	6
9	707	361	5
10	663	339	5
11	663	339	5
12	633	324	4
13	574	294	4
14	530	271	4
15	530	271	4
16	516	264	4
17	295	151	2
18	162	83	1
19	147	75	1
20	59	30	0
21	44	23	0
22	44	23	0
23	29	15	0
24	29	15	0

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	5	2226	1	10	No	No	No	No	No	No	No	No	No	No
2	5	2137	1	10	No	No	No	No	No	No	No	No	No	No
3	5	2093	1	9	No	No	No	No	No	No	No	No	No	No
4	5	1780	1	8	No	No	No	No	No	No	No	No	No	No
5	5	1691	1	8	No	No	No	No	No	No	No	No	No	No
6	5	1514	1	7	No	No	No	No	No	No	No	No	No	No
7	5	1402	1	6	No	No	No	No	No	No	No	No	No	No
8	5	1336	1	6	No	No	No	No	No	No	No	No	No	No
9	5	1068	1	5	No	No	No	No	No	No	No	No	No	No
10	5	1002	1	5	No	No	No	No	No	No	No	No	No	No
11	5	1002	1	5	No	No	No	No	No	No	No	No	No	No
12	5	957	1	4	No	No	No	No	No	No	No	No	No	No
13	5	868	1	4	No	No	No	No	No	No	No	No	No	No
14	5	801	1	4	No	No	No	No	No	No	No	No	No	No
15	5	801	1	4	No	No	No	No	No	No	No	No	No	No
16	5	780	1	4	No	No	No	No	No	No	No	No	No	No
17	5	446	1	2	No	No	No	No	No	No	No	No	No	No
18	5	245	1	1	No	No	No	No	No	No	No	No	No	No
19	5	222	1	1	No	No	No	No	No	No	No	No	No	No
20	5	89	1	0	No	No	No	No	No	No	No	No	No	No
21	5	67	1	0	No	No	No	No	No	No	No	No	No	No
22	5	67	1	0	No	No	No	No	No	No	No	No	No	No
23	5	44	1	0	No	No	No	No	No	No	No	No	No	No
24	5	44	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	40.9
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:06
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	10
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	2236
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Study Intersections

Signal Warrants Report For Intersection 2: S. Chambers Road and S. Red Sky Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	E
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	E
1	386	992	43
2	371	952	41
3	363	932	40
4	309	794	34
5	293	754	33
6	262	675	29
7	243	625	27
8	232	595	26
9	185	476	21
10	174	446	19
11	174	446	19
12	166	427	18
13	151	387	17
14	139	357	15
15	139	357	15
16	135	347	15
17	77	198	9
18	42	109	5
19	39	99	4
20	15	40	2
21	12	30	1
22	12	30	1
23	8	20	1
24	8	20	1

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	7	1378	2	43	No	No	No	No	No	No	No	No	No	No
2	7	1323	2	41	No	No	No	No	No	No	No	No	No	No
3	7	1295	2	40	No	No	No	No	No	No	No	No	No	No
4	7	1103	2	34	No	No	No	No	No	No	No	No	No	No
5	7	1047	2	33	No	No	No	No	No	No	No	No	No	No
6	7	937	2	29	No	No	No	No	No	No	No	No	No	No
7	7	868	2	27	No	No	No	No	No	No	No	No	No	No
8	7	827	2	26	No	No	No	No	No	No	No	No	No	No
9	7	661	2	21	No	No	No	No	No	No	No	No	No	No
10	7	620	2	19	No	No	No	No	No	No	No	No	No	No
11	7	620	2	19	No	No	No	No	No	No	No	No	No	No
12	7	593	2	18	No	No	No	No	No	No	No	No	No	No
13	7	538	2	17	No	No	No	No	No	No	No	No	No	No
14	7	496	2	15	No	No	No	No	No	No	No	No	No	No
15	7	496	2	15	No	No	No	No	No	No	No	No	No	No
16	7	482	2	15	No	No	No	No	No	No	No	No	No	No
17	7	275	2	9	No	No	No	No	No	No	No	No	No	No
18	7	151	2	5	No	No	No	No	No	No	No	No	No	No
19	7	138	2	4	No	No	No	No	No	No	No	No	No	No
20	7	55	2	2	No	No	No	No	No	No	No	No	No	No
21	7	42	2	1	No	No	No	No	No	No	No	No	No	No
22	7	42	2	1	No	No	No	No	No	No	No	No	No	No
23	7	28	2	1	No	No	No	No	No	No	No	No	No	No
24	7	28	2	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	E
Total Stopped Delay Per Vehicle on Minor Approach (s)	13.6
Number of Lanes on Minor Street Approach	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:09
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	43
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	1421
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Signal Warrants Report For Intersection 4: E. Hess Road and Firefly Lane

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	E	W	N
1	708	1440	8
2	680	1382	8
3	666	1354	8
4	566	1152	6
5	538	1094	6
6	481	979	5
7	446	907	5
8	425	864	5
9	340	691	4
10	319	648	4
11	319	648	4
12	304	619	3
13	276	562	3
14	255	518	3
15	255	518	3
16	248	504	3
17	142	288	2
18	78	158	1
19	71	144	1
20	28	58	0
21	21	43	0
22	21	43	0
23	14	29	0
24	14	29	0

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	6	2148	1	8	No	No	No	No	No	No	No	No	No	No
2	6	2062	1	8	No	No	No	No	No	No	No	No	No	No
3	6	2020	1	8	No	No	No	No	No	No	No	No	No	No
4	6	1718	1	6	No	No	No	No	No	No	No	No	No	No
5	6	1632	1	6	No	No	No	No	No	No	No	No	No	No
6	6	1460	1	5	No	No	No	No	No	No	No	No	No	No
7	6	1353	1	5	No	No	No	No	No	No	No	No	No	No
8	6	1289	1	5	No	No	No	No	No	No	No	No	No	No
9	6	1031	1	4	No	No	No	No	No	No	No	No	No	No
10	6	967	1	4	No	No	No	No	No	No	No	No	No	No
11	6	967	1	4	No	No	No	No	No	No	No	No	No	No
12	6	923	1	3	No	No	No	No	No	No	No	No	No	No
13	6	838	1	3	No	No	No	No	No	No	No	No	No	No
14	6	773	1	3	No	No	No	No	No	No	No	No	No	No
15	6	773	1	3	No	No	No	No	No	No	No	No	No	No
16	6	752	1	3	No	No	No	No	No	No	No	No	No	No
17	6	430	1	2	No	No	No	No	No	No	No	No	No	No
18	6	236	1	1	No	No	No	No	No	No	No	No	No	No
19	6	215	1	1	No	No	No	No	No	No	No	No	No	No
20	6	86	1	0	No	No	No	No	No	No	No	No	No	No
21	6	64	1	0	No	No	No	No	No	No	No	No	No	No
22	6	64	1	0	No	No	No	No	No	No	No	No	No	No
23	6	43	1	0	No	No	No	No	No	No	No	No	No	No
24	6	43	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	32.2
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:04
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	8
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	2156
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Study Intersections

Signal Warrants Report For Intersection 2: S. Chambers Road and S. Red Sky Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	E
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	E
1	1030	430	72
2	989	413	69
3	968	404	68
4	824	344	58
5	783	327	55
6	700	292	49
7	649	271	45
8	618	258	43
9	494	206	35
10	464	194	32
11	464	194	32
12	443	185	31
13	402	168	28
14	371	155	26
15	371	155	26
16	361	151	25
17	206	86	14
18	113	47	8
19	103	43	7
20	41	17	3
21	31	13	2
22	31	13	2
23	21	9	1
24	21	9	1

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	7	1460	2	72	No	No	No	No	No	No	Yes	Yes	No	No
2	7	1402	2	69	No	No	No	No	No	No	No	Yes	No	No
3	7	1372	2	68	No	No	No	No	No	No	No	Yes	No	No
4	7	1168	2	58	No	No	No	No	No	No	No	Yes	No	No
5	7	1110	2	55	No	No	No	No	No	No	No	No	No	No
6	7	992	2	49	No	No	No	No	No	No	No	No	No	No
7	7	920	2	45	No	No	No	No	No	No	No	No	No	No
8	7	876	2	43	No	No	No	No	No	No	No	No	No	No
9	7	700	2	35	No	No	No	No	No	No	No	No	No	No
10	7	658	2	32	No	No	No	No	No	No	No	No	No	No
11	7	658	2	32	No	No	No	No	No	No	No	No	No	No
12	7	628	2	31	No	No	No	No	No	No	No	No	No	No
13	7	570	2	28	No	No	No	No	No	No	No	No	No	No
14	7	526	2	26	No	No	No	No	No	No	No	No	No	No
15	7	526	2	26	No	No	No	No	No	No	No	No	No	No
16	7	512	2	25	No	No	No	No	No	No	No	No	No	No
17	7	292	2	14	No	No	No	No	No	No	No	No	No	No
18	7	160	2	8	No	No	No	No	No	No	No	No	No	No
19	7	146	2	7	No	No	No	No	No	No	No	No	No	No
20	7	58	2	3	No	No	No	No	No	No	No	No	No	No
21	7	44	2	2	No	No	No	No	No	No	No	No	No	No
22	7	44	2	2	No	No	No	No	No	No	No	No	No	No
23	7	30	2	1	No	No	No	No	No	No	No	No	No	No
24	7	30	2	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	1	4	0	0

Warrant 3 Condition A

Orientation	E
Total Stopped Delay Per Vehicle on Minor Approach (s)	16.4
Number of Lanes on Minor Street Approach	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:19
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	72
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	1532
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Signal Warrants Report For Intersection 4: E. Hess Road and Firefly Lane

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	E	W	N
1	1593	814	10
2	1529	781	10
3	1497	765	9
4	1274	651	8
5	1211	619	8
6	1083	554	7
7	1004	513	6
8	956	488	6
9	765	391	5
10	717	366	5
11	717	366	5
12	685	350	4
13	621	317	4
14	573	293	4
15	573	293	4
16	558	285	4
17	319	163	2
18	175	90	1
19	159	81	1
20	64	33	0
21	48	24	0
22	48	24	0
23	32	16	0
24	32	16	0

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	6	2407	1	10	No	No	No	No	No	No	No	No	No	No
2	6	2310	1	10	No	No	No	No	No	No	No	No	No	No
3	6	2262	1	9	No	No	No	No	No	No	No	No	No	No
4	6	1925	1	8	No	No	No	No	No	No	No	No	No	No
5	6	1830	1	8	No	No	No	No	No	No	No	No	No	No
6	6	1637	1	7	No	No	No	No	No	No	No	No	No	No
7	6	1517	1	6	No	No	No	No	No	No	No	No	No	No
8	6	1444	1	6	No	No	No	No	No	No	No	No	No	No
9	6	1156	1	5	No	No	No	No	No	No	No	No	No	No
10	6	1083	1	5	No	No	No	No	No	No	No	No	No	No
11	6	1083	1	5	No	No	No	No	No	No	No	No	No	No
12	6	1035	1	4	No	No	No	No	No	No	No	No	No	No
13	6	938	1	4	No	No	No	No	No	No	No	No	No	No
14	6	866	1	4	No	No	No	No	No	No	No	No	No	No
15	6	866	1	4	No	No	No	No	No	No	No	No	No	No
16	6	843	1	4	No	No	No	No	No	No	No	No	No	No
17	6	482	1	2	No	No	No	No	No	No	No	No	No	No
18	6	265	1	1	No	No	No	No	No	No	No	No	No	No
19	6	240	1	1	No	No	No	No	No	No	No	No	No	No
20	6	97	1	0	No	No	No	No	No	No	No	No	No	No
21	6	72	1	0	No	No	No	No	No	No	No	No	No	No
22	6	72	1	0	No	No	No	No	No	No	No	No	No	No
23	6	48	1	0	No	No	No	No	No	No	No	No	No	No
24	6	48	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	50.3
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:08
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	10
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	2417
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Study Intersections

Signal Warrants Report For Intersection 2: S. Chambers Road and S. Red Sky Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	E
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	E
1	417	1072	47
2	400	1029	45
3	392	1008	44
4	334	858	38
5	317	815	36
6	284	729	32
7	263	675	30
8	250	643	28
9	200	515	23
10	188	482	21
11	188	482	21
12	179	461	20
13	163	418	18
14	150	386	17
15	150	386	17
16	146	375	16
17	83	214	9
18	46	118	5
19	42	107	5
20	17	43	2
21	13	32	1
22	13	32	1
23	8	21	1
24	8	21	1

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	7	1489	2	47	No	No	No	No	No	No	No	No	No	No
2	7	1429	2	45	No	No	No	No	No	No	No	No	No	No
3	7	1400	2	44	No	No	No	No	No	No	No	No	No	No
4	7	1192	2	38	No	No	No	No	No	No	No	No	No	No
5	7	1132	2	36	No	No	No	No	No	No	No	No	No	No
6	7	1013	2	32	No	No	No	No	No	No	No	No	No	No
7	7	938	2	30	No	No	No	No	No	No	No	No	No	No
8	7	893	2	28	No	No	No	No	No	No	No	No	No	No
9	7	715	2	23	No	No	No	No	No	No	No	No	No	No
10	7	670	2	21	No	No	No	No	No	No	No	No	No	No
11	7	670	2	21	No	No	No	No	No	No	No	No	No	No
12	7	640	2	20	No	No	No	No	No	No	No	No	No	No
13	7	581	2	18	No	No	No	No	No	No	No	No	No	No
14	7	536	2	17	No	No	No	No	No	No	No	No	No	No
15	7	536	2	17	No	No	No	No	No	No	No	No	No	No
16	7	521	2	16	No	No	No	No	No	No	No	No	No	No
17	7	297	2	9	No	No	No	No	No	No	No	No	No	No
18	7	164	2	5	No	No	No	No	No	No	No	No	No	No
19	7	149	2	5	No	No	No	No	No	No	No	No	No	No
20	7	60	2	2	No	No	No	No	No	No	No	No	No	No
21	7	45	2	1	No	No	No	No	No	No	No	No	No	No
22	7	45	2	1	No	No	No	No	No	No	No	No	No	No
23	7	29	2	1	No	No	No	No	No	No	No	No	No	No
24	7	29	2	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	E
Total Stopped Delay Per Vehicle on Minor Approach (s)	14.6
Number of Lanes on Minor Street Approach	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:11
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	47
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	1536
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Signal Warrants Report For Intersection 4: E. Hess Road and Firefly Lane

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	E	W	N
1	765	1555	8
2	734	1493	8
3	719	1462	8
4	612	1244	6
5	581	1182	6
6	520	1057	5
7	482	980	5
8	459	933	5
9	367	746	4
10	344	700	4
11	344	700	4
12	329	669	3
13	298	606	3
14	275	560	3
15	275	560	3
16	268	544	3
17	153	311	2
18	84	171	1
19	77	156	1
20	31	62	0
21	23	47	0
22	23	47	0
23	15	31	0
24	15	31	0

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	6	2320	1	8	No	No	No	No	No	No	No	No	No	No
2	6	2227	1	8	No	No	No	No	No	No	No	No	No	No
3	6	2181	1	8	No	No	No	No	No	No	No	No	No	No
4	6	1856	1	6	No	No	No	No	No	No	No	No	No	No
5	6	1763	1	6	No	No	No	No	No	No	No	No	No	No
6	6	1577	1	5	No	No	No	No	No	No	No	No	No	No
7	6	1462	1	5	No	No	No	No	No	No	No	No	No	No
8	6	1392	1	5	No	No	No	No	No	No	No	No	No	No
9	6	1113	1	4	No	No	No	No	No	No	No	No	No	No
10	6	1044	1	4	No	No	No	No	No	No	No	No	No	No
11	6	1044	1	4	No	No	No	No	No	No	No	No	No	No
12	6	998	1	3	No	No	No	No	No	No	No	No	No	No
13	6	904	1	3	No	No	No	No	No	No	No	No	No	No
14	6	835	1	3	No	No	No	No	No	No	No	No	No	No
15	6	835	1	3	No	No	No	No	No	No	No	No	No	No
16	6	812	1	3	No	No	No	No	No	No	No	No	No	No
17	6	464	1	2	No	No	No	No	No	No	No	No	No	No
18	6	255	1	1	No	No	No	No	No	No	No	No	No	No
19	6	233	1	1	No	No	No	No	No	No	No	No	No	No
20	6	93	1	0	No	No	No	No	No	No	No	No	No	No
21	6	70	1	0	No	No	No	No	No	No	No	No	No	No
22	6	70	1	0	No	No	No	No	No	No	No	No	No	No
23	6	46	1	0	No	No	No	No	No	No	No	No	No	No
24	6	46	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	37.7
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:05
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	8
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	2328
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Study Intersections

Signal Warrants Report For Intersection 2: S. Chambers Road and S. Red Sky Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	Yes
#2	Four Hour Vehicular Volume	Yes
#3	Peak Hour	Yes

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	E
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	E
1	1114	535	373
2	1069	514	358
3	1047	503	351
4	891	428	298
5	847	407	283
6	758	364	254
7	702	337	235
8	668	321	224
9	535	257	179
10	501	241	168
11	501	241	168
12	479	230	160
13	434	209	145
14	401	193	134
15	401	193	134
16	390	187	131
17	223	107	75
18	123	59	41
19	111	54	37
20	45	21	15
21	33	16	11
22	33	16	11
23	22	11	7
24	22	11	7

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	7	1649	2	373	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	7	1583	2	358	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	7	1550	2	351	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	7	1319	2	298	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	7	1254	2	283	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	7	1122	2	254	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	7	1039	2	235	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	7	989	2	224	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	7	792	2	179	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
10	7	742	2	168	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
11	7	742	2	168	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
12	7	709	2	160	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No
13	7	643	2	145	No	No	Yes	Yes	No	No	Yes	Yes	No	No
14	7	594	2	134	No	No	No	Yes	No	No	No	Yes	No	No
15	7	594	2	134	No	No	No	Yes	No	No	No	Yes	No	No
16	7	577	2	131	No	No	No	Yes	No	No	No	Yes	No	No
17	7	330	2	75	No	No	No	No	No	No	No	No	No	No
18	7	182	2	41	No	No	No	No	No	No	No	No	No	No
19	7	165	2	37	No	No	No	No	No	No	No	No	No	No
20	7	66	2	15	No	No	No	No	No	No	No	No	No	No
21	7	49	2	11	No	No	No	No	No	No	No	No	No	No
22	7	49	2	11	No	No	No	No	No	No	No	No	No	No
23	7	33	2	7	No	No	No	No	No	No	No	No	No	No
24	7	33	2	7	No	No	No	No	No	No	No	No	No	No
Hours Met					8	12	13	16	8	11	13	16	12	8

Warrant 3 Condition A

Orientation	E
Total Stopped Delay Per Vehicle on Minor Approach (s)	430.7
Number of Lanes on Minor Street Approach	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	44:37
Delay Condition Met	Yes
Volume on Minor Street Approach During Same Hour	373
High Minor Volume Condition Met	Yes
Total Entering Volume on All Approaches During Same Hour	2022
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	Yes
Warrant Met for Intersection	**Yes**

Signal Warrants Report For Intersection 4: E. Hess Road and Firefly Lane

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	E	W	N
1	1917	1091	10
2	1840	1047	10
3	1802	1026	9
4	1534	873	8
5	1457	829	8
6	1304	742	7
7	1208	687	6
8	1150	655	6
9	920	524	5
10	863	491	5
11	863	491	5
12	824	469	4
13	748	425	4
14	690	393	4
15	690	393	4
16	671	382	4
17	383	218	2
18	211	120	1
19	192	109	1
20	77	44	0
21	58	33	0
22	58	33	0
23	38	22	0
24	38	22	0

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	6	3008	1	10	No	No	No	No	No	No	No	No	No	No
2	6	2887	1	10	No	No	No	No	No	No	No	No	No	No
3	6	2828	1	9	No	No	No	No	No	No	No	No	No	No
4	6	2407	1	8	No	No	No	No	No	No	No	No	No	No
5	6	2286	1	8	No	No	No	No	No	No	No	No	No	No
6	6	2046	1	7	No	No	No	No	No	No	No	No	No	No
7	6	1895	1	6	No	No	No	No	No	No	No	No	No	No
8	6	1805	1	6	No	No	No	No	No	No	No	No	No	No
9	6	1444	1	5	No	No	No	No	No	No	No	No	No	No
10	6	1354	1	5	No	No	No	No	No	No	No	No	No	No
11	6	1354	1	5	No	No	No	No	No	No	No	No	No	No
12	6	1293	1	4	No	No	No	No	No	No	No	No	No	No
13	6	1173	1	4	No	No	No	No	No	No	No	No	No	No
14	6	1083	1	4	No	No	No	No	No	No	No	No	No	No
15	6	1083	1	4	No	No	No	No	No	No	No	No	No	No
16	6	1053	1	4	No	No	No	No	No	No	No	No	No	No
17	6	601	1	2	No	No	No	No	No	No	No	No	No	No
18	6	331	1	1	No	No	No	No	No	No	No	No	No	No
19	6	301	1	1	No	No	No	No	No	No	No	No	No	No
20	6	121	1	0	No	No	No	No	No	No	No	No	No	No
21	6	91	1	0	No	No	No	No	No	No	No	No	No	No
22	6	91	1	0	No	No	No	No	No	No	No	No	No	No
23	6	60	1	0	No	No	No	No	No	No	No	No	No	No
24	6	60	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	105.6
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:17
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	10
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	3018
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Study Intersections

Signal Warrants Report For Intersection 2: S. Chambers Road and S. Red Sky Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	Yes
#2	Four Hour Vehicular Volume	Yes
#3	Peak Hour	Yes

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	E
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	E
1	635	1233	587
2	610	1184	564
3	597	1159	552
4	508	986	470
5	483	937	446
6	432	838	399
7	400	777	370
8	381	740	352
9	305	592	282
10	286	555	264
11	286	555	264
12	273	530	252
13	248	481	229
14	229	444	211
15	229	444	211
16	222	432	205
17	127	247	117
18	70	136	65
19	64	123	59
20	25	49	23
21	19	37	18
22	19	37	18
23	13	25	12
24	13	25	12

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	7	1868	2	587	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	7	1794	2	564	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	7	1756	2	552	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	7	1494	2	470	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	7	1420	2	446	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	7	1270	2	399	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	7	1177	2	370	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	7	1121	2	352	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	7	897	2	282	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
10	7	841	2	264	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
11	7	841	2	264	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
12	7	803	2	252	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
13	7	729	2	229	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
14	7	673	2	211	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No
15	7	673	2	211	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No
16	7	654	2	205	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No
17	7	374	2	117	No	No	No	Yes	No	No	No	No	No	No
18	7	206	2	65	No	No	No	No	No	No	No	No	No	No
19	7	187	2	59	No	No	No	No	No	No	No	No	No	No
20	7	74	2	23	No	No	No	No	No	No	No	No	No	No
21	7	56	2	18	No	No	No	No	No	No	No	No	No	No
22	7	56	2	18	No	No	No	No	No	No	No	No	No	No
23	7	38	2	12	No	No	No	No	No	No	No	No	No	No
24	7	38	2	12	No	No	No	No	No	No	No	No	No	No
Hours Met					16	16	16	17	8	13	16	16	16	12

Warrant 3 Condition A

Orientation	E
Total Stopped Delay Per Vehicle on Minor Approach (s)	828
Number of Lanes on Minor Street Approach	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	135:00
Delay Condition Met	Yes
Volume on Minor Street Approach During Same Hour	587
High Minor Volume Condition Met	Yes
Total Entering Volume on All Approaches During Same Hour	2455
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	Yes
Warrant Met for Intersection	**Yes**

Signal Warrants Report For Intersection 4: E. Hess Road and Firefly Lane

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	E	W	N
1	1275	2054	8
2	1224	1972	8
3	1199	1931	8
4	1020	1643	6
5	969	1561	6
6	867	1397	5
7	803	1294	5
8	765	1232	5
9	612	986	4
10	574	924	4
11	574	924	4
12	548	883	3
13	497	801	3
14	459	739	3
15	459	739	3
16	446	719	3
17	255	411	2
18	140	226	1
19	128	205	1
20	51	82	0
21	38	62	0
22	38	62	0
23	26	41	0
24	26	41	0

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	6	3329	1	8	No	No	No	No	No	No	No	No	No	No
2	6	3196	1	8	No	No	No	No	No	No	No	No	No	No
3	6	3130	1	8	No	No	No	No	No	No	No	No	No	No
4	6	2663	1	6	No	No	No	No	No	No	No	No	No	No
5	6	2530	1	6	No	No	No	No	No	No	No	No	No	No
6	6	2264	1	5	No	No	No	No	No	No	No	No	No	No
7	6	2097	1	5	No	No	No	No	No	No	No	No	No	No
8	6	1997	1	5	No	No	No	No	No	No	No	No	No	No
9	6	1598	1	4	No	No	No	No	No	No	No	No	No	No
10	6	1498	1	4	No	No	No	No	No	No	No	No	No	No
11	6	1498	1	4	No	No	No	No	No	No	No	No	No	No
12	6	1431	1	3	No	No	No	No	No	No	No	No	No	No
13	6	1298	1	3	No	No	No	No	No	No	No	No	No	No
14	6	1198	1	3	No	No	No	No	No	No	No	No	No	No
15	6	1198	1	3	No	No	No	No	No	No	No	No	No	No
16	6	1165	1	3	No	No	No	No	No	No	No	No	No	No
17	6	666	1	2	No	No	No	No	No	No	No	No	No	No
18	6	366	1	1	No	No	No	No	No	No	No	No	No	No
19	6	333	1	1	No	No	No	No	No	No	No	No	No	No
20	6	133	1	0	No	No	No	No	No	No	No	No	No	No
21	6	100	1	0	No	No	No	No	No	No	No	No	No	No
22	6	100	1	0	No	No	No	No	No	No	No	No	No	No
23	6	67	1	0	No	No	No	No	No	No	No	No	No	No
24	6	67	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	129.1
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:17
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	8
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	3337
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Signal Warrants Report For Intersection 2: S. Chambers Road and S. Red Sky Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	Yes
#2	Four Hour Vehicular Volume	Yes
#3	Peak Hour	Yes

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	E
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	E
1	2485	1090	175
2	2386	1046	168
3	2336	1025	165
4	1988	872	140
5	1889	828	133
6	1690	741	119
7	1566	687	110
8	1491	654	105
9	1193	523	84
10	1118	491	79
11	1118	491	79
12	1069	469	75
13	969	425	68
14	895	392	63
15	895	392	63
16	870	382	61
17	497	218	35
18	273	120	19
19	249	109	18
20	99	44	7
21	75	33	5
22	75	33	5
23	50	22	4
24	50	22	4

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	7	3575	2	175	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	7	3432	2	168	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	7	3361	2	165	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	7	2860	2	140	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	7	2717	2	133	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	7	2431	2	119	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	7	2253	2	110	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
8	7	2145	2	105	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
9	7	1716	2	84	No	No	No	No	No	Yes	Yes	Yes	Yes	No
10	7	1609	2	79	No	No	No	No	No	No	Yes	Yes	No	No
11	7	1609	2	79	No	No	No	No	No	No	Yes	Yes	No	No
12	7	1538	2	75	No	No	No	No	No	No	Yes	Yes	No	No
13	7	1394	2	68	No	No	No	No	No	No	No	Yes	No	No
14	7	1287	2	63	No	No	No	No	No	No	No	Yes	No	No
15	7	1287	2	63	No	No	No	No	No	No	No	Yes	No	No
16	7	1252	2	61	No	No	No	No	No	No	No	Yes	No	No
17	7	715	2	35	No	No	No	No	No	No	No	No	No	No
18	7	393	2	19	No	No	No	No	No	No	No	No	No	No
19	7	358	2	18	No	No	No	No	No	No	No	No	No	No
20	7	143	2	7	No	No	No	No	No	No	No	No	No	No
21	7	108	2	5	No	No	No	No	No	No	No	No	No	No
22	7	108	2	5	No	No	No	No	No	No	No	No	No	No
23	7	72	2	4	No	No	No	No	No	No	No	No	No	No
24	7	72	2	4	No	No	No	No	No	No	No	No	No	No
Hours Met					0	3	4	6	8	9	12	16	9	8

Warrant 3 Condition A

Orientation	E
Total Stopped Delay Per Vehicle on Minor Approach (s)	526
Number of Lanes on Minor Street Approach	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	25:34
Delay Condition Met	Yes
Volume on Minor Street Approach During Same Hour	175
High Minor Volume Condition Met	Yes
Total Entering Volume on All Approaches During Same Hour	3750
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	Yes
Warrant Met for Intersection	**Yes**

Signal Warrants Report For Intersection 4: E. Hess Road and Firefly Lane

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	E	W	N
1	1716	1535	20
2	1647	1474	19
3	1613	1443	19
4	1373	1228	16
5	1304	1167	15
6	1167	1044	14
7	1081	967	13
8	1030	921	12
9	824	737	10
10	772	691	9
11	772	691	9
12	738	660	9
13	669	599	8
14	618	553	7
15	618	553	7
16	601	537	7
17	343	307	4
18	189	169	2
19	172	154	2
20	69	61	1
21	51	46	1
22	51	46	1
23	34	31	0
24	34	31	0

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	6	3251	1	20	No	No	No	No	No	No	No	No	No	No
2	6	3121	1	19	No	No	No	No	No	No	No	No	No	No
3	6	3056	1	19	No	No	No	No	No	No	No	No	No	No
4	6	2601	1	16	No	No	No	No	No	No	No	No	No	No
5	6	2471	1	15	No	No	No	No	No	No	No	No	No	No
6	6	2211	1	14	No	No	No	No	No	No	No	No	No	No
7	6	2048	1	13	No	No	No	No	No	No	No	No	No	No
8	6	1951	1	12	No	No	No	No	No	No	No	No	No	No
9	6	1561	1	10	No	No	No	No	No	No	No	No	No	No
10	6	1463	1	9	No	No	No	No	No	No	No	No	No	No
11	6	1463	1	9	No	No	No	No	No	No	No	No	No	No
12	6	1398	1	9	No	No	No	No	No	No	No	No	No	No
13	6	1268	1	8	No	No	No	No	No	No	No	No	No	No
14	6	1171	1	7	No	No	No	No	No	No	No	No	No	No
15	6	1171	1	7	No	No	No	No	No	No	No	No	No	No
16	6	1138	1	7	No	No	No	No	No	No	No	No	No	No
17	6	650	1	4	No	No	No	No	No	No	No	No	No	No
18	6	358	1	2	No	No	No	No	No	No	No	No	No	No
19	6	326	1	2	No	No	No	No	No	No	No	No	No	No
20	6	130	1	1	No	No	No	No	No	No	No	No	No	No
21	6	97	1	1	No	No	No	No	No	No	No	No	No	No
22	6	97	1	1	No	No	No	No	No	No	No	No	No	No
23	6	65	1	0	No	No	No	No	No	No	No	No	No	No
24	6	65	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	142.7
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:47
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	20
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	3271
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Study Intersections

Signal Warrants Report For Intersection 2: S. Chambers Road and S. Red Sky Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	E
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	E
1	1730	2915	55
2	1661	2798	53
3	1626	2740	52
4	1384	2332	44
5	1315	2215	42
6	1176	1982	37
7	1090	1836	35
8	1038	1749	33
9	830	1399	26
10	779	1312	25
11	779	1312	25
12	744	1253	24
13	675	1137	21
14	623	1049	20
15	623	1049	20
16	606	1020	19
17	346	583	11
18	190	321	6
19	173	292	6
20	69	117	2
21	52	87	2
22	52	87	2
23	35	58	1
24	35	58	1

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	7	4645	2	55	No	No	No	No	No	No	No	No	No	No
2	7	4459	2	53	No	No	No	No	No	No	No	No	No	No
3	7	4366	2	52	No	No	No	No	No	No	No	No	No	No
4	7	3716	2	44	No	No	No	No	No	No	No	No	No	No
5	7	3530	2	42	No	No	No	No	No	No	No	No	No	No
6	7	3158	2	37	No	No	No	No	No	No	No	No	No	No
7	7	2926	2	35	No	No	No	No	No	No	No	No	No	No
8	7	2787	2	33	No	No	No	No	No	No	No	No	No	No
9	7	2229	2	26	No	No	No	No	No	No	No	No	No	No
10	7	2091	2	25	No	No	No	No	No	No	No	No	No	No
11	7	2091	2	25	No	No	No	No	No	No	No	No	No	No
12	7	1997	2	24	No	No	No	No	No	No	No	No	No	No
13	7	1812	2	21	No	No	No	No	No	No	No	No	No	No
14	7	1672	2	20	No	No	No	No	No	No	No	No	No	No
15	7	1672	2	20	No	No	No	No	No	No	No	No	No	No
16	7	1626	2	19	No	No	No	No	No	No	No	No	No	No
17	7	929	2	11	No	No	No	No	No	No	No	No	No	No
18	7	511	2	6	No	No	No	No	No	No	No	No	No	No
19	7	465	2	6	No	No	No	No	No	No	No	No	No	No
20	7	186	2	2	No	No	No	No	No	No	No	No	No	No
21	7	139	2	2	No	No	No	No	No	No	No	No	No	No
22	7	139	2	2	No	No	No	No	No	No	No	No	No	No
23	7	93	2	1	No	No	No	No	No	No	No	No	No	No
24	7	93	2	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	E
Total Stopped Delay Per Vehicle on Minor Approach (s)	685.8
Number of Lanes on Minor Street Approach	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	10:28
Delay Condition Met	Yes
Volume on Minor Street Approach During Same Hour	55
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	4700
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Signal Warrants Report For Intersection 4: E. Hess Road and Firefly Lane

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	E	W	N
1	1636	2140	20
2	1571	2054	19
3	1538	2012	19
4	1309	1712	16
5	1243	1626	15
6	1112	1455	14
7	1031	1348	13
8	982	1284	12
9	785	1027	10
10	736	963	9
11	736	963	9
12	703	920	9
13	638	835	8
14	589	770	7
15	589	770	7
16	573	749	7
17	327	428	4
18	180	235	2
19	164	214	2
20	65	86	1
21	49	64	1
22	49	64	1
23	33	43	0
24	33	43	0

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	6	3776	1	20	No	No	No	No	No	No	No	No	No	No
2	6	3625	1	19	No	No	No	No	No	No	No	No	No	No
3	6	3550	1	19	No	No	No	No	No	No	No	No	No	No
4	6	3021	1	16	No	No	No	No	No	No	No	No	No	No
5	6	2869	1	15	No	No	No	No	No	No	No	No	No	No
6	6	2567	1	14	No	No	No	No	No	No	No	No	No	No
7	6	2379	1	13	No	No	No	No	No	No	No	No	No	No
8	6	2266	1	12	No	No	No	No	No	No	No	No	No	No
9	6	1812	1	10	No	No	No	No	No	No	No	No	No	No
10	6	1699	1	9	No	No	No	No	No	No	No	No	No	No
11	6	1699	1	9	No	No	No	No	No	No	No	No	No	No
12	6	1623	1	9	No	No	No	No	No	No	No	No	No	No
13	6	1473	1	8	No	No	No	No	No	No	No	No	No	No
14	6	1359	1	7	No	No	No	No	No	No	No	No	No	No
15	6	1359	1	7	No	No	No	No	No	No	No	No	No	No
16	6	1322	1	7	No	No	No	No	No	No	No	No	No	No
17	6	755	1	4	No	No	No	No	No	No	No	No	No	No
18	6	415	1	2	No	No	No	No	No	No	No	No	No	No
19	6	378	1	2	No	No	No	No	No	No	No	No	No	No
20	6	151	1	1	No	No	No	No	No	No	No	No	No	No
21	6	113	1	1	No	No	No	No	No	No	No	No	No	No
22	6	113	1	1	No	No	No	No	No	No	No	No	No	No
23	6	76	1	0	No	No	No	No	No	No	No	No	No	No
24	6	76	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	418.9
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	2:19
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	20
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	3796
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Study Intersections

Signal Warrants Report For Intersection 2: S. Chambers Road and S. Red Sky Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	Yes
#2	Four Hour Vehicular Volume	Yes
#3	Peak Hour	Yes

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	E
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	E
1	2549	1122	239
2	2447	1077	229
3	2396	1055	225
4	2039	898	191
5	1937	853	182
6	1733	763	163
7	1606	707	151
8	1529	673	143
9	1224	539	115
10	1147	505	108
11	1147	505	108
12	1096	482	103
13	994	438	93
14	918	404	86
15	918	404	86
16	892	393	84
17	510	224	48
18	280	123	26
19	255	112	24
20	102	45	10
21	76	34	7
22	76	34	7
23	51	22	5
24	51	22	5

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	7	3671	2	239	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	7	3524	2	229	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	7	3451	2	225	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	7	2937	2	191	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	7	2790	2	182	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	7	2496	2	163	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	7	2313	2	151	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	7	2202	2	143	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	7	1763	2	115	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	7	1652	2	108	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
11	7	1652	2	108	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
12	7	1578	2	103	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
13	7	1432	2	93	No	No	No	No	No	Yes	Yes	Yes	Yes	No
14	7	1322	2	86	No	No	No	No	No	Yes	Yes	Yes	Yes	No
15	7	1322	2	86	No	No	No	No	No	Yes	Yes	Yes	Yes	No
16	7	1285	2	84	No	No	No	No	No	Yes	Yes	Yes	Yes	No
17	7	734	2	48	No	No	No	No	No	No	No	No	No	No
18	7	403	2	26	No	No	No	No	No	No	No	No	No	No
19	7	367	2	24	No	No	No	No	No	No	No	No	No	No
20	7	147	2	10	No	No	No	No	No	No	No	No	No	No
21	7	110	2	7	No	No	No	No	No	No	No	No	No	No
22	7	110	2	7	No	No	No	No	No	No	No	No	No	No
23	7	73	2	5	No	No	No	No	No	No	No	No	No	No
24	7	73	2	5	No	No	No	No	No	No	No	No	No	No
Hours Met					3	6	8	9	12	16	16	16	16	12

Warrant 3 Condition A

Orientation	E
Total Stopped Delay Per Vehicle on Minor Approach (s)	2370.2
Number of Lanes on Minor Street Approach	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	157:21
Delay Condition Met	Yes
Volume on Minor Street Approach During Same Hour	239
High Minor Volume Condition Met	Yes
Total Entering Volume on All Approaches During Same Hour	3910
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	Yes
Warrant Met for Intersection	**Yes**

Signal Warrants Report For Intersection 4: E. Hess Road and Firefly Lane

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	E	W	N
1	1821	1595	20
2	1748	1531	19
3	1712	1499	19
4	1457	1276	16
5	1384	1212	15
6	1238	1085	14
7	1147	1005	13
8	1093	957	12
9	874	766	10
10	819	718	9
11	819	718	9
12	783	686	9
13	710	622	8
14	656	574	7
15	656	574	7
16	637	558	7
17	364	319	4
18	200	175	2
19	182	160	2
20	73	64	1
21	55	48	1
22	55	48	1
23	36	32	0
24	36	32	0

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	6	3416	1	20	No	No	No	No	No	No	No	No	No	No
2	6	3279	1	19	No	No	No	No	No	No	No	No	No	No
3	6	3211	1	19	No	No	No	No	No	No	No	No	No	No
4	6	2733	1	16	No	No	No	No	No	No	No	No	No	No
5	6	2596	1	15	No	No	No	No	No	No	No	No	No	No
6	6	2323	1	14	No	No	No	No	No	No	No	No	No	No
7	6	2152	1	13	No	No	No	No	No	No	No	No	No	No
8	6	2050	1	12	No	No	No	No	No	No	No	No	No	No
9	6	1640	1	10	No	No	No	No	No	No	No	No	No	No
10	6	1537	1	9	No	No	No	No	No	No	No	No	No	No
11	6	1537	1	9	No	No	No	No	No	No	No	No	No	No
12	6	1469	1	9	No	No	No	No	No	No	No	No	No	No
13	6	1332	1	8	No	No	No	No	No	No	No	No	No	No
14	6	1230	1	7	No	No	No	No	No	No	No	No	No	No
15	6	1230	1	7	No	No	No	No	No	No	No	No	No	No
16	6	1195	1	7	No	No	No	No	No	No	No	No	No	No
17	6	683	1	4	No	No	No	No	No	No	No	No	No	No
18	6	375	1	2	No	No	No	No	No	No	No	No	No	No
19	6	342	1	2	No	No	No	No	No	No	No	No	No	No
20	6	137	1	1	No	No	No	No	No	No	No	No	No	No
21	6	103	1	1	No	No	No	No	No	No	No	No	No	No
22	6	103	1	1	No	No	No	No	No	No	No	No	No	No
23	6	68	1	0	No	No	No	No	No	No	No	No	No	No
24	6	68	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	194.8
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	1:04
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	20
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	3436
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Study Intersections

Signal Warrants Report For Intersection 2: S. Chambers Road and S. Red Sky Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	Yes
#2	Four Hour Vehicular Volume	Yes
#3	Peak Hour	Yes

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	E
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	E
1	1933	3056	412
2	1856	2934	396
3	1817	2873	387
4	1546	2445	330
5	1469	2323	313
6	1314	2078	280
7	1218	1925	260
8	1160	1834	247
9	928	1467	198
10	870	1375	185
11	870	1375	185
12	831	1314	177
13	754	1192	161
14	696	1100	148
15	696	1100	148
16	677	1070	144
17	387	611	82
18	213	336	45
19	193	306	41
20	77	122	16
21	58	92	12
22	58	92	12
23	39	61	8
24	39	61	8

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	7	4989	2	412	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	7	4790	2	396	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	7	4690	2	387	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	7	3991	2	330	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	7	3792	2	313	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	7	3392	2	280	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	7	3143	2	260	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	7	2994	2	247	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	7	2395	2	198	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	7	2245	2	185	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	7	2245	2	185	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	7	2145	2	177	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	7	1946	2	161	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	7	1796	2	148	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	7	1796	2	148	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	7	1747	2	144	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	7	998	2	82	No	No	No	No	No	Yes	Yes	Yes	Yes	No
18	7	549	2	45	No	No	No	No	No	No	No	No	No	No
19	7	499	2	41	No	No	No	No	No	No	No	No	No	No
20	7	199	2	16	No	No	No	No	No	No	No	No	No	No
21	7	150	2	12	No	No	No	No	No	No	No	No	No	No
22	7	150	2	12	No	No	No	No	No	No	No	No	No	No
23	7	100	2	8	No	No	No	No	No	No	No	No	No	No
24	7	100	2	8	No	No	No	No	No	No	No	No	No	No
Hours Met					8	13	16	16	16	17	17	17	17	16

Warrant 3 Condition A

Orientation	E
Total Stopped Delay Per Vehicle on Minor Approach (s)	6490.2
Number of Lanes on Minor Street Approach	2
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	742:45
Delay Condition Met	Yes
Volume on Minor Street Approach During Same Hour	412
High Minor Volume Condition Met	Yes
Total Entering Volume on All Approaches During Same Hour	5401
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	Yes
Warrant Met for Intersection	**Yes**

Signal Warrants Report For Intersection 4: E. Hess Road and Firefly Lane

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	E	W	N
1	1966	2470	20
2	1887	2371	19
3	1848	2322	19
4	1573	1976	16
5	1494	1877	15
6	1337	1680	14
7	1239	1556	13
8	1180	1482	12
9	944	1186	10
10	885	1112	9
11	885	1112	9
12	845	1062	9
13	767	963	8
14	708	889	7
15	708	889	7
16	688	865	7
17	393	494	4
18	216	272	2
19	197	247	2
20	79	99	1
21	59	74	1
22	59	74	1
23	39	49	0
24	39	49	0

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	6	4436	1	20	No	No	No	No	No	No	No	No	No	No
2	6	4258	1	19	No	No	No	No	No	No	No	No	No	No
3	6	4170	1	19	No	No	No	No	No	No	No	No	No	No
4	6	3549	1	16	No	No	No	No	No	No	No	No	No	No
5	6	3371	1	15	No	No	No	No	No	No	No	No	No	No
6	6	3017	1	14	No	No	No	No	No	No	No	No	No	No
7	6	2795	1	13	No	No	No	No	No	No	No	No	No	No
8	6	2662	1	12	No	No	No	No	No	No	No	No	No	No
9	6	2130	1	10	No	No	No	No	No	No	No	No	No	No
10	6	1997	1	9	No	No	No	No	No	No	No	No	No	No
11	6	1997	1	9	No	No	No	No	No	No	No	No	No	No
12	6	1907	1	9	No	No	No	No	No	No	No	No	No	No
13	6	1730	1	8	No	No	No	No	No	No	No	No	No	No
14	6	1597	1	7	No	No	No	No	No	No	No	No	No	No
15	6	1597	1	7	No	No	No	No	No	No	No	No	No	No
16	6	1553	1	7	No	No	No	No	No	No	No	No	No	No
17	6	887	1	4	No	No	No	No	No	No	No	No	No	No
18	6	488	1	2	No	No	No	No	No	No	No	No	No	No
19	6	444	1	2	No	No	No	No	No	No	No	No	No	No
20	6	178	1	1	No	No	No	No	No	No	No	No	No	No
21	6	133	1	1	No	No	No	No	No	No	No	No	No	No
22	6	133	1	1	No	No	No	No	No	No	No	No	No	No
23	6	88	1	0	No	No	No	No	No	No	No	No	No	No
24	6	88	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	1259.6
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	6:59
Delay Condition Met	Yes
Volume on Minor Street Approach During Same Hour	20
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	4456
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Study Intersections

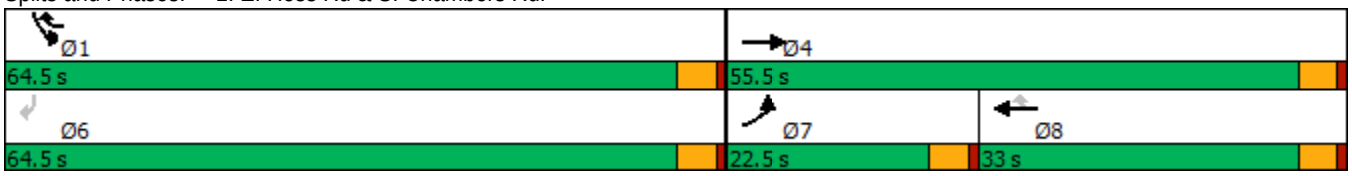
APPENDIX C

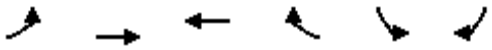
INTERSECTION CAPACITY ANALYSIS RESULTS

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	36	380	568	923	370	18
Future Volume (vph)	36	380	568	923	370	18
Turn Type	Prot	NA	NA	pm+ov	Prot	Perm
Protected Phases	7	4	8	1	1	
Permitted Phases				8		6
Detector Phase	7	4	8	1	1	6
Switch Phase						
Minimum Initial (s)	11.0	15.0	15.0	11.0	11.0	4.0
Minimum Split (s)	22.5	20.5	20.5	15.5	15.5	20.0
Total Split (s)	22.5	55.5	33.0	64.5	64.5	64.5
Total Split (%)	18.8%	46.3%	27.5%	53.8%	53.8%	53.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	11.9	22.4	17.8	41.6	15.5	15.5
Actuated g/C Ratio	0.25	0.47	0.37	0.87	0.33	0.33
v/c Ratio	0.09	0.25	0.47	0.68	0.36	0.04
Control Delay	20.8	7.8	15.0	3.8	15.0	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	7.8	15.0	3.8	15.0	8.2
LOS	C	A	B	A	B	A
Approach Delay		8.9	8.1		14.7	
Approach LOS		A	A		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 47.6	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 9.3	Intersection LOS: A
Intersection Capacity Utilization 73.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: E. Hess Rd & S. Chambers Rd.





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	36	380	568	923	370	18
Future Volume (veh/h)	36	380	568	923	370	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	39	413	617	1003	402	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	158	2332	1742	1077	653	300
Arrive On Green	0.09	0.66	0.49	0.49	0.19	0.19
Sat Flow, veh/h	1781	3647	3647	1585	3456	1585
Grp Volume(v), veh/h	39	413	617	1003	402	20
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1728	1585
Q Serve(g_s), s	1.2	2.6	6.2	28.5	6.2	0.6
Cycle Q Clear(g_c), s	1.2	2.6	6.2	28.5	6.2	0.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	158	2332	1742	1077	653	300
V/C Ratio(X)	0.25	0.18	0.35	0.93	0.62	0.07
Avail Cap(c_a), veh/h	552	3118	1742	1077	3567	1636
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.7	3.9	9.1	8.1	21.6	19.4
Incr Delay (d2), s/veh	0.8	0.0	0.1	14.0	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.5	1.8	4.2	2.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	25.5	3.9	9.3	22.1	22.6	19.5
LnGrp LOS	C	A	A	C	C	B
Approach Vol, veh/h		452	1620		422	
Approach Delay, s/veh		5.8	17.2		22.4	
Approach LOS		A	B		C	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	42.6	15.5	9.6	33.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	51.0	60.0	18.0	28.5
Max Q Clear Time (g_c+I1), s	4.6	8.2	3.2	30.5
Green Ext Time (p_c), s	2.7	1.5	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	16.0
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	53	925	29	22	375
Future Vol, veh/h	13	53	925	29	22	375
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	135	-	0	400	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	62	1088	34	26	441

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1316	544	0	0	1122	0
Stage 1	1088	-	-	-	-	-
Stage 2	228	-	-	-	-	-
Critical Hdwy	6.29	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.67	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	179	483	-	-	618	-
Stage 1	278	-	-	-	-	-
Stage 2	750	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	171	483	-	-	618	-
Mov Cap-2 Maneuver	171	-	-	-	-	-
Stage 1	278	-	-	-	-	-
Stage 2	719	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.5	0	0.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	171	483	618	-
HCM Lane V/C Ratio	-	-	0.089	0.129	0.042	-
HCM Control Delay (s)	-	-	28.1	13.6	11.1	-
HCM Lane LOS	-	-	D	B	B	-
HCM 95th %tile Q(veh)	-	-	0.3	0.4	0.1	-

DELAY (CONTROL)

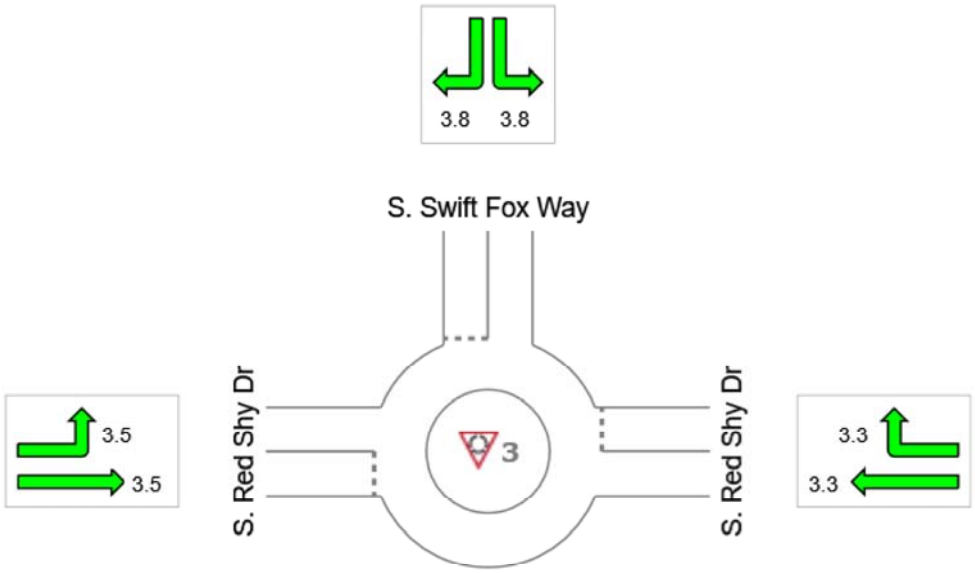
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 3 [Ex_AM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches			Intersection
	East	North	West	
Delay (Control)	3.3	3.8	3.5	3.7
LOS	A	A	A	A



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	749	1466	7	5	5
Future Vol, veh/h	4	749	1466	7	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	215	-	-	215	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	851	1666	8	6	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1674	0	-	0	2102	833
Stage 1	-	-	-	-	1666	-
Stage 2	-	-	-	-	436	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	379	-	-	-	44	312
Stage 1	-	-	-	-	139	-
Stage 2	-	-	-	-	619	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	379	-	-	-	43	312
Mov Cap-2 Maneuver	-	-	-	-	43	-
Stage 1	-	-	-	-	137	-
Stage 2	-	-	-	-	619	-

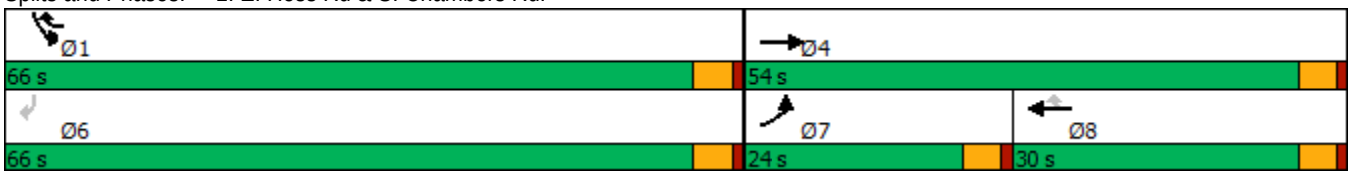
Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	60.5
HCM LOS			F

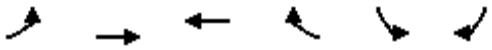
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	379	-	-	-	76
HCM Lane V/C Ratio	0.012	-	-	-	0.15
HCM Control Delay (s)	14.6	-	-	-	60.5
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	0.5

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	19	506	335	368	936	5
Future Volume (vph)	19	506	335	368	936	5
Turn Type	Prot	NA	NA	pm+ov	Prot	Perm
Protected Phases	7	4	8	1	1	
Permitted Phases				8		6
Detector Phase	7	4	8	1	1	6
Switch Phase						
Minimum Initial (s)	11.0	15.0	15.0	11.0	11.0	4.0
Minimum Split (s)	22.5	20.5	20.5	15.5	15.5	20.0
Total Split (s)	24.0	54.0	30.0	66.0	66.0	66.0
Total Split (%)	20.0%	45.0%	25.0%	55.0%	55.0%	55.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	11.7	18.5	16.5	48.7	23.2	23.2
Actuated g/C Ratio	0.23	0.36	0.32	0.95	0.45	0.45
v/c Ratio	0.05	0.42	0.31	0.25	0.64	0.01
Control Delay	23.2	14.6	17.5	0.7	13.1	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	14.6	17.5	0.7	13.1	6.2
LOS	C	B	B	A	B	A
Approach Delay		14.9	8.7		13.1	
Approach LOS		B	A		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 51.3	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 12.1	Intersection LOS: B
Intersection Capacity Utilization 50.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: E. Hess Rd & S. Chambers Rd.





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	506	335	368	936	5
Future Volume (veh/h)	19	506	335	368	936	5
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	20	533	353	387	985	5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	95	1584	1073	1070	1289	591
Arrive On Green	0.05	0.45	0.30	0.30	0.37	0.37
Sat Flow, veh/h	1781	3647	3647	1585	3456	1585
Grp Volume(v), veh/h	20	533	353	387	985	5
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1728	1585
Q Serve(g_s), s	0.5	4.9	3.8	5.2	12.4	0.1
Cycle Q Clear(g_c), s	0.5	4.9	3.8	5.2	12.4	0.1
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	95	1584	1073	1070	1289	591
V/C Ratio(X)	0.21	0.34	0.33	0.36	0.76	0.01
Avail Cap(c_a), veh/h	699	3540	1824	1405	4277	1962
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.5	9.0	13.4	3.5	13.7	9.8
Incr Delay (d2), s/veh	1.1	0.1	0.2	0.2	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.3	1.2	7.1	3.7	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.6	9.1	13.6	3.7	14.6	9.8
LnGrp LOS	C	A	B	A	B	A
Approach Vol, veh/h		553	740		990	
Approach Delay, s/veh		9.6	8.4		14.6	
Approach LOS		A	A		B	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			26.7		23.0	7.2	19.5
Change Period (Y+Rc), s			4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s			49.5		61.5	19.5	25.5
Max Q Clear Time (g_c+I1), s			6.9		14.4	2.5	7.2
Green Ext Time (p_c), s			3.6		4.1	0.0	3.3

Intersection Summary		
HCM 6th Ctrl Delay		11.4
HCM 6th LOS		B

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	27	359	27	58	934
Future Vol, veh/h	16	27	359	27	58	934
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	135	-	0	400	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	28	370	28	60	963

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	875	185	0	0	398	0
Stage 1	370	-	-	-	-	-
Stage 2	505	-	-	-	-	-
Critical Hdwy	6.29	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.67	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	321	826	-	-	1157	-
Stage 1	646	-	-	-	-	-
Stage 2	538	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	304	826	-	-	1157	-
Mov Cap-2 Maneuver	304	-	-	-	-	-
Stage 1	646	-	-	-	-	-
Stage 2	510	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.5	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	304	826	1157	-
HCM Lane V/C Ratio	-	-	0.054	0.034	0.052	-
HCM Control Delay (s)	-	-	17.5	9.5	8.3	-
HCM Lane LOS	-	-	C	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.2	-

DELAY (CONTROL)

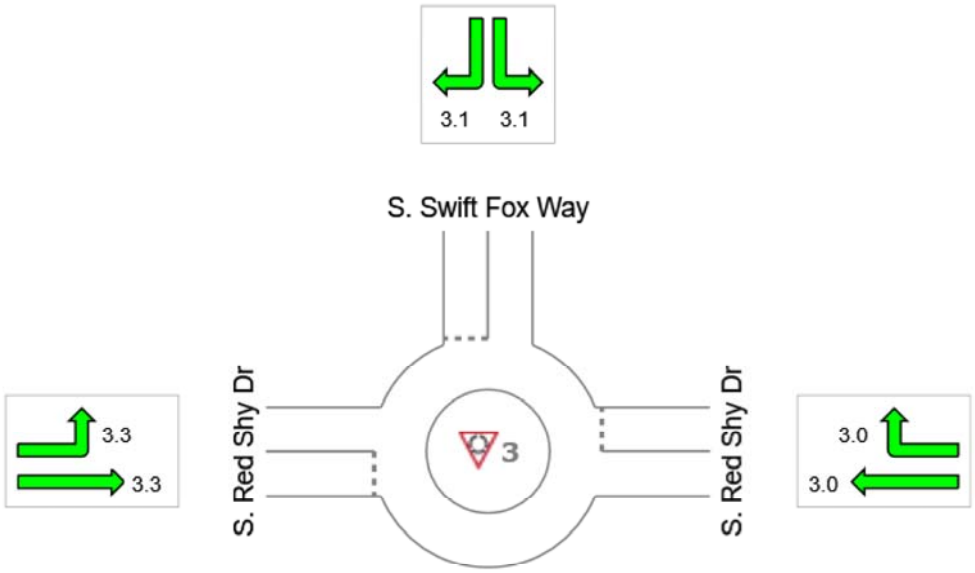
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 3 [Ex_PM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches			Intersection
	East	North	West	
Delay (Control)	3.0	3.1	3.3	3.2
LOS	A	A	A	A



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	1435	696	12	6	0
Future Vol, veh/h	5	1435	696	12	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	215	-	-	215	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	1511	733	13	6	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	746	0	-	0	1499	367
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	766	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	858	-	-	-	113	630
Stage 1	-	-	-	-	436	-
Stage 2	-	-	-	-	419	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	858	-	-	-	112	630
Mov Cap-2 Maneuver	-	-	-	-	112	-
Stage 1	-	-	-	-	433	-
Stage 2	-	-	-	-	419	-

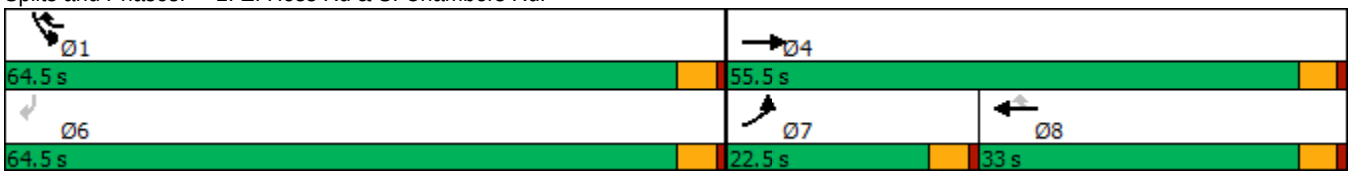
Approach	EB	WB	SB
HCM Control Delay, s	0	0	39.1
HCM LOS			E

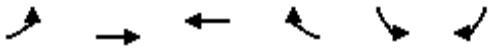
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	858	-	-	-	112
HCM Lane V/C Ratio	0.006	-	-	-	0.056
HCM Control Delay (s)	9.2	-	-	-	39.1
HCM Lane LOS	A	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	38	411	615	998	400	20
Future Volume (vph)	38	411	615	998	400	20
Turn Type	Prot	NA	NA	pm+ov	Prot	Perm
Protected Phases	7	4	8	1	1	
Permitted Phases				8		6
Detector Phase	7	4	8	1	1	6
Switch Phase						
Minimum Initial (s)	11.0	15.0	15.0	11.0	11.0	4.0
Minimum Split (s)	22.5	20.5	20.5	15.5	15.5	20.0
Total Split (s)	22.5	55.5	33.0	64.5	64.5	64.5
Total Split (%)	18.8%	46.3%	27.5%	53.8%	53.8%	53.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	12.5	27.6	19.8	46.9	19.1	19.1
Actuated g/C Ratio	0.22	0.49	0.35	0.82	0.34	0.34
v/c Ratio	0.11	0.26	0.54	0.75	0.38	0.04
Control Delay	28.3	9.6	20.0	5.5	16.5	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	9.6	20.0	5.5	16.5	7.4
LOS	C	A	B	A	B	A
Approach Delay		11.2	11.0		16.1	
Approach LOS		B	B		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 56.9	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 11.9	Intersection LOS: B
Intersection Capacity Utilization 78.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: E. Hess Rd & S. Chambers Rd.





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	411	615	998	400	20
Future Volume (veh/h)	38	411	615	998	400	20
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	41	447	668	1085	435	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	163	2336	1736	1073	651	299
Arrive On Green	0.09	0.66	0.49	0.49	0.19	0.19
Sat Flow, veh/h	1781	3647	3647	1585	3456	1585
Grp Volume(v), veh/h	41	447	668	1085	435	22
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1728	1585
Q Serve(g_s), s	1.2	2.9	6.9	28.5	6.8	0.7
Cycle Q Clear(g_c), s	1.2	2.9	6.9	28.5	6.8	0.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	163	2336	1736	1073	651	299
V/C Ratio(X)	0.25	0.19	0.38	1.01	0.67	0.07
Avail Cap(c_a), veh/h	550	3107	1736	1073	3554	1630
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.6	3.9	9.4	9.4	22.0	19.5
Incr Delay (d2), s/veh	0.8	0.0	0.1	30.2	1.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.5	2.0	9.0	2.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	25.4	4.0	9.5	39.6	23.2	19.6
LnGrp LOS	C	A	A	F	C	B
Approach Vol, veh/h		488	1753		457	
Approach Delay, s/veh		5.8	28.2		23.0	
Approach LOS		A	C		C	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			42.8		15.5	9.8	33.0
Change Period (Y+Rc), s			4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s			51.0		60.0	18.0	28.5
Max Q Clear Time (g_c+I1), s			4.9		8.8	3.2	30.5
Green Ext Time (p_c), s			2.9		1.6	0.0	0.0

Intersection Summary		
HCM 6th Ctrl Delay		23.2
HCM 6th LOS		C

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	57	1000	31	24	406
Future Vol, veh/h	15	57	1000	31	24	406
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	135	-	0	400	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	67	1176	36	28	478

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1423	588	0	0	1212	0
Stage 1	1176	-	-	-	-	-
Stage 2	247	-	-	-	-	-
Critical Hdwy	6.29	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.67	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	155	452	-	-	571	-
Stage 1	250	-	-	-	-	-
Stage 2	733	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	147	452	-	-	571	-
Mov Cap-2 Maneuver	147	-	-	-	-	-
Stage 1	250	-	-	-	-	-
Stage 2	697	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.2	0	0.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	147	452	571	-
HCM Lane V/C Ratio	-	-	0.12	0.148	0.049	-
HCM Control Delay (s)	-	-	32.8	14.3	11.6	-
HCM Lane LOS	-	-	D	B	B	-
HCM 95th %tile Q(veh)	-	-	0.4	0.5	0.2	-

DELAY (CONTROL)

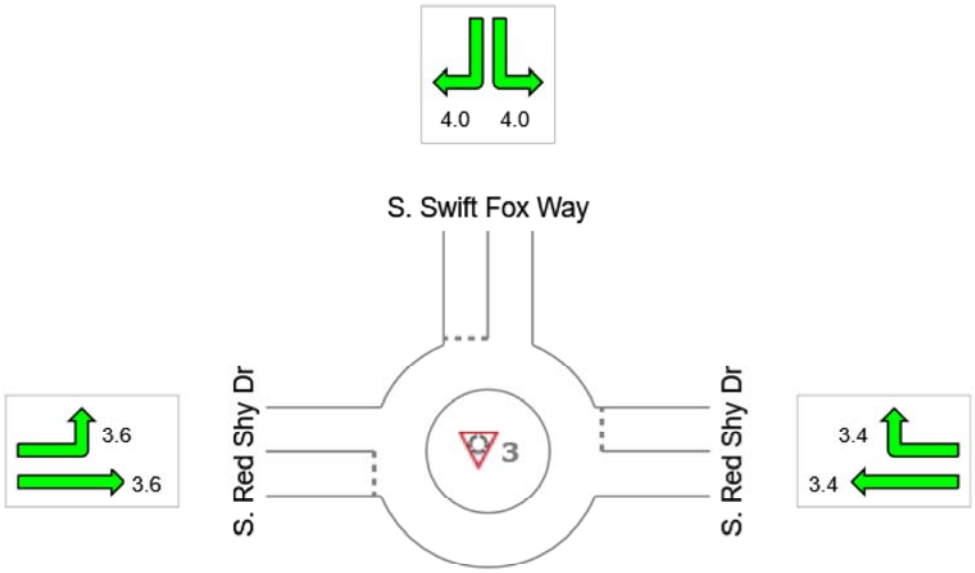
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 3 [2021Background_AM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches			Intersection
	East	North	West	
Delay (Control)	3.4	4.0	3.6	3.8
LOS	A	A	A	A



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	810	1586	7	5	5
Future Vol, veh/h	4	810	1586	7	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	215	-	-	215	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	920	1802	8	6	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1810	0	-	0	2272	901
Stage 1	-	-	-	-	1802	-
Stage 2	-	-	-	-	470	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	336	-	-	-	34	281
Stage 1	-	-	-	-	117	-
Stage 2	-	-	-	-	595	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	336	-	-	-	33	281
Mov Cap-2 Maneuver	-	-	-	-	33	-
Stage 1	-	-	-	-	115	-
Stage 2	-	-	-	-	595	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	80
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	336	-	-	-	59
HCM Lane V/C Ratio	0.014	-	-	-	0.193
HCM Control Delay (s)	15.9	-	-	-	80
HCM Lane LOS	C	-	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	0.6

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	15	57	1000	31	24	406
Future Volume (vph)	15	57	1000	31	24	406
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	11.0	11.0	14.0	14.0	5.0	14.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5
Total Split (s)	24.0	24.0	54.0	54.0	12.0	66.0
Total Split (%)	26.7%	26.7%	60.0%	60.0%	13.3%	73.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min
Act Effct Green (s)	12.0	12.0	38.3	38.3	6.8	41.8
Actuated g/C Ratio	0.23	0.23	0.73	0.73	0.13	0.80
v/c Ratio	0.04	0.16	0.45	0.03	0.12	0.12
Control Delay	24.4	9.3	7.7	3.0	28.4	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.4	9.3	7.7	3.0	28.4	2.8
LOS	C	A	A	A	C	A
Approach Delay	12.5		7.5			4.2
Approach LOS	B		A			A

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 52.2	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.45	
Intersection Signal Delay: 6.8	Intersection LOS: A
Intersection Capacity Utilization 44.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: S. Chambers Rd. & S. Red Sky Dr.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	15	57	1000	31	24	406
Future Volume (veh/h)	15	57	1000	31	24	406
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	67	1176	36	28	478
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	280	249	1857	828	58	3324
Arrive On Green	0.16	0.16	0.52	0.52	0.03	0.65
Sat Flow, veh/h	1781	1585	3647	1585	1781	5274
Grp Volume(v), veh/h	18	67	1176	36	28	478
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1585	1781	1702
Q Serve(g_s), s	0.4	1.7	11.1	0.5	0.7	1.7
Cycle Q Clear(g_c), s	0.4	1.7	11.1	0.5	0.7	1.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	280	249	1857	828	58	3324
V/C Ratio(X)	0.06	0.27	0.63	0.04	0.48	0.14
Avail Cap(c_a), veh/h	741	659	3751	1673	285	6697
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.8	17.4	8.0	5.5	22.3	3.2
Incr Delay (d2), s/veh	0.1	0.6	0.4	0.0	6.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.6	3.0	0.1	0.4	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.9	18.0	8.4	5.5	28.4	3.2
LnGrp LOS	B	B	A	A	C	A
Approach Vol, veh/h	85		1212			506
Approach Delay, s/veh	17.7		8.3			4.6
Approach LOS	B		A			A

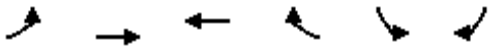
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	6.0	29.0			35.0	11.9
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	7.5	49.5			61.5	19.5
Max Q Clear Time (g_c+I1), s	2.7	13.1			3.7	3.7
Green Ext Time (p_c), s	0.0	11.4			3.7	0.2

Intersection Summary	
HCM 6th Ctrl Delay	7.7
HCM 6th LOS	A

Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Configurations					
Traffic Volume (vph)	4	810	1586	7	5
Future Volume (vph)	4	810	1586	7	5
Turn Type	Prot	NA	NA	Perm	Prot
Protected Phases	7	4	8		6
Permitted Phases				8	
Detector Phase	7	4	8	8	6
Switch Phase					
Minimum Initial (s)	5.0	14.0	14.0	14.0	11.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5
Total Split (s)	9.5	67.5	58.0	58.0	22.5
Total Split (%)	10.6%	75.0%	64.4%	64.4%	25.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes		Yes	Yes	
Recall Mode	None	None	None	None	Min
Act Effct Green (s)	5.2	42.8	41.4	41.4	11.4
Actuated g/C Ratio	0.08	0.67	0.65	0.65	0.18
v/c Ratio	0.03	0.39	0.78	0.01	0.04
Control Delay	33.8	4.7	11.0	4.3	28.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	33.8	4.7	11.0	4.3	28.1
LOS	C	A	B	A	C
Approach Delay		4.9	11.0		28.1
Approach LOS		A	B		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 63.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 9.0	Intersection LOS: A
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: E. Hess Rd & Firefly Ln



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	810	1586	7	5	5
Future Volume (veh/h)	4	810	1586	7	5	5
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	5	920	1802	8	6	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	12	2511	2252	1005	126	126
Arrive On Green	0.01	0.71	0.63	0.63	0.16	0.16
Sat Flow, veh/h	1781	3647	3647	1585	780	780
Grp Volume(v), veh/h	5	920	1802	8	13	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1691	0
Q Serve(g_s), s	0.2	7.0	25.7	0.1	0.4	0.0
Cycle Q Clear(g_c), s	0.2	7.0	25.7	0.1	0.4	0.0
Prop In Lane	1.00			1.00	0.46	0.46
Lane Grp Cap(c), veh/h	12	2511	2252	1005	273	0
V/C Ratio(X)	0.42	0.37	0.80	0.01	0.05	0.00
Avail Cap(c_a), veh/h	131	3286	2790	1244	447	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.7	4.0	9.3	4.6	24.1	0.0
Incr Delay (d2), s/veh	22.3	0.1	1.4	0.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.3	6.6	0.0	0.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	56.0	4.0	10.7	4.6	24.2	0.0
LnGrp LOS	E	A	B	A	C	A
Approach Vol, veh/h		925	1810		13	
Approach Delay, s/veh		4.3	10.6		24.2	
Approach LOS		A	B		C	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	52.6	15.5	5.0	47.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	63.0	18.0	5.0	53.5
Max Q Clear Time (g_c+I1), s	9.0	2.4	2.2	27.7
Green Ext Time (p_c), s	7.2	0.0	0.0	15.5

Intersection Summary	
HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	18	29	388	29	62	1010
Future Volume (vph)	18	29	388	29	62	1010
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	11.0	11.0	14.0	14.0	5.0	14.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5
Total Split (s)	26.0	26.0	41.0	41.0	23.0	64.0
Total Split (%)	28.9%	28.9%	45.6%	45.6%	25.6%	71.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min
Act Effct Green (s)	11.4	11.4	23.6	23.6	7.2	31.8
Actuated g/C Ratio	0.30	0.30	0.62	0.62	0.19	0.83
v/c Ratio	0.04	0.06	0.18	0.03	0.19	0.25
Control Delay	13.3	7.2	8.9	5.8	16.6	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	7.2	8.9	5.8	16.6	3.0
LOS	B	A	A	A	B	A
Approach Delay	9.6		8.7			3.8
Approach LOS	A		A			A

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 38.3	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.25	
Intersection Signal Delay: 5.3	Intersection LOS: A
Intersection Capacity Utilization 36.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: S. Chambers Rd. & S. Red Sky Dr.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	18	29	388	29	62	1010
Future Volume (veh/h)	18	29	388	29	62	1010
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	19	30	400	30	64	1041
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	214	190	1471	656	119	3134
Arrive On Green	0.12	0.12	0.41	0.41	0.07	0.61
Sat Flow, veh/h	1781	1585	3647	1585	1781	5274
Grp Volume(v), veh/h	19	30	400	30	64	1041
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1585	1781	1702
Q Serve(g_s), s	0.3	0.6	2.5	0.4	1.2	3.3
Cycle Q Clear(g_c), s	0.3	0.6	2.5	0.4	1.2	3.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	214	190	1471	656	119	3134
V/C Ratio(X)	0.09	0.16	0.27	0.05	0.54	0.33
Avail Cap(c_a), veh/h	1132	1008	3836	1711	974	8984
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.2	13.3	6.5	5.9	15.3	3.2
Incr Delay (d2), s/veh	0.2	0.4	0.1	0.0	3.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.2	0.6	0.1	0.5	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.4	13.7	6.6	5.9	19.0	3.2
LnGrp LOS	B	B	A	A	B	A
Approach Vol, veh/h	49		430			1105
Approach Delay, s/veh	13.6		6.6			4.1
Approach LOS	B		A			A

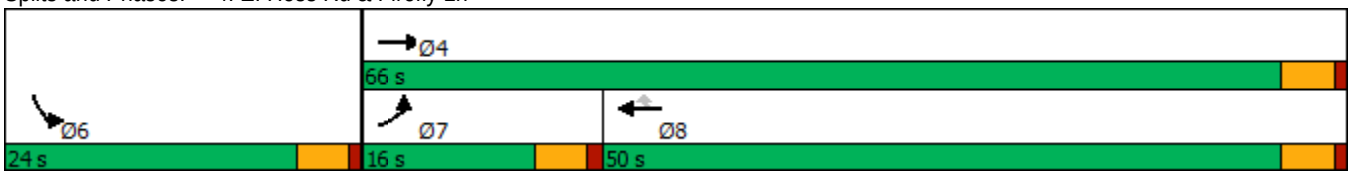
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	6.8	18.5			25.3	8.6
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	18.5	36.5			59.5	21.5
Max Q Clear Time (g_c+I1), s	3.2	4.5			5.3	2.6
Green Ext Time (p_c), s	0.1	2.9			9.8	0.1

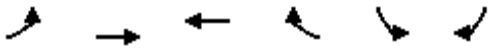
Intersection Summary	
HCM 6th Ctrl Delay	5.1
HCM 6th LOS	A

Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Configurations					
Traffic Volume (vph)	5	1550	753	12	7
Future Volume (vph)	5	1550	753	12	7
Turn Type	Prot	NA	NA	Perm	Prot
Protected Phases	7	4	8		6
Permitted Phases				8	
Detector Phase	7	4	8	8	6
Switch Phase					
Minimum Initial (s)	11.0	14.0	14.0	14.0	11.0
Minimum Split (s)	15.5	22.5	22.5	22.5	22.5
Total Split (s)	16.0	66.0	50.0	50.0	24.0
Total Split (%)	17.8%	73.3%	55.6%	55.6%	26.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes		Yes	Yes	
Recall Mode	None	None	None	None	Min
Act Effct Green (s)	11.2	35.1	32.6	32.6	11.2
Actuated g/C Ratio	0.20	0.63	0.59	0.59	0.20
v/c Ratio	0.01	0.73	0.38	0.01	0.02
Control Delay	22.4	8.9	7.6	6.8	22.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	8.9	7.6	6.8	22.4
LOS	C	A	A	A	C
Approach Delay		8.9	7.5		22.4
Approach LOS		A	A		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 55.5	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 8.5	Intersection LOS: A
Intersection Capacity Utilization 59.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: E. Hess Rd & Firefly Ln





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	1550	753	12	7	1
Future Volume (veh/h)	5	1550	753	12	7	1
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	5	1632	793	13	7	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	26	2287	1950	870	269	38
Arrive On Green	0.01	0.64	0.55	0.55	0.20	0.20
Sat Flow, veh/h	1781	3647	3647	1585	1374	196
Grp Volume(v), veh/h	5	1632	793	13	9	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1766	0
Q Serve(g_s), s	0.2	17.0	7.3	0.2	0.2	0.0
Cycle Q Clear(g_c), s	0.2	17.0	7.3	0.2	0.2	0.0
Prop In Lane	1.00			1.00	0.78	0.11
Lane Grp Cap(c), veh/h	26	2287	1950	870	346	0
V/C Ratio(X)	0.19	0.71	0.41	0.01	0.03	0.00
Avail Cap(c_a), veh/h	365	3894	2881	1285	614	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	27.3	6.6	7.4	5.8	18.2	0.0
Incr Delay (d2), s/veh	3.5	0.4	0.1	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	3.1	1.8	0.0	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	30.8	7.0	7.5	5.8	18.3	0.0
LnGrp LOS	C	A	A	A	B	A
Approach Vol, veh/h		1637	806		9	
Approach Delay, s/veh		7.1	7.5		18.3	
Approach LOS		A	A		B	

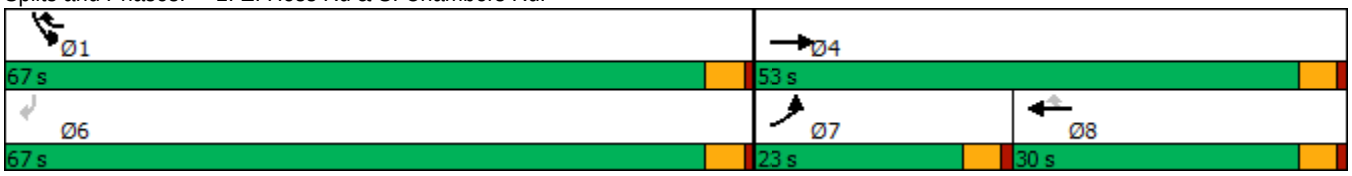
Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	40.6	15.5	5.3	35.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	61.5	19.5	11.5	45.5
Max Q Clear Time (g_c+I1), s	19.0	2.2	2.2	9.3
Green Ext Time (p_c), s	17.1	0.0	0.0	5.7

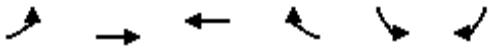
Intersection Summary	
HCM 6th Ctrl Delay	7.3
HCM 6th LOS	A

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	547	362	398	1012	5
Future Volume (vph)	21	547	362	398	1012	5
Turn Type	Prot	NA	NA	pm+ov	Prot	Perm
Protected Phases	7	4	8	1	1	
Permitted Phases				8		6
Detector Phase	7	4	8	1	1	6
Switch Phase						
Minimum Initial (s)	11.0	15.0	15.0	11.0	11.0	4.0
Minimum Split (s)	22.5	20.5	20.5	15.5	15.5	20.0
Total Split (s)	23.0	53.0	30.0	67.0	67.0	67.0
Total Split (%)	19.2%	44.2%	25.0%	55.8%	55.8%	55.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	12.0	21.5	16.9	51.7	26.3	26.3
Actuated g/C Ratio	0.21	0.37	0.29	0.90	0.46	0.46
v/c Ratio	0.06	0.44	0.37	0.29	0.68	0.01
Control Delay	27.8	15.4	21.5	0.8	15.4	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.8	15.4	21.5	0.8	15.4	7.0
LOS	C	B	C	A	B	A
Approach Delay		15.9	10.7		15.4	
Approach LOS		B	B		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 57.6	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 14.0	Intersection LOS: B
Intersection Capacity Utilization 53.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: E. Hess Rd & S. Chambers Rd.





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	21	547	362	398	1012	5
Future Volume (veh/h)	21	547	362	398	1012	5
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	576	381	419	1065	5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	103	1534	1023	1083	1367	627
Arrive On Green	0.06	0.43	0.29	0.29	0.40	0.40
Sat Flow, veh/h	1781	3647	3647	1585	3456	1585
Grp Volume(v), veh/h	22	576	381	419	1065	5
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1728	1585
Q Serve(g_s), s	0.6	5.7	4.5	5.9	14.0	0.1
Cycle Q Clear(g_c), s	0.6	5.7	4.5	5.9	14.0	0.1
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	103	1534	1023	1083	1367	627
V/C Ratio(X)	0.21	0.38	0.37	0.39	0.78	0.01
Avail Cap(c_a), veh/h	632	3308	1739	1403	4145	1901
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.4	10.0	14.8	3.6	13.8	9.6
Incr Delay (d2), s/veh	1.0	0.2	0.2	0.2	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.6	1.5	0.1	4.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	24.5	10.2	15.0	3.8	14.8	9.6
LnGrp LOS	C	B	B	A	B	A
Approach Vol, veh/h		598	800		1070	
Approach Delay, s/veh		10.7	9.1		14.7	
Approach LOS		B	A		B	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	27.0	25.1	7.5	19.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	48.5	62.5	18.5	25.5
Max Q Clear Time (g_c+I1), s	7.7	16.0	2.6	7.9
Green Ext Time (p_c), s	3.9	4.6	0.0	3.5

Intersection Summary	
HCM 6th Ctrl Delay	11.9
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	18	29	388	29	62	1010
Future Vol, veh/h	18	29	388	29	62	1010
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	135	-	0	400	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	30	400	30	64	1041

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	944	200	0	0	430	0
Stage 1	400	-	-	-	-	-
Stage 2	544	-	-	-	-	-
Critical Hdwy	6.29	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.67	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	294	808	-	-	1126	-
Stage 1	624	-	-	-	-	-
Stage 2	513	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	277	808	-	-	1126	-
Mov Cap-2 Maneuver	277	-	-	-	-	-
Stage 1	624	-	-	-	-	-
Stage 2	484	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.2	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	277	808	1126	-
HCM Lane V/C Ratio	-	-	0.067	0.037	0.057	-
HCM Control Delay (s)	-	-	18.9	9.6	8.4	-
HCM Lane LOS	-	-	C	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.2	-

DELAY (CONTROL)

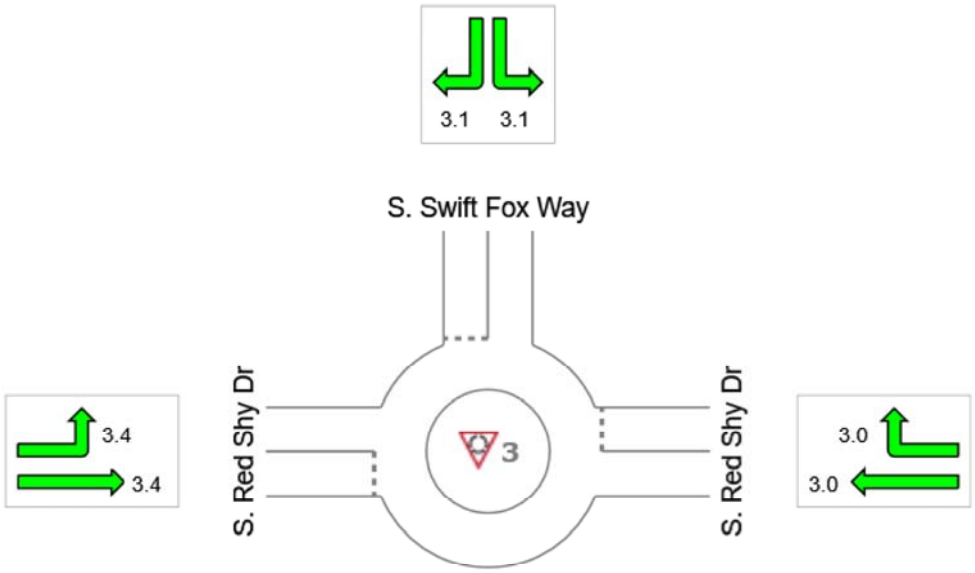
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 3 [2021Background_PM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches			Intersection
	East	North	West	
Delay (Control)	3.0	3.1	3.4	3.3
LOS	A	A	A	A



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	1550	753	12	7	0
Future Vol, veh/h	5	1550	753	12	7	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	215	-	-	215	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	1632	793	13	7	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	806	0	-	0	1619	397
Stage 1	-	-	-	-	793	-
Stage 2	-	-	-	-	826	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	814	-	-	-	94	602
Stage 1	-	-	-	-	406	-
Stage 2	-	-	-	-	390	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	814	-	-	-	93	602
Mov Cap-2 Maneuver	-	-	-	-	93	-
Stage 1	-	-	-	-	404	-
Stage 2	-	-	-	-	390	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	47
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	814	-	-	-	93
HCM Lane V/C Ratio	0.006	-	-	-	0.079
HCM Control Delay (s)	9.5	-	-	-	47
HCM Lane LOS	A	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	265	139	1000	95	56	406
Future Volume (vph)	265	139	1000	95	56	406
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	11.0	11.0	14.0	14.0	5.0	14.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5
Total Split (s)	31.0	31.0	45.6	45.6	13.4	59.0
Total Split (%)	34.4%	34.4%	50.7%	50.7%	14.9%	65.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min
Act Effct Green (s)	19.0	19.0	32.8	32.8	8.0	42.0
Actuated g/C Ratio	0.27	0.27	0.46	0.46	0.11	0.59
v/c Ratio	0.66	0.30	0.72	0.14	0.33	0.16
Control Delay	33.5	6.1	19.5	3.5	40.0	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.5	6.1	19.5	3.5	40.0	6.5
LOS	C	A	B	A	D	A
Approach Delay	24.0		18.1			10.6
Approach LOS	C		B			B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 70.9	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 17.6	Intersection LOS: B
Intersection Capacity Utilization 57.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: S. Chambers Rd. & S. Red Sky Dr.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	265	139	1000	95	56	406
Future Volume (veh/h)	265	139	1000	95	56	406
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	312	164	1176	112	66	478
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	400	356	1695	756	102	3139
Arrive On Green	0.22	0.22	0.48	0.48	0.06	0.61
Sat Flow, veh/h	1781	1585	3647	1585	1781	5274
Grp Volume(v), veh/h	312	164	1176	112	66	478
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1585	1781	1702
Q Serve(g_s), s	9.2	5.0	14.5	2.2	2.0	2.2
Cycle Q Clear(g_c), s	9.2	5.0	14.5	2.2	2.0	2.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	400	356	1695	756	102	3139
V/C Ratio(X)	0.78	0.46	0.69	0.15	0.65	0.15
Avail Cap(c_a), veh/h	843	750	2607	1163	283	4968
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.4	18.8	11.4	8.2	25.8	4.6
Incr Delay (d2), s/veh	3.3	0.9	0.5	0.1	6.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	1.8	4.7	0.7	1.0	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.7	19.7	12.0	8.3	32.5	4.6
LnGrp LOS	C	B	B	A	C	A
Approach Vol, veh/h	476		1288			544
Approach Delay, s/veh	22.4		11.6			8.0
Approach LOS	C		B			A

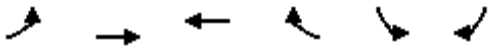
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.7	31.2			38.9	17.1
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	8.9	41.1			54.5	26.5
Max Q Clear Time (g_c+I1), s	4.0	16.5			4.2	11.2
Green Ext Time (p_c), s	0.0	10.2			3.7	1.4

Intersection Summary	
HCM 6th Ctrl Delay	13.0
HCM 6th LOS	B

Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Configurations					
Traffic Volume (vph)	4	869	1690	7	5
Future Volume (vph)	4	869	1690	7	5
Turn Type	Prot	NA	NA	Perm	Prot
Protected Phases	7	4	8		6
Permitted Phases				8	
Detector Phase	7	4	8	8	6
Switch Phase					
Minimum Initial (s)	5.0	14.0	14.0	14.0	11.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5
Total Split (s)	9.5	67.5	58.0	58.0	22.5
Total Split (%)	10.6%	75.0%	64.4%	64.4%	25.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes		Yes	Yes	
Recall Mode	None	None	None	None	Min
Act Effct Green (s)	5.1	48.2	46.6	46.6	11.2
Actuated g/C Ratio	0.07	0.70	0.68	0.68	0.16
v/c Ratio	0.04	0.40	0.80	0.01	0.04
Control Delay	35.2	4.5	11.3	4.1	29.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	35.2	4.5	11.3	4.1	29.5
LOS	D	A	B	A	C
Approach Delay		4.7	11.3		29.5
Approach LOS		A	B		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 68.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 9.1	Intersection LOS: A
Intersection Capacity Utilization 63.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: E. Hess Rd & Firefly Ln



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	869	1690	7	5	5
Future Volume (veh/h)	4	869	1690	7	5	5
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	5	988	1920	8	6	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	12	2558	2311	1031	120	120
Arrive On Green	0.01	0.72	0.65	0.65	0.15	0.15
Sat Flow, veh/h	1781	3647	3647	1585	780	780
Grp Volume(v), veh/h	5	988	1920	8	13	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1691	0
Q Serve(g_s), s	0.2	7.7	29.3	0.1	0.5	0.0
Cycle Q Clear(g_c), s	0.2	7.7	29.3	0.1	0.5	0.0
Prop In Lane	1.00			1.00	0.46	0.46
Lane Grp Cap(c), veh/h	12	2558	2311	1031	261	0
V/C Ratio(X)	0.42	0.39	0.83	0.01	0.05	0.00
Avail Cap(c_a), veh/h	125	3136	2663	1188	426	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.3	3.9	9.5	4.4	25.7	0.0
Incr Delay (d2), s/veh	22.4	0.1	2.1	0.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.4	7.7	0.0	0.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	57.7	4.0	11.6	4.4	25.8	0.0
LnGrp LOS	E	A	B	A	C	A
Approach Vol, veh/h		993	1928		13	
Approach Delay, s/veh		4.2	11.6		25.8	
Approach LOS		A	B		C	

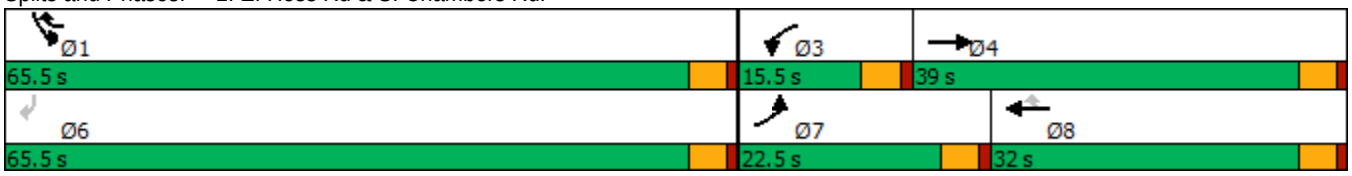
Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			55.9		15.5	5.0	50.9
Change Period (Y+Rc), s			4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s			63.0		18.0	5.0	53.5
Max Q Clear Time (g_c+I1), s			9.7		2.5	2.2	31.3
Green Ext Time (p_c), s			7.9		0.0	0.0	15.1

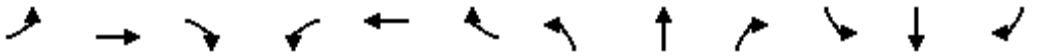
Intersection Summary		
HCM 6th Ctrl Delay		9.2
HCM 6th LOS		A

Lane Group	EBL	EBT	WBL	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	54	411	20	620	1046	439	25
Future Volume (vph)	54	411	20	620	1046	439	25
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	Perm
Protected Phases	7	4	3	8	1	1	
Permitted Phases					8		6
Detector Phase	7	4	3	8	1	1	6
Switch Phase							
Minimum Initial (s)	11.0	15.0	11.0	15.0	15.0	15.0	4.0
Minimum Split (s)	22.5	20.5	15.5	20.5	19.5	19.5	20.0
Total Split (s)	22.5	39.0	15.5	32.0	65.5	65.5	65.5
Total Split (%)	18.8%	32.5%	12.9%	26.7%	54.6%	54.6%	54.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			
Recall Mode	None	None	None	None	None	None	None
Act Effct Green (s)	13.1	25.2	12.9	21.6	56.0	26.0	26.0
Actuated g/C Ratio	0.20	0.38	0.19	0.33	0.84	0.39	0.39
v/c Ratio	0.17	0.33	0.06	0.58	0.79	0.35	0.04
Control Delay	35.1	20.3	36.9	25.6	7.1	15.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.1	20.3	36.9	25.6	7.1	15.5	0.1
LOS	D	C	D	C	A	B	A
Approach Delay		22.0		14.3			
Approach LOS		C		B			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 66.3	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 15.7	Intersection LOS: B
Intersection Capacity Utilization 81.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: E. Hess Rd & S. Chambers Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	411	0	20	620	1046	0	0	0	439	0	25
Future Volume (veh/h)	54	411	0	20	620	1046	0	0	0	439	0	25
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1870	1870	0	1870	1870	1870				1870	0	1870
Adj Flow Rate, veh/h	59	447	0	22	674	1137				477	0	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	2	2	2				2	0	2
Cap, veh/h	200	1750	0	99	1549	1068				822	0	377
Arrive On Green	0.11	0.49	0.00	0.06	0.44	0.44				0.24	0.00	0.24
Sat Flow, veh/h	1781	3647	0	1781	3554	1585				3456	0	1585
Grp Volume(v), veh/h	59	447	0	22	674	1137				477	0	27
Grp Sat Flow(s),veh/h/ln	1781	1777	0	1781	1777	1585				1728	0	1585
Q Serve(g_s), s	1.9	4.6	0.0	0.7	8.3	27.5				7.7	0.0	0.8
Cycle Q Clear(g_c), s	1.9	4.6	0.0	0.7	8.3	27.5				7.7	0.0	0.8
Prop In Lane	1.00		0.00	1.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	200	1750	0	99	1549	1068				822	0	377
V/C Ratio(X)	0.29	0.26	0.00	0.22	0.44	1.06				0.58	0.00	0.07
Avail Cap(c_a), veh/h	508	1943	0	311	1549	1068				3341	0	1533
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	25.7	9.3	0.0	28.5	12.4	10.3				21.3	0.0	18.6
Incr Delay (d2), s/veh	0.8	0.1	0.0	1.1	0.2	46.5				0.7	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	1.4	0.0	0.3	2.7	20.9				2.8	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.5	9.4	0.0	29.6	12.6	56.8				21.9	0.0	18.7
LnGrp LOS	C	A	A	C	B	F				C	A	B
Approach Vol, veh/h		506			1833						504	
Approach Delay, s/veh		11.4			40.2						21.7	
Approach LOS		B			D						C	

Timer - Assigned Phs			3	4		6	7	8				
Phs Duration (G+Y+Rc), s			8.0	35.6		19.5	11.6	32.0				
Change Period (Y+Rc), s			4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s			11.0	34.5		61.0	18.0	27.5				
Max Q Clear Time (g_c+I1), s			2.7	6.6		9.7	3.9	29.5				
Green Ext Time (p_c), s			0.0	2.8		1.8	0.1	0.0				

Intersection Summary												
HCM 6th Ctrl Delay			31.8									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	3.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	59	77	1000	95	56	406
Future Vol, veh/h	59	77	1000	95	56	406
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	135	-	0	400	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	69	91	1176	112	66	478

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1499	588	0	0	1288	0
Stage 1	1176	-	-	-	-	-
Stage 2	323	-	-	-	-	-
Critical Hdwy	6.29	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.67	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	139	452	-	-	534	-
Stage 1	250	-	-	-	-	-
Stage 2	670	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	122	452	-	-	534	-
Mov Cap-2 Maneuver	122	-	-	-	-	-
Stage 1	250	-	-	-	-	-
Stage 2	587	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	37.9	0	1.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	122	452	534	-
HCM Lane V/C Ratio	-	-	0.569	0.2	0.123	-
HCM Control Delay (s)	-	-	67.8	15	12.7	-
HCM Lane LOS	-	-	F	C	B	-
HCM 95th %tile Q(veh)	-	-	2.8	0.7	0.4	-

DELAY (CONTROL)

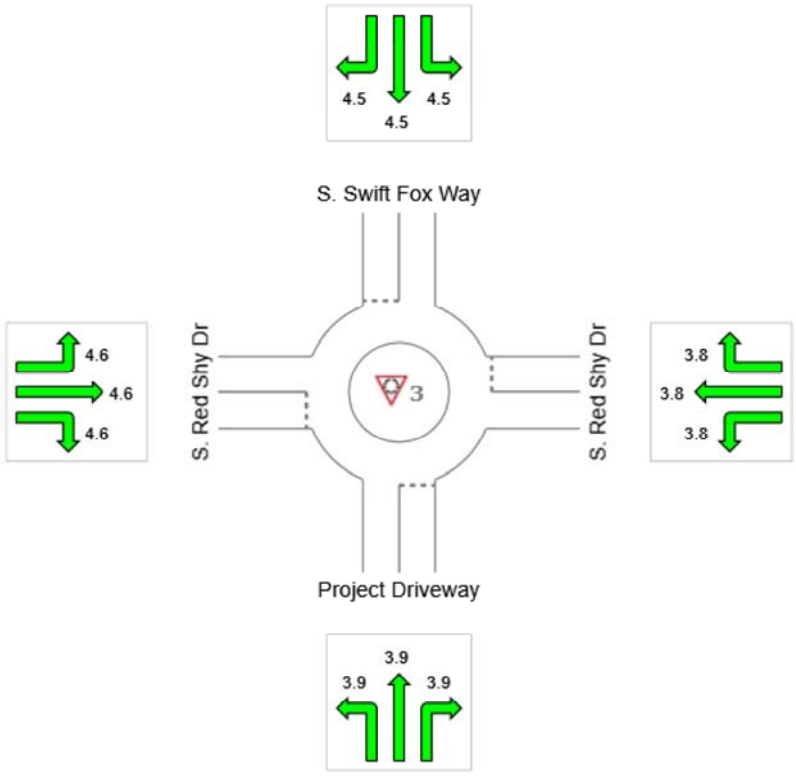
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 3 [2021+Project_AM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	3.9	3.8	4.5	4.6	4.4
LOS	A	A	A	A	A



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	869	1690	7	5	5
Future Vol, veh/h	4	869	1690	7	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	215	-	-	215	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	988	1920	8	6	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1928	0	-	0	2424	960
Stage 1	-	-	-	-	1920	-
Stage 2	-	-	-	-	504	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	302	-	-	-	27	257
Stage 1	-	-	-	-	101	-
Stage 2	-	-	-	-	572	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	302	-	-	-	27	257
Mov Cap-2 Maneuver	-	-	-	-	27	-
Stage 1	-	-	-	-	99	-
Stage 2	-	-	-	-	572	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	99.4
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	302	-	-	-	49
HCM Lane V/C Ratio	0.015	-	-	-	0.232
HCM Control Delay (s)	17.1	-	-	-	99.4
HCM Lane LOS	C	-	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	0.8

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↱		↱
Traffic Vol, veh/h	0	874	1661	59	0	29
Future Vol, veh/h	0	874	1661	59	0	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	950	1805	64	0	32

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	903
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	-	0	280
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	280
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

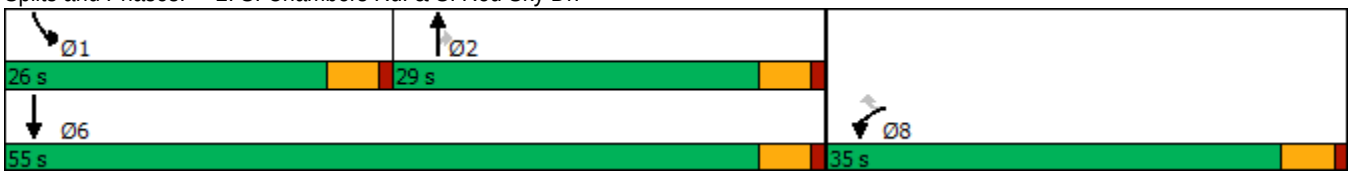
Approach	EB	WB	SB
HCM Control Delay, s	0	0	19.5
HCM LOS			C

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	280
HCM Lane V/C Ratio	-	-	-	0.113
HCM Control Delay (s)	-	-	-	19.5
HCM Lane LOS	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	0.4

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	265	139	388	232	163	1010
Future Volume (vph)	265	139	388	232	163	1010
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	11.0	11.0	14.0	14.0	5.0	14.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5
Total Split (s)	35.0	35.0	29.0	29.0	26.0	55.0
Total Split (%)	38.9%	38.9%	32.2%	32.2%	28.9%	61.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min
Act Effct Green (s)	15.0	15.0	16.1	16.1	11.1	28.3
Actuated g/C Ratio	0.28	0.28	0.30	0.30	0.21	0.53
v/c Ratio	0.54	0.26	0.37	0.37	0.46	0.38
Control Delay	22.7	5.3	18.2	5.1	25.2	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	5.3	18.2	5.1	25.2	7.5
LOS	C	A	B	A	C	A
Approach Delay	16.7		13.3			10.0
Approach LOS	B		B			A

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 52.9	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 12.2	Intersection LOS: B
Intersection Capacity Utilization 46.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: S. Chambers Rd. & S. Red Sky Dr.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	265	139	388	232	163	1010
Future Volume (veh/h)	265	139	388	232	163	1010
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	273	143	400	239	168	1041
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	443	394	1131	504	225	2793
Arrive On Green	0.25	0.25	0.32	0.32	0.13	0.55
Sat Flow, veh/h	1781	1585	3647	1585	1781	5274
Grp Volume(v), veh/h	273	143	400	239	168	1041
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1585	1781	1702
Q Serve(g_s), s	6.0	3.3	3.8	5.3	4.0	5.1
Cycle Q Clear(g_c), s	6.0	3.3	3.8	5.3	4.0	5.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	443	394	1131	504	225	2793
V/C Ratio(X)	0.62	0.36	0.35	0.47	0.75	0.37
Avail Cap(c_a), veh/h	1235	1099	1979	883	870	5861
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.7	13.7	11.5	12.0	18.5	5.7
Incr Delay (d2), s/veh	1.4	0.6	0.2	0.7	4.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	1.0	1.3	1.6	1.8	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.1	14.2	11.7	12.7	23.4	5.8
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	416		639			1209
Approach Delay, s/veh	15.4		12.1			8.2
Approach LOS	B		B			A

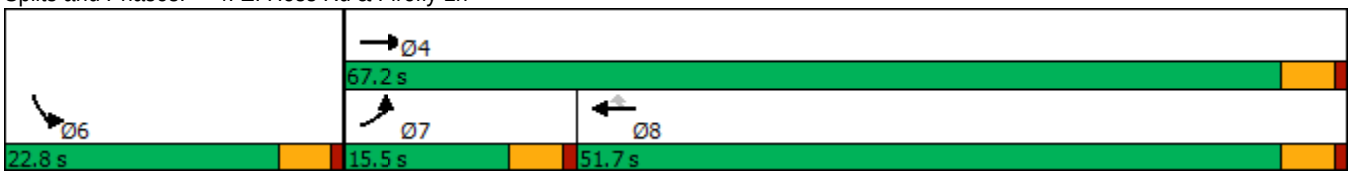
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.1	18.5			28.6	15.4
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	21.5	24.5			50.5	30.5
Max Q Clear Time (g_c+I1), s	6.0	7.3			7.1	8.0
Green Ext Time (p_c), s	0.4	3.2			9.5	1.3

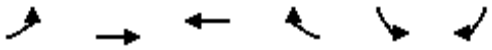
Intersection Summary		
HCM 6th Ctrl Delay		10.6
HCM 6th LOS		B

Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Configurations					
Traffic Volume (vph)	5	1880	1084	12	7
Future Volume (vph)	5	1880	1084	12	7
Turn Type	Prot	NA	NA	Perm	Prot
Protected Phases	7	4	8		6
Permitted Phases				8	
Detector Phase	7	4	8	8	6
Switch Phase					
Minimum Initial (s)	11.0	14.0	14.0	14.0	11.0
Minimum Split (s)	15.5	22.5	22.5	22.5	22.5
Total Split (s)	15.5	67.2	51.7	51.7	22.8
Total Split (%)	17.2%	74.7%	57.4%	57.4%	25.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes		Yes	Yes	
Recall Mode	None	None	None	None	Min
Act Effct Green (s)	11.3	48.9	46.3	46.3	11.3
Actuated g/C Ratio	0.16	0.70	0.67	0.67	0.16
v/c Ratio	0.02	0.79	0.48	0.01	0.03
Control Delay	30.0	9.4	7.2	5.4	30.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	9.4	7.2	5.4	30.1
LOS	C	A	A	A	C
Approach Delay		9.4	7.1		30.1
Approach LOS		A	A		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 69.4	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 8.6	Intersection LOS: A
Intersection Capacity Utilization 68.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: E. Hess Rd & Firefly Ln





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	1880	1084	12	7	1
Future Volume (veh/h)	5	1880	1084	12	7	1
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	5	1979	1141	13	7	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	26	2515	2230	995	221	32
Arrive On Green	0.01	0.71	0.63	0.63	0.16	0.16
Sat Flow, veh/h	1781	3647	3647	1585	1374	196
Grp Volume(v), veh/h	5	1979	1141	13	9	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1766	0
Q Serve(g_s), s	0.2	25.1	12.1	0.2	0.3	0.0
Cycle Q Clear(g_c), s	0.2	25.1	12.1	0.2	0.3	0.0
Prop In Lane	1.00			1.00	0.78	0.11
Lane Grp Cap(c), veh/h	26	2515	2230	995	284	0
V/C Ratio(X)	0.19	0.79	0.51	0.01	0.03	0.00
Avail Cap(c_a), veh/h	286	3255	2450	1093	472	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.3	6.6	7.0	4.8	24.2	0.0
Incr Delay (d2), s/veh	3.5	1.0	0.2	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	4.8	3.0	0.0	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	36.9	7.6	7.2	4.8	24.3	0.0
LnGrp LOS	D	A	A	A	C	A
Approach Vol, veh/h		1984	1154		9	
Approach Delay, s/veh		7.7	7.1		24.3	
Approach LOS		A	A		C	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	53.0	15.5	5.5	47.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	62.7	18.3	11.0	47.2
Max Q Clear Time (g_c+I1), s	27.1	2.3	2.2	14.1
Green Ext Time (p_c), s	21.3	0.0	0.0	9.2

Intersection Summary	
HCM 6th Ctrl Delay	7.5
HCM 6th LOS	A

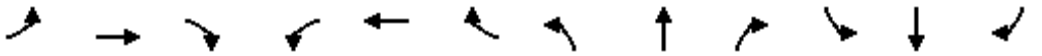
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBT	WBL	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	54	411	110	389	550	1232	32
Future Volume (vph)	54	411	110	389	550	1232	32
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	Perm
Protected Phases	7	4	3	8	1	1	
Permitted Phases					8		6
Detector Phase	7	4	3	8	1	1	6
Switch Phase							
Minimum Initial (s)	11.0	15.0	11.0	15.0	11.0	11.0	4.0
Minimum Split (s)	22.5	20.5	15.5	20.5	15.5	15.5	20.0
Total Split (s)	23.0	29.0	21.0	27.0	70.0	70.0	70.0
Total Split (%)	19.2%	24.2%	17.5%	22.5%	58.3%	58.3%	58.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			
Recall Mode	None	None	None	None	None	None	None
Act Effct Green (s)	11.7	17.9	12.7	23.0	70.6	41.7	41.7
Actuated g/C Ratio	0.14	0.21	0.15	0.27	0.82	0.48	0.48
v/c Ratio	0.24	0.59	0.45	0.43	0.41	0.78	0.04
Control Delay	42.7	36.8	44.1	31.8	1.1	22.3	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	36.8	44.1	31.8	1.1	22.3	1.6
LOS	D	D	D	C	A	C	A
Approach Delay		37.5		17.0			
Approach LOS		D		B			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 86.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 22.6	Intersection LOS: C
Intersection Capacity Utilization 67.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: E. Hess Rd & S. Chambers Rd.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	411	0	110	389	550	0	0	0	1232	0	32
Future Volume (veh/h)	54	411	0	110	389	550	0	0	0	1232	0	32
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1870	1870	0	1870	1870	1870				1870	0	1870
Adj Flow Rate, veh/h	57	433	0	116	409	579				1297	0	34
Peak Hour Factor	0.95	0.95	0.92	0.95	0.95	0.95				0.95	0.92	0.95
Percent Heavy Veh, %	2	2	0	2	2	2				2	0	2
Cap, veh/h	188	766	0	252	893	1110				1552	0	712
Arrive On Green	0.11	0.22	0.00	0.14	0.25	0.25				0.45	0.00	0.45
Sat Flow, veh/h	1781	3647	0	1781	3554	1585				3456	0	1585
Grp Volume(v), veh/h	57	433	0	116	409	579				1297	0	34
Grp Sat Flow(s),veh/h/ln	1781	1777	0	1781	1777	1585				1728	0	1585
Q Serve(g_s), s	2.1	7.6	0.0	4.2	6.8	12.0				23.0	0.0	0.8
Cycle Q Clear(g_c), s	2.1	7.6	0.0	4.2	6.8	12.0				23.0	0.0	0.8
Prop In Lane	1.00		0.00	1.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	188	766	0	252	893	1110				1552	0	712
V/C Ratio(X)	0.30	0.57	0.00	0.46	0.46	0.52				0.84	0.00	0.05
Avail Cap(c_a), veh/h	474	1252	0	422	1149	1224				3254	0	1492
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	28.7	24.4	0.0	27.4	22.0	4.9				16.9	0.0	10.8
Incr Delay (d2), s/veh	0.9	0.7	0.0	1.3	0.4	0.4				1.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	2.9	0.0	1.7	2.6	2.1				7.6	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.6	25.0	0.0	28.7	22.4	5.3				18.2	0.0	10.8
LnGrp LOS	C	C	A	C	C	A				B	A	B
Approach Vol, veh/h		490			1104						1331	
Approach Delay, s/veh		25.6			14.1						18.0	
Approach LOS		C			B						B	

Timer - Assigned Phs			3	4		6	7	8				
Phs Duration (G+Y+Rc), s			14.3	19.5		35.7	11.8	22.0				
Change Period (Y+Rc), s			4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s			16.5	24.5		65.5	18.5	22.5				
Max Q Clear Time (g_c+I1), s			6.2	9.6		25.0	4.1	14.0				
Green Ext Time (p_c), s			0.2	2.2		6.2	0.1	3.1				

Intersection Summary												
HCM 6th Ctrl Delay			17.8									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	37

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	265	139	388	232	163	1010
Future Vol, veh/h	265	139	388	232	163	1010
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	135	-	0	400	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	273	143	400	239	168	1041

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1152	200	0	0	639	0
Stage 1	400	-	-	-	-	-
Stage 2	752	-	-	-	-	-
Critical Hdwy	6.29	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.67	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	~ 223	808	-	-	941	-
Stage 1	624	-	-	-	-	-
Stage 2	398	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 183	808	-	-	941	-
Mov Cap-2 Maneuver	~ 183	-	-	-	-	-
Stage 1	624	-	-	-	-	-
Stage 2	327	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	197.3	0	1.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	183	808	941	-
HCM Lane V/C Ratio	-	-	1.493	0.177	0.179	-
HCM Control Delay (s)	-	-	295.3	10.4	9.7	-
HCM Lane LOS	-	-	F	B	A	-
HCM 95th %tile Q(veh)	-	-	17.2	0.6	0.6	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

DELAY (CONTROL)

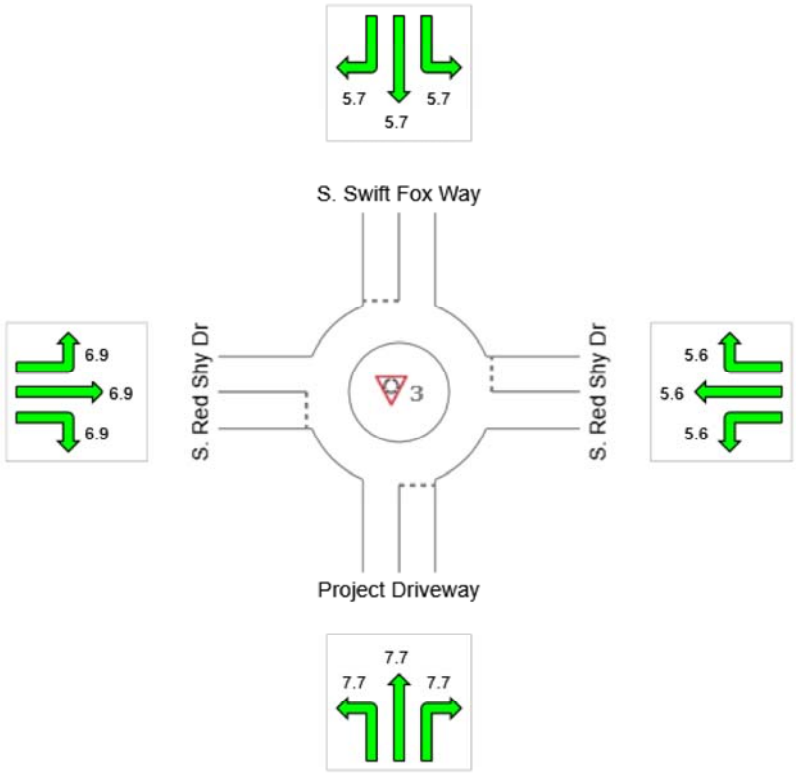
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 3 [2021+Project_PM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	7.7	5.6	5.7	6.9	7.1
LOS	A	A	A	A	A



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	1880	1084	12	7	0
Future Vol, veh/h	5	1880	1084	12	7	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	215	-	-	215	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	1979	1141	13	7	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1154	0	-	0	2141	571
Stage 1	-	-	-	-	1141	-
Stage 2	-	-	-	-	1000	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	601	-	-	-	42	464
Stage 1	-	-	-	-	267	-
Stage 2	-	-	-	-	317	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	601	-	-	-	42	464
Mov Cap-2 Maneuver	-	-	-	-	42	-
Stage 1	-	-	-	-	265	-
Stage 2	-	-	-	-	317	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	108.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	601	-	-	-	42
HCM Lane V/C Ratio	0.009	-	-	-	0.175
HCM Control Delay (s)	11	-	-	-	108.1
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	0.6

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↱		↱
Traffic Vol, veh/h	0	1885	912	178	0	82
Future Vol, veh/h	0	1885	912	178	0	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2049	991	193	0	89

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	496
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	-	0	519
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	519
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

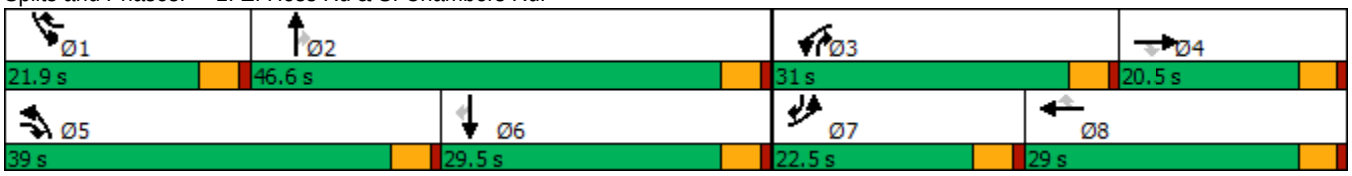
Approach	EB	WB	SB
HCM Control Delay, s	0	0	13.4
HCM LOS			B

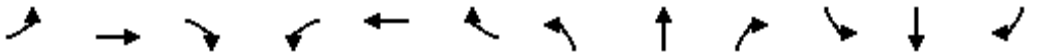
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	519
HCM Lane V/C Ratio	-	-	-	0.172
HCM Control Delay (s)	-	-	-	13.4
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	385	490	610	490	610	800	1685	910	240	765	90
Future Volume (vph)	190	385	490	610	490	610	800	1685	910	240	765	90
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	11.0	14.0	11.0	11.0	14.0	11.0	11.0	14.0	11.0	11.0	14.0	11.0
Minimum Split (s)	22.5	20.5	15.5	15.5	20.5	15.5	15.5	22.5	15.5	15.5	20.0	22.5
Total Split (s)	22.5	20.5	39.0	31.0	29.0	21.9	39.0	46.6	31.0	21.9	29.5	22.5
Total Split (%)	18.8%	17.1%	32.5%	25.8%	24.2%	18.3%	32.5%	38.8%	25.8%	18.3%	24.6%	18.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	None	None
Act Effct Green (s)	12.9	15.9	54.0	26.5	29.5	51.4	33.6	42.1	73.1	17.4	25.9	43.3
Actuated g/C Ratio	0.11	0.13	0.45	0.22	0.25	0.43	0.28	0.35	0.61	0.15	0.22	0.36
v/c Ratio	0.56	0.89	0.70	0.87	0.61	0.90	0.91	1.03	1.00	0.53	0.76	0.15
Control Delay	56.7	73.2	26.8	58.9	44.1	45.2	55.5	67.0	51.9	51.7	49.4	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.7	73.2	26.8	58.9	44.1	45.2	55.5	67.0	51.9	51.7	49.4	2.0
LOS	E	E	C	E	D	D	E	E	D	D	D	A
Approach Delay		48.9			49.8			60.2			46.0	
Approach LOS		D			D			E			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.9	
Natural Cycle: 125	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 54.0	Intersection LOS: D
Intersection Capacity Utilization 90.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: E. Hess Rd & S. Chambers Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	385	490	610	490	610	800	1685	910	240	765	90
Future Volume (veh/h)	190	385	490	610	490	610	800	1685	910	240	765	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	207	418	533	663	533	663	870	1832	989	261	832	98
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	343	513	668	739	920	568	958	1941	941	343	1032	477
Arrive On Green	0.10	0.14	0.14	0.21	0.26	0.26	0.28	0.38	0.38	0.10	0.20	0.20
Sat Flow, veh/h	3456	3554	1585	3456	3554	1585	3456	5106	1585	3456	5106	1585
Grp Volume(v), veh/h	207	418	533	663	533	663	870	1832	989	261	832	98
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1777	1585	1728	1702	1585	1728	1702	1585
Q Serve(g_s), s	6.4	12.6	16.0	20.7	14.5	28.7	26.9	38.4	42.1	8.2	17.2	5.1
Cycle Q Clear(g_c), s	6.4	12.6	16.0	20.7	14.5	28.7	26.9	38.4	42.1	8.2	17.2	5.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	343	513	668	739	920	568	958	1941	941	343	1032	477
V/C Ratio(X)	0.60	0.81	0.80	0.90	0.58	1.17	0.91	0.94	1.05	0.76	0.81	0.21
Avail Cap(c_a), veh/h	562	513	668	827	920	568	1076	1941	941	543	1152	515
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.8	45.9	27.9	42.4	35.8	35.5	38.7	33.2	22.5	48.6	42.1	28.8
Incr Delay (d2), s/veh	1.7	9.8	6.7	11.8	0.9	93.2	10.4	10.2	43.6	3.5	3.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	6.1	12.7	9.7	6.1	29.0	12.2	16.6	32.1	3.6	7.3	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.5	55.7	34.6	54.1	36.7	128.8	49.0	43.4	66.1	52.1	46.0	29.0
LnGrp LOS	D	E	C	D	D	F	D	D	F	D	D	C
Approach Vol, veh/h		1158			1859			3691			1191	
Approach Delay, s/veh		44.9			75.7			50.8			46.0	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.5	46.6	28.2	20.5	35.2	26.9	15.5	33.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	17.4	42.1	26.5	16.0	34.5	25.0	18.0	24.5
Max Q Clear Time (g_c+I1), s	10.2	44.1	22.7	18.0	28.9	19.2	8.4	30.7
Green Ext Time (p_c), s	0.5	0.0	1.0	0.0	1.8	2.7	0.4	0.0

Intersection Summary	
HCM 6th Ctrl Delay	55.1
HCM 6th LOS	E

Intersection	
Int Delay, s/veh	33.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	140	2445	40	30	1060
Future Vol, veh/h	35	140	2445	40	30	1060
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	135	-	0	400	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	152	2658	43	33	1152

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3185	1329	0	0	2701	0
Stage 1	2658	-	-	-	-	-
Stage 2	527	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	~ 21	~ 125	-	-	54	-
Stage 1	~ 21	-	-	-	-	-
Stage 2	508	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 8	~ 125	-	-	54	-
Mov Cap-2 Maneuver	~ 8	-	-	-	-	-
Stage 1	~ 21	-	-	-	-	-
Stage 2	198	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 693	0	4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	8	125	54	-
HCM Lane V/C Ratio	-	-	4.755	1.217	0.604	-
HCM Control Delay (s)	-	-	$ 2594.9	217.5	144	-
HCM Lane LOS	-	-	F	F	F	-
HCM 95th %tile Q(veh)	-	-	6.1	9.4	2.4	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

DELAY (CONTROL)

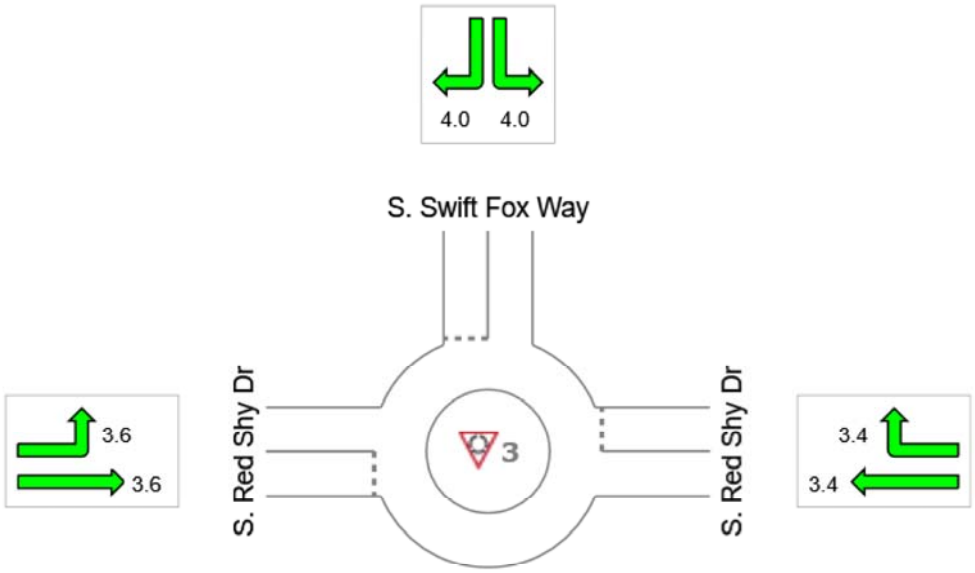
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 3 [2041Background_AM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches			Intersection
	East	North	West	
Delay (Control)	3.4	4.0	3.6	3.8
LOS	A	A	A	A



Colour code based on Level of Service

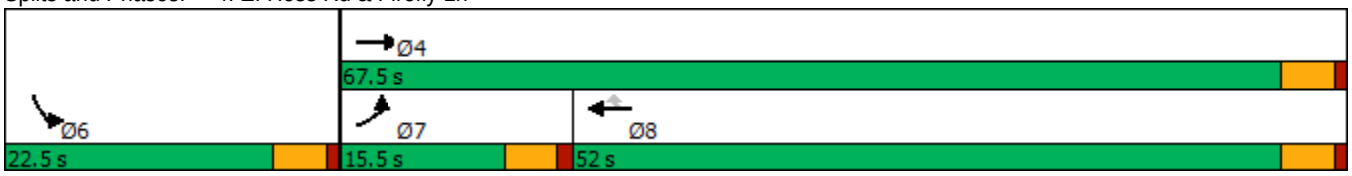
LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

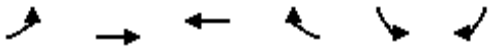
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Configurations					
Traffic Volume (vph)	10	1525	1700	16	10
Future Volume (vph)	10	1525	1700	16	10
Turn Type	Prot	NA	NA	Perm	Prot
Protected Phases	7	4	8		6
Permitted Phases				8	
Detector Phase	7	4	8	8	6
Switch Phase					
Minimum Initial (s)	11.0	14.0	14.0	14.0	11.0
Minimum Split (s)	15.5	22.5	22.5	22.5	22.5
Total Split (s)	15.5	67.5	52.0	52.0	22.5
Total Split (%)	17.2%	75.0%	57.8%	57.8%	25.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes		Yes	Yes	
Recall Mode	None	None	None	None	Min
Act Effct Green (s)	11.1	49.3	46.7	46.7	11.1
Actuated g/C Ratio	0.16	0.71	0.67	0.67	0.16
v/c Ratio	0.04	0.66	0.78	0.02	0.08
Control Delay	28.4	6.9	12.3	5.5	28.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	28.4	6.9	12.3	5.5	28.7
LOS	C	A	B	A	C
Approach Delay		7.0	12.3		28.7
Approach LOS		A	B		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 69.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 9.9	Intersection LOS: A
Intersection Capacity Utilization 63.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: E. Hess Rd & Firefly Ln





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	1525	1700	16	10	10
Future Volume (veh/h)	10	1525	1700	16	10	10
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	11	1658	1848	17	11	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	54	2527	2188	976	128	128
Arrive On Green	0.03	0.71	0.62	0.62	0.16	0.16
Sat Flow, veh/h	1781	3647	3647	1585	806	806
Grp Volume(v), veh/h	11	1658	1848	17	23	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1685	0
Q Serve(g_s), s	0.4	17.5	28.8	0.3	0.8	0.0
Cycle Q Clear(g_c), s	0.4	17.5	28.8	0.3	0.8	0.0
Prop In Lane	1.00			1.00	0.48	0.48
Lane Grp Cap(c), veh/h	54	2527	2188	976	268	0
V/C Ratio(X)	0.20	0.66	0.84	0.02	0.09	0.00
Avail Cap(c_a), veh/h	283	3235	2439	1088	438	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.7	5.4	10.6	5.2	24.8	0.0
Incr Delay (d2), s/veh	1.8	0.3	2.7	0.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	3.2	8.2	0.1	0.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	34.6	5.7	13.3	5.2	25.0	0.0
LnGrp LOS	C	A	B	A	C	A
Approach Vol, veh/h		1669	1865		23	
Approach Delay, s/veh		5.9	13.2		25.0	
Approach LOS		A	B		C	

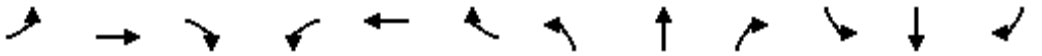
Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			53.7		15.5	6.6	47.1
Change Period (Y+Rc), s			4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s			63.0		18.0	11.0	47.5
Max Q Clear Time (g_c+I1), s			19.5		2.8	2.4	30.8
Green Ext Time (p_c), s			17.7		0.0	0.0	11.8

Intersection Summary	
HCM 6th Ctrl Delay	9.9
HCM 6th LOS	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	575	980	780	490	345	800	1685	910	770	2015	120
Future Volume (vph)	280	575	980	780	490	345	800	1685	910	770	2015	120
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	11.0	14.0	11.0	11.0	14.0	11.0	11.0	14.0	11.0	11.0	14.0	11.0
Minimum Split (s)	22.5	20.5	15.5	15.5	20.5	15.5	15.5	22.5	15.5	15.5	20.0	22.5
Total Split (s)	24.6	26.0	40.0	31.0	32.4	30.0	40.0	58.0	31.0	30.0	48.0	24.6
Total Split (%)	17.0%	17.9%	27.6%	21.4%	22.3%	20.7%	27.6%	40.0%	21.4%	20.7%	33.1%	17.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	None	None
Act Effct Green (s)	17.6	21.5	61.5	26.5	30.4	60.4	35.5	53.5	84.5	25.5	43.5	65.6
Actuated g/C Ratio	0.12	0.15	0.42	0.18	0.21	0.42	0.24	0.37	0.58	0.18	0.30	0.45
v/c Ratio	0.73	1.19	1.49	1.35	0.72	0.53	1.04	0.98	1.05	1.39	1.44	0.17
Control Delay	72.1	155.7	256.7	212.9	60.1	28.2	93.2	60.9	72.5	227.8	237.3	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.1	155.7	256.7	212.9	60.1	28.2	93.2	60.9	72.5	227.8	237.3	5.6
LOS	E	F	F	F	E	C	F	E	E	F	F	A
Approach Delay		196.9			127.1			71.6			225.3	
Approach LOS		F			F			E			F	

Intersection Summary	
Cycle Length: 145	
Actuated Cycle Length: 145	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.49	
Intersection Signal Delay: 150.1	Intersection LOS: F
Intersection Capacity Utilization 133.1%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 1: E. Hess Rd & S. Chambers Rd.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	575	980	780	490	345	800	1685	910	770	2015	120
Future Volume (veh/h)	280	575	980	780	490	345	800	1685	910	770	2015	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	304	625	1065	848	533	375	870	1832	989	837	2190	130
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	358	527	623	632	808	639	846	1884	875	608	1532	640
Arrive On Green	0.10	0.15	0.15	0.18	0.23	0.23	0.24	0.37	0.37	0.18	0.30	0.30
Sat Flow, veh/h	3456	3554	1585	3456	3554	1585	3456	5106	1585	3456	5106	1585
Grp Volume(v), veh/h	304	625	1065	848	533	375	870	1832	989	837	2190	130
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1777	1585	1728	1702	1585	1728	1702	1585
Q Serve(g_s), s	12.5	21.5	21.5	26.5	19.8	26.8	35.5	51.2	53.5	25.5	43.5	7.7
Cycle Q Clear(g_c), s	12.5	21.5	21.5	26.5	19.8	26.8	35.5	51.2	53.5	25.5	43.5	7.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	358	527	623	632	808	639	846	1884	875	608	1532	640
V/C Ratio(X)	0.85	1.19	1.71	1.34	0.66	0.59	1.03	0.97	1.13	1.38	1.43	0.20
Avail Cap(c_a), veh/h	479	527	623	632	808	639	846	1884	875	608	1532	640
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.9	61.7	44.0	59.3	50.9	33.8	54.8	45.0	32.5	59.8	50.8	28.1
Incr Delay (d2), s/veh	10.4	101.7	326.0	164.7	2.0	1.4	38.4	14.7	73.2	180.0	197.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	16.9	77.9	25.8	8.9	10.3	19.6	23.4	46.1	26.1	45.9	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.3	163.4	370.0	223.9	52.9	35.2	93.1	59.8	105.7	239.7	247.9	28.2
LnGrp LOS	E	F	F	F	D	D	F	E	F	F	F	C
Approach Vol, veh/h		1994			1756			3691			3157	
Approach Delay, s/veh		260.2			131.7			79.9			236.7	
Approach LOS		F			F			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	30.0	58.0	31.0	26.0	40.0	48.0	19.5	37.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	25.5	53.5	26.5	21.5	35.5	43.5	20.1	27.9
Max Q Clear Time (g_c+I1), s	27.5	55.5	28.5	23.5	37.5	45.5	14.5	28.8
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0

Intersection Summary	
HCM 6th Ctrl Delay	169.1
HCM 6th LOS	F

Intersection	
Int Delay, s/veh	7.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	35	1700	30	70	2885
Future Vol, veh/h	20	35	1700	30	70	2885
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	135	-	0	400	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	38	1848	33	76	3136

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3254	924	0	0	1881	0
Stage 1	1848	-	-	-	-	-
Stage 2	1406	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	~ 19	233	-	-	144	-
Stage 1	71	-	-	-	-	-
Stage 2	171	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 9	233	-	-	144	-
Mov Cap-2 Maneuver	~ 9	-	-	-	-	-
Stage 1	71	-	-	-	-	-
Stage 2	81	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 544.2	0	1.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	9	233	144	-
HCM Lane V/C Ratio	-	-	2.415	0.163	0.528	-
HCM Control Delay (s)	-	-	$ 1455.7	23.4	55.1	-
HCM Lane LOS	-	-	F	C	F	-
HCM 95th %tile Q(veh)	-	-	3.8	0.6	2.6	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

DELAY (CONTROL)

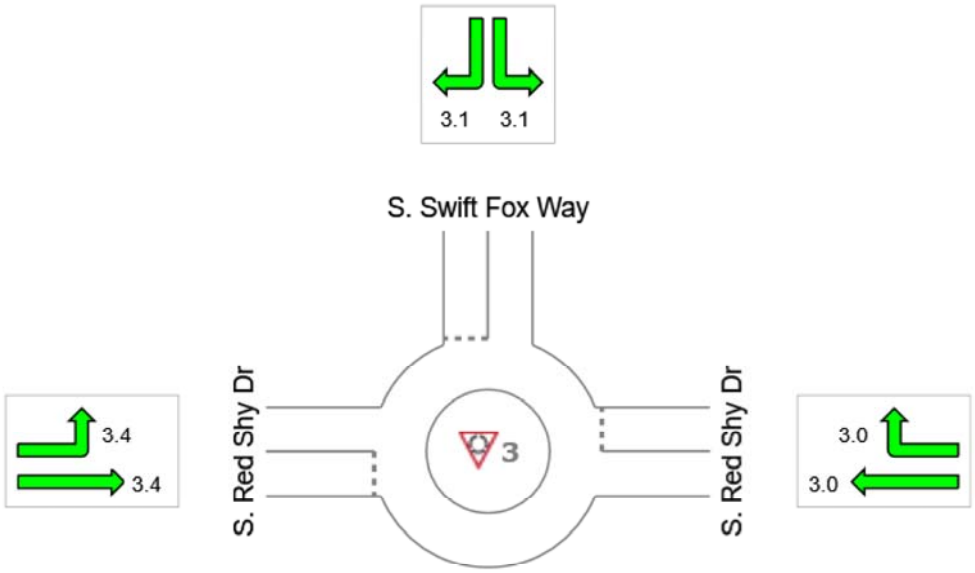
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 3 [2041Background_PM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches			Intersection
	East	North	West	
Delay (Control)	3.0	3.1	3.4	3.3
LOS	A	A	A	A



Colour code based on Level of Service

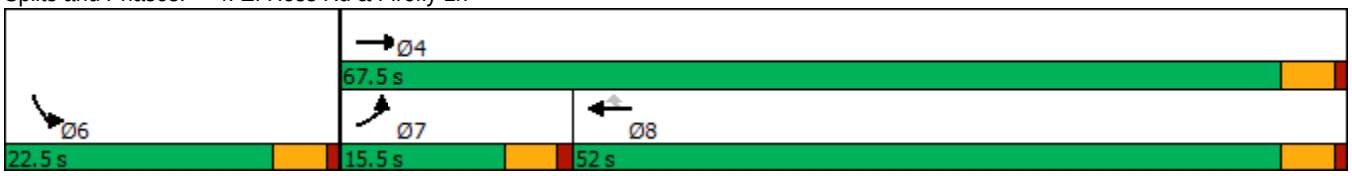
LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

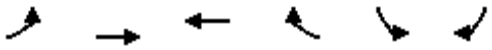
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Configurations					
Traffic Volume (vph)	15	2125	1610	26	10
Future Volume (vph)	15	2125	1610	26	10
Turn Type	Prot	NA	NA	Perm	Prot
Protected Phases	7	4	8		6
Permitted Phases				8	
Detector Phase	7	4	8	8	6
Switch Phase					
Minimum Initial (s)	11.0	14.0	14.0	14.0	11.0
Minimum Split (s)	15.5	22.5	22.5	22.5	22.5
Total Split (s)	15.5	67.5	52.0	52.0	22.5
Total Split (%)	17.2%	75.0%	57.8%	57.8%	25.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes		Yes	Yes	
Recall Mode	None	None	None	None	Min
Act Effct Green (s)	11.0	60.5	57.5	57.5	11.0
Actuated g/C Ratio	0.14	0.75	0.71	0.71	0.14
v/c Ratio	0.07	0.87	0.69	0.02	0.09
Control Delay	32.4	11.9	9.9	5.0	32.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.4	11.9	9.9	5.0	32.9
LOS	C	B	A	A	C
Approach Delay		12.0	9.8		32.9
Approach LOS		B	A		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 80.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 11.2	Intersection LOS: B
Intersection Capacity Utilization 75.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: E. Hess Rd & Firefly Ln





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	2125	1610	26	10	10
Future Volume (veh/h)	15	2125	1610	26	10	10
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	16	2310	1750	28	11	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	74	2645	2294	1023	113	113
Arrive On Green	0.04	0.74	0.65	0.65	0.14	0.14
Sat Flow, veh/h	1781	3647	3647	1585	806	806
Grp Volume(v), veh/h	16	2310	1750	28	23	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1685	0
Q Serve(g_s), s	0.7	37.1	26.9	0.5	0.9	0.0
Cycle Q Clear(g_c), s	0.7	37.1	26.9	0.5	0.9	0.0
Prop In Lane	1.00			1.00	0.48	0.48
Lane Grp Cap(c), veh/h	74	2645	2294	1023	237	0
V/C Ratio(X)	0.22	0.87	0.76	0.03	0.10	0.00
Avail Cap(c_a), veh/h	250	2861	2294	1023	388	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.3	7.3	9.7	5.0	29.3	0.0
Incr Delay (d2), s/veh	1.5	3.1	1.6	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	7.7	7.6	0.1	0.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	37.7	10.4	11.2	5.0	29.5	0.0
LnGrp LOS	D	B	B	A	C	A
Approach Vol, veh/h		2326	1778		23	
Approach Delay, s/veh		10.6	11.1		29.5	
Approach LOS		B	B		C	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	62.7	15.5	7.7	55.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	63.0	18.0	11.0	47.5
Max Q Clear Time (g_c+I1), s	39.1	2.9	2.7	28.9
Green Ext Time (p_c), s	19.1	0.0	0.0	12.1

Intersection Summary	
HCM 6th Ctrl Delay	10.9
HCM 6th LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	385	490	630	495	650	800	1685	910	280	765	95
Future Volume (vph)	210	385	490	630	495	650	800	1685	910	280	765	95
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2		1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	1	5	2	2	1	6	7
Switch Phase												
Minimum Initial (s)	11.0	14.0	11.0	11.0	14.0	11.0	11.0	14.0	14.0	11.0	14.0	11.0
Minimum Split (s)	22.5	20.5	15.5	15.5	20.5	15.5	15.5	22.5	22.5	15.5	20.0	22.5
Total Split (s)	22.5	20.5	39.3	25.0	23.0	24.0	39.3	50.5	50.5	24.0	35.2	22.5
Total Split (%)	18.8%	17.1%	32.8%	20.8%	19.2%	20.0%	32.8%	42.1%	42.1%	20.0%	29.3%	18.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	None	None
Act Effct Green (s)	13.5	15.9	54.1	20.5	22.9	46.9	33.7	46.0	46.0	19.5	31.8	49.8
Actuated g/C Ratio	0.11	0.13	0.45	0.17	0.19	0.39	0.28	0.38	0.38	0.16	0.27	0.42
v/c Ratio	0.59	0.89	0.72	1.17	0.80	1.05	0.90	0.94	1.16	0.55	0.62	0.14
Control Delay	56.8	73.2	29.9	136.9	56.5	78.8	54.8	46.3	104.5	50.3	41.4	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.8	73.2	29.9	136.9	56.5	78.8	54.8	46.3	104.5	50.3	41.4	5.4
LOS	E	E	C	F	E	E	D	D	F	D	D	A
Approach Delay		50.4			93.2			63.9			40.6	
Approach LOS		D			F			E			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.9	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.17	
Intersection Signal Delay: 65.4	Intersection LOS: E
Intersection Capacity Utilization 93.2%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 1: E. Hess Rd & S. Chambers Rd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	385	490	630	495	650	800	1685	910	280	765	95
Future Volume (veh/h)	210	385	490	630	495	650	800	1685	910	280	765	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	228	418	533	685	538	707	870	1832	989	304	832	103
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	337	504	663	628	804	531	955	2082	646	377	1228	536
Arrive On Green	0.10	0.14	0.14	0.18	0.23	0.23	0.28	0.41	0.41	0.11	0.24	0.24
Sat Flow, veh/h	3456	3554	1585	3456	3554	1585	3456	5106	1585	3456	5106	1585
Grp Volume(v), veh/h	228	418	533	685	538	707	870	1832	989	304	832	103
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1777	1585	1728	1702	1585	1728	1702	1585
Q Serve(g_s), s	7.2	12.9	16.0	20.5	15.6	25.5	27.5	37.4	46.0	9.7	16.7	5.2
Cycle Q Clear(g_c), s	7.2	12.9	16.0	20.5	15.6	25.5	27.5	37.4	46.0	9.7	16.7	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	337	504	663	628	804	531	955	2082	646	377	1228	536
V/C Ratio(X)	0.68	0.83	0.80	1.09	0.67	1.33	0.91	0.88	1.53	0.81	0.68	0.19
Avail Cap(c_a), veh/h	551	504	663	628	804	531	1066	2082	646	597	1389	586
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.2	47.1	28.8	46.2	39.8	37.5	39.5	30.9	33.4	49.1	38.9	26.4
Incr Delay (d2), s/veh	2.4	11.1	7.1	63.2	2.2	161.2	10.8	4.7	246.4	4.3	1.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	6.3	13.1	14.0	6.8	37.6	12.5	15.2	60.6	4.3	6.8	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.6	58.2	35.9	109.3	42.0	198.7	50.2	35.6	279.8	53.4	40.0	26.6
LnGrp LOS	D	E	D	F	D	F	D	D	F	D	D	C
Approach Vol, veh/h		1179			1930			3691			1239	
Approach Delay, s/veh		46.8			123.3			104.5			42.2	
Approach LOS		D			F			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.8	50.5	25.0	20.5	35.7	31.6	15.5	30.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.5	46.0	20.5	16.0	34.8	30.7	18.0	18.5
Max Q Clear Time (g_c+I1), s	11.7	48.0	22.5	18.0	29.5	18.7	9.2	27.5
Green Ext Time (p_c), s	0.6	0.0	0.0	0.0	1.7	4.4	0.5	0.0

Intersection Summary	
HCM 6th Ctrl Delay	90.9
HCM 6th LOS	F

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	79	160	2445	104	62	1060
Future Volume (vph)	79	160	2445	104	62	1060
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	11.0	11.0	14.0	14.0	5.0	14.0
Minimum Split (s)	22.5	22.5	22.5	22.5	15.5	22.5
Total Split (s)	22.5	22.5	52.0	52.0	15.5	67.5
Total Split (%)	25.0%	25.0%	57.8%	57.8%	17.2%	75.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min
Act Effct Green (s)	11.4	11.4	50.1	50.1	8.3	60.8
Actuated g/C Ratio	0.14	0.14	0.62	0.62	0.10	0.75
v/c Ratio	0.35	0.47	0.85	0.11	0.37	0.30
Control Delay	36.3	10.1	17.5	2.3	39.8	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	10.1	17.5	2.3	39.8	3.6
LOS	D	B	B	A	D	A
Approach Delay	18.8		16.9			5.6
Approach LOS	B		B			A

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 81.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 13.7	Intersection LOS: B
Intersection Capacity Utilization 68.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: S. Chambers Rd. & S. Red Sky Dr.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	79	160	2445	104	62	1060
Future Volume (veh/h)	79	160	2445	104	62	1060
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	86	174	2658	113	67	1152
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	261	233	3176	986	90	3741
Arrive On Green	0.15	0.15	0.62	0.62	0.05	0.73
Sat Flow, veh/h	1781	1585	5274	1585	1781	5274
Grp Volume(v), veh/h	86	174	2658	113	67	1152
Grp Sat Flow(s),veh/h/ln	1781	1585	1702	1585	1781	1702
Q Serve(g_s), s	3.2	7.8	30.6	2.2	2.8	5.8
Cycle Q Clear(g_c), s	3.2	7.8	30.6	2.2	2.8	5.8
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	261	233	3176	986	90	3741
V/C Ratio(X)	0.33	0.75	0.84	0.11	0.75	0.31
Avail Cap(c_a), veh/h	430	382	3251	1009	263	4312
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.5	30.5	11.1	5.7	35.0	3.4
Incr Delay (d2), s/veh	0.7	4.8	2.0	0.1	11.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	3.2	9.8	0.6	1.5	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	29.3	35.3	13.1	5.8	46.6	3.5
LnGrp LOS	C	D	B	A	D	A
Approach Vol, veh/h	260		2771			1219
Approach Delay, s/veh	33.3		12.8			5.9
Approach LOS	C		B			A

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.3	50.9			59.1	15.4
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	11.0	47.5			63.0	18.0
Max Q Clear Time (g_c+I1), s	4.8	32.6			7.8	9.8
Green Ext Time (p_c), s	0.1	13.8			11.4	0.5

Intersection Summary	
HCM 6th Ctrl Delay	12.1
HCM 6th LOS	B

DELAY (CONTROL)

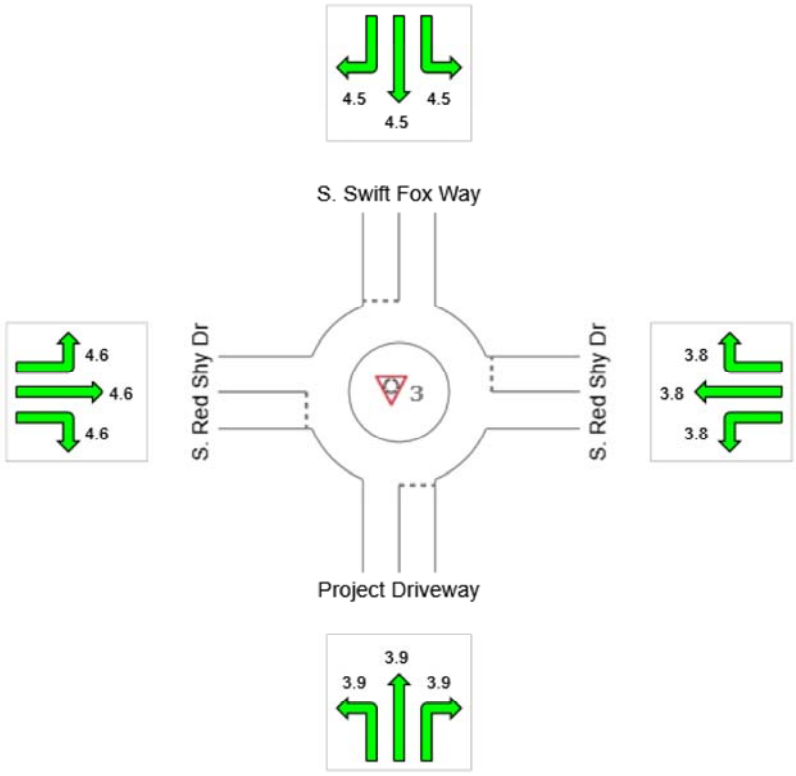
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 3 [2041+Project_AM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	3.9	3.8	4.5	4.6	4.4
LOS	A	A	A	A	A



Colour code based on Level of Service

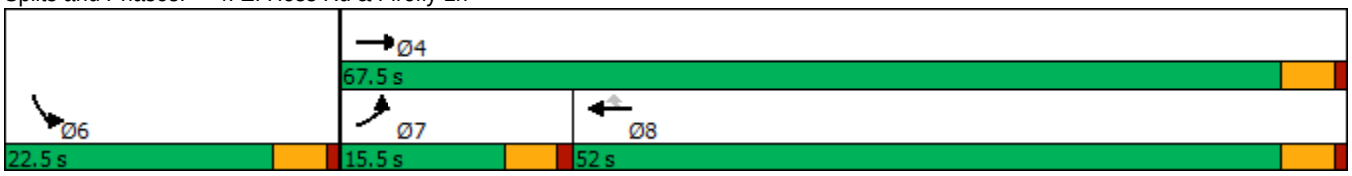
LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

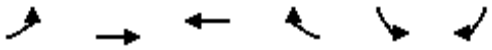
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Configurations					
Traffic Volume (vph)	10	1585	1805	16	10
Future Volume (vph)	10	1585	1805	16	10
Turn Type	Prot	NA	NA	Perm	Prot
Protected Phases	7	4	8		6
Permitted Phases				8	
Detector Phase	7	4	8	8	6
Switch Phase					
Minimum Initial (s)	11.0	14.0	14.0	14.0	11.0
Minimum Split (s)	15.5	22.5	22.5	22.5	22.5
Total Split (s)	15.5	67.5	52.0	52.0	22.5
Total Split (%)	17.2%	75.0%	57.8%	57.8%	25.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes		Yes	Yes	
Recall Mode	None	None	None	None	Min
Act Effct Green (s)	11.1	50.5	47.8	47.8	11.1
Actuated g/C Ratio	0.16	0.72	0.68	0.68	0.16
v/c Ratio	0.04	0.68	0.82	0.02	0.08
Control Delay	28.4	7.2	13.7	5.5	28.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	28.4	7.2	13.7	5.5	28.8
LOS	C	A	B	A	C
Approach Delay		7.3	13.7		28.8
Approach LOS		A	B		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 70.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 10.8	Intersection LOS: B
Intersection Capacity Utilization 66.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: E. Hess Rd & Firefly Ln





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	1585	1805	16	10	10
Future Volume (veh/h)	10	1585	1805	16	10	10
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	11	1723	1962	17	11	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	54	2559	2228	994	124	124
Arrive On Green	0.03	0.72	0.63	0.63	0.15	0.15
Sat Flow, veh/h	1781	3647	3647	1585	806	806
Grp Volume(v), veh/h	11	1723	1962	17	23	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1685	0
Q Serve(g_s), s	0.4	18.8	32.9	0.3	0.8	0.0
Cycle Q Clear(g_c), s	0.4	18.8	32.9	0.3	0.8	0.0
Prop In Lane	1.00			1.00	0.48	0.48
Lane Grp Cap(c), veh/h	54	2559	2228	994	259	0
V/C Ratio(X)	0.20	0.67	0.88	0.02	0.09	0.00
Avail Cap(c_a), veh/h	274	3134	2363	1054	425	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.8	5.4	11.1	5.0	25.9	0.0
Incr Delay (d2), s/veh	1.8	0.4	4.1	0.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	3.5	9.7	0.1	0.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	35.7	5.9	15.2	5.0	26.1	0.0
LnGrp LOS	D	A	B	A	C	A
Approach Vol, veh/h		1734	1979		23	
Approach Delay, s/veh		6.0	15.1		26.1	
Approach LOS		A	B		C	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			55.9		15.5	6.7	49.3
Change Period (Y+Rc), s			4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s			63.0		18.0	11.0	47.5
Max Q Clear Time (g_c+I1), s			20.8		2.8	2.4	34.9
Green Ext Time (p_c), s			18.7		0.0	0.0	9.9

Intersection Summary		
HCM 6th Ctrl Delay		11.0
HCM 6th LOS		B

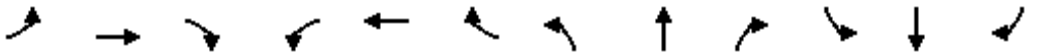
Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↱		↱
Traffic Vol, veh/h	0	1595	1760	59	0	29
Future Vol, veh/h	0	1595	1760	59	0	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1679	1853	62	0	31

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	927
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	-	0	270
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	270
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	20
HCM LOS			C

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	270
HCM Lane V/C Ratio	-	-	-	0.113
HCM Control Delay (s)	-	-	-	20
HCM Lane LOS	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	0.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	330	575	980	890	520	500	700	1135	795	990	2015	130
Future Volume (veh/h)	330	575	980	890	520	500	700	1135	795	990	2015	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	359	625	1065	967	565	543	761	1234	864	1076	2190	141
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	411	527	604	679	802	702	806	1602	497	751	1521	661
Arrive On Green	0.12	0.15	0.15	0.20	0.23	0.23	0.23	0.31	0.31	0.22	0.30	0.30
Sat Flow, veh/h	3456	3554	1585	3456	3554	1585	3456	5106	1585	3456	5106	1585
Grp Volume(v), veh/h	359	625	1065	967	565	543	761	1234	864	1076	2190	141
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1777	1585	1728	1702	1585	1728	1702	1585
Q Serve(g_s), s	14.8	21.5	21.5	28.5	21.2	32.7	31.4	31.7	45.5	31.5	43.2	8.3
Cycle Q Clear(g_c), s	14.8	21.5	21.5	28.5	21.2	32.7	31.4	31.7	45.5	31.5	43.2	8.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	411	527	604	679	802	702	806	1602	497	751	1521	661
V/C Ratio(X)	0.87	1.19	1.76	1.42	0.70	0.77	0.94	0.77	1.74	1.43	1.44	0.21
Avail Cap(c_a), veh/h	489	527	604	679	802	702	822	1602	497	751	1521	661
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.8	61.7	44.9	58.3	51.7	34.2	54.7	45.0	49.7	56.8	50.9	27.0
Incr Delay (d2), s/veh	14.1	101.7	349.6	199.2	2.8	5.4	19.1	2.4	340.0	202.6	201.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	16.9	79.6	31.0	9.6	16.6	15.5	13.4	64.4	34.5	46.2	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.8	163.4	394.4	257.4	54.5	39.6	73.8	47.4	389.8	259.4	252.5	27.2
LnGrp LOS	E	F	F	F	D	D	E	D	F	F	F	C
Approach Vol, veh/h		2049			2075			2859			3407	
Approach Delay, s/veh		268.3			145.2			157.9			245.3	
Approach LOS		F			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	36.0	50.0	33.0	26.0	38.3	47.7	21.8	37.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	31.5	45.5	28.5	21.5	34.5	42.5	20.5	29.5
Max Q Clear Time (g_c+I1), s	33.5	47.5	30.5	23.5	33.4	45.2	16.8	34.7
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.4	0.0	0.5	0.0

Intersection Summary	
HCM 6th Ctrl Delay	205.8
HCM 6th LOS	F

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	267	145	1700	104	171	2885
Future Volume (veh/h)	267	145	1700	104	171	2885
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	290	158	1848	113	186	3136
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	331	294	2856	886	221	3711
Arrive On Green	0.19	0.19	0.56	0.56	0.12	0.73
Sat Flow, veh/h	1781	1585	5274	1585	1781	5274
Grp Volume(v), veh/h	290	158	1848	113	186	3136
Grp Sat Flow(s),veh/h/ln	1781	1585	1702	1585	1781	1702
Q Serve(g_s), s	16.3	9.3	25.7	3.5	10.5	44.8
Cycle Q Clear(g_c), s	16.3	9.3	25.7	3.5	10.5	44.8
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	331	294	2856	886	221	3711
V/C Ratio(X)	0.88	0.54	0.65	0.13	0.84	0.84
Avail Cap(c_a), veh/h	424	377	2856	886	353	3794
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.8	37.9	15.7	10.8	44.1	10.0
Incr Delay (d2), s/veh	15.3	1.5	0.5	0.1	9.9	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	3.7	9.5	1.2	5.2	14.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	56.0	39.4	16.2	10.8	54.0	11.8
LnGrp LOS	E	D	B	B	D	B
Approach Vol, veh/h	448		1961			3322
Approach Delay, s/veh	50.2		15.9			14.2
Approach LOS	D		B			B

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	17.3	62.1				79.3	23.6
Change Period (Y+Rc), s	4.5	4.5				4.5	4.5
Max Green Setting (Gmax), s	20.4	51.6				76.5	24.5
Max Q Clear Time (g_c+I1), s	12.5	27.7				46.8	18.3
Green Ext Time (p_c), s	0.3	16.0				28.1	0.8

Intersection Summary	
HCM 6th Ctrl Delay	17.6
HCM 6th LOS	B

DELAY (CONTROL)

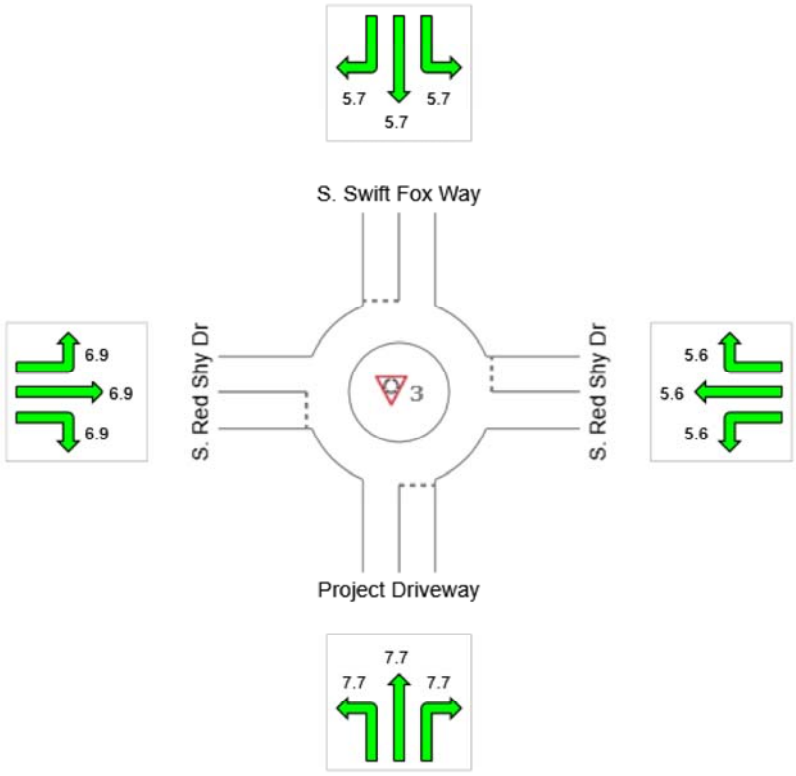
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 3 [2041+Project_PM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

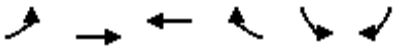
	Approaches				Intersection
	South	East	North	West	
Delay (Control)	7.7	5.6	5.7	6.9	7.1
LOS	A	A	A	A	A



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: Same as Sign Control
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	2445	1940	26	10	10
Future Volume (veh/h)	15	2445	1940	26	10	10
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	16	2658	2109	28	11	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	69	2897	2611	1165	82	82
Arrive On Green	0.04	0.82	0.73	0.73	0.10	0.10
Sat Flow, veh/h	1781	3647	3647	1585	806	806
Grp Volume(v), veh/h	16	2658	2109	28	23	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1685	0
Q Serve(g_s), s	0.9	59.4	41.9	0.5	1.3	0.0
Cycle Q Clear(g_c), s	0.9	59.4	41.9	0.5	1.3	0.0
Prop In Lane	1.00			1.00	0.48	0.48
Lane Grp Cap(c), veh/h	69	2897	2611	1165	171	0
V/C Ratio(X)	0.23	0.92	0.81	0.02	0.13	0.00
Avail Cap(c_a), veh/h	181	3037	2611	1165	288	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	50.5	7.3	9.4	3.9	44.3	0.0
Incr Delay (d2), s/veh	1.7	4.9	2.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	12.6	12.2	0.1	0.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	52.1	12.2	11.3	3.9	44.6	0.0
LnGrp LOS	D	B	B	A	D	A
Approach Vol, veh/h		2674	2137		23	
Approach Delay, s/veh		12.5	11.2		44.6	
Approach LOS		B	B		D	

Timer - Assigned Phs		4		6	7	8
Phs Duration (G+Y+Rc), s		92.7		15.5	8.7	84.0
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		92.5		18.5	11.0	77.0
Max Q Clear Time (g_c+I1), s		61.4		3.3	2.9	43.9
Green Ext Time (p_c), s		26.9		0.0	0.0	22.3

Intersection Summary		
HCM 6th Ctrl Delay	12.1	
HCM 6th LOS	B	

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↱		↱
Traffic Vol, veh/h	0	2470	1765	179	0	162
Future Vol, veh/h	0	2470	1765	179	0	162
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	100	95	95	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2600	1765	188	0	162

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	883
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	-	0	289
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	289
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	32.2
HCM LOS			D

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	289
HCM Lane V/C Ratio	-	-	-	0.561
HCM Control Delay (s)	-	-	-	32.2
HCM Lane LOS	-	-	-	D
HCM 95th %tile Q(veh)	-	-	-	3.2

APPENDIX D

DOUGLAS COUNTY ROADWAY SEGMENT THRESHOLDS

Table 3: Vehicular Level of Service

Vehicular Level of Service (LOS)	Definition
LOS A	Free-flow vehicular traffic; vehicles moving freely.
LOS B	Stable flow with the ability of vehicles to choose speed and/or lane.
LOS C	Stable flow; however monitoring of speed and lane changes of vehicles is required.
LOS D	Stable flow with restricted speed and ability to change lanes.
LOS E	Unstable flow at or near capacity; experiencing increased delays and reduced traveler reliability.
LOS F	Unstable flow; stop and go conditions.

Developing and maintaining a safe transportation system to address present and future demands the County established LOS thresholds of LOS D for arterial and collector roadways in urban and semi-urban areas and LOS C for arterial and collector roadways in rural areas. This LOS criteria provides safety and mobility on the County roadways and ensures operations do not become unstable

Average daily traffic volume capacities of roads, by classification, were estimated based on typical traffic flow characteristics and capacities per hour per lane that have been documented in various regional and local agency studies throughout the United States. **Table 4** presents the daily capacities, by roadway classification, based on the number of lanes and area type.

Table 4: Recommended Traffic Volume Thresholds

	Urban		
	Number of Lanes		
Roadway Classification	2	4	6
Roadway Classification	LOS D	LOS D	LOS D
Collector	12,000	20,000	
Arterial			
Minor Arterial		30,000	
Major Arterial		40,000	55,000
Expressway		50,000	70,000

Not currently identified in Douglas County Roadway Standards.

1. Collector (4-lane)
2. Expressway

APPENDIX E

ANTHOLOGY BUILDOUT VOLUMES

ANTHOLOGY NORTH TRAFFIC IMPACT ANALYSIS

April 2015

Prepared by

DAVID EVANS AND ASSOCIATES INC.

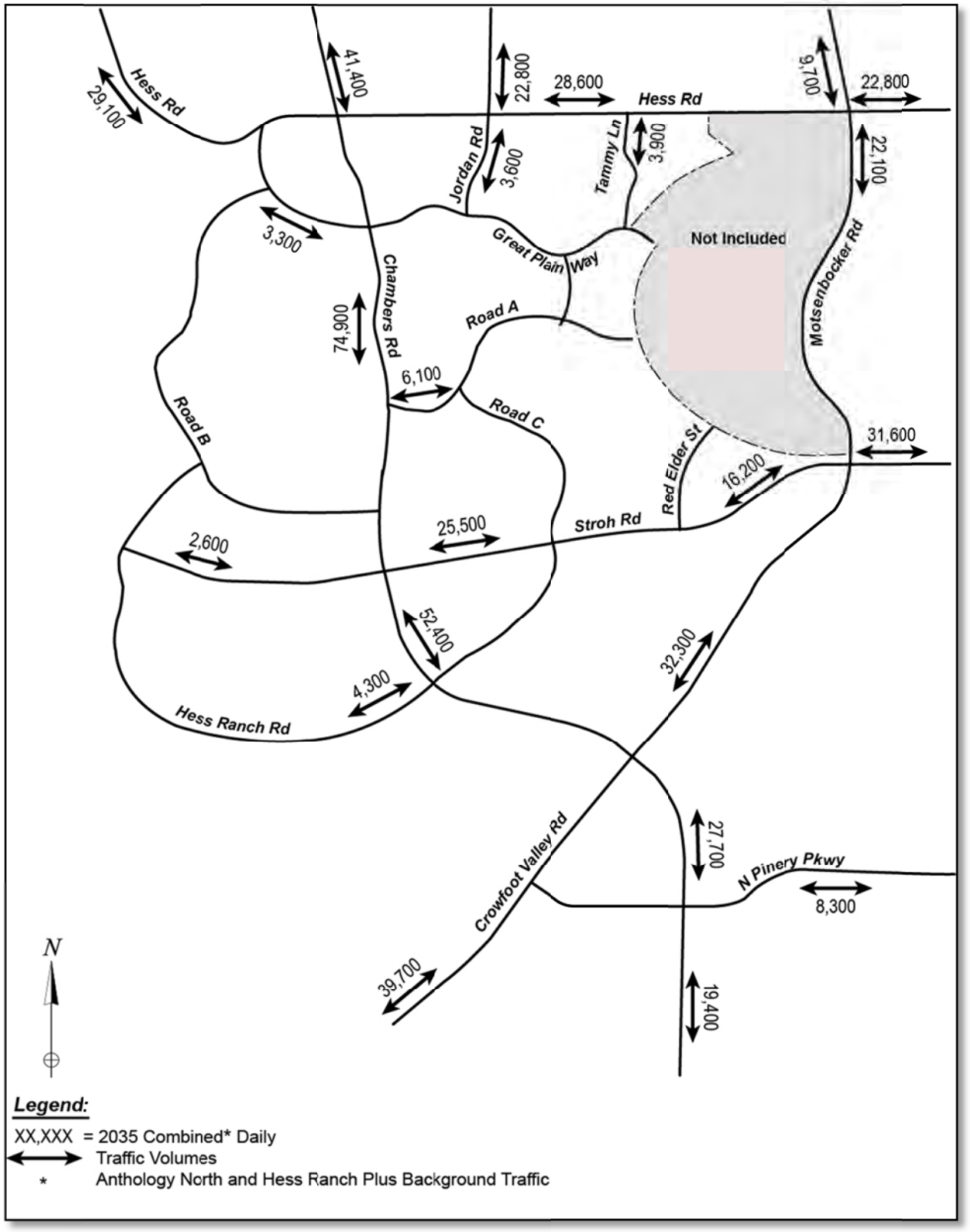


Figure 7. 2035 Total Site Plus Background Traffic Volumes

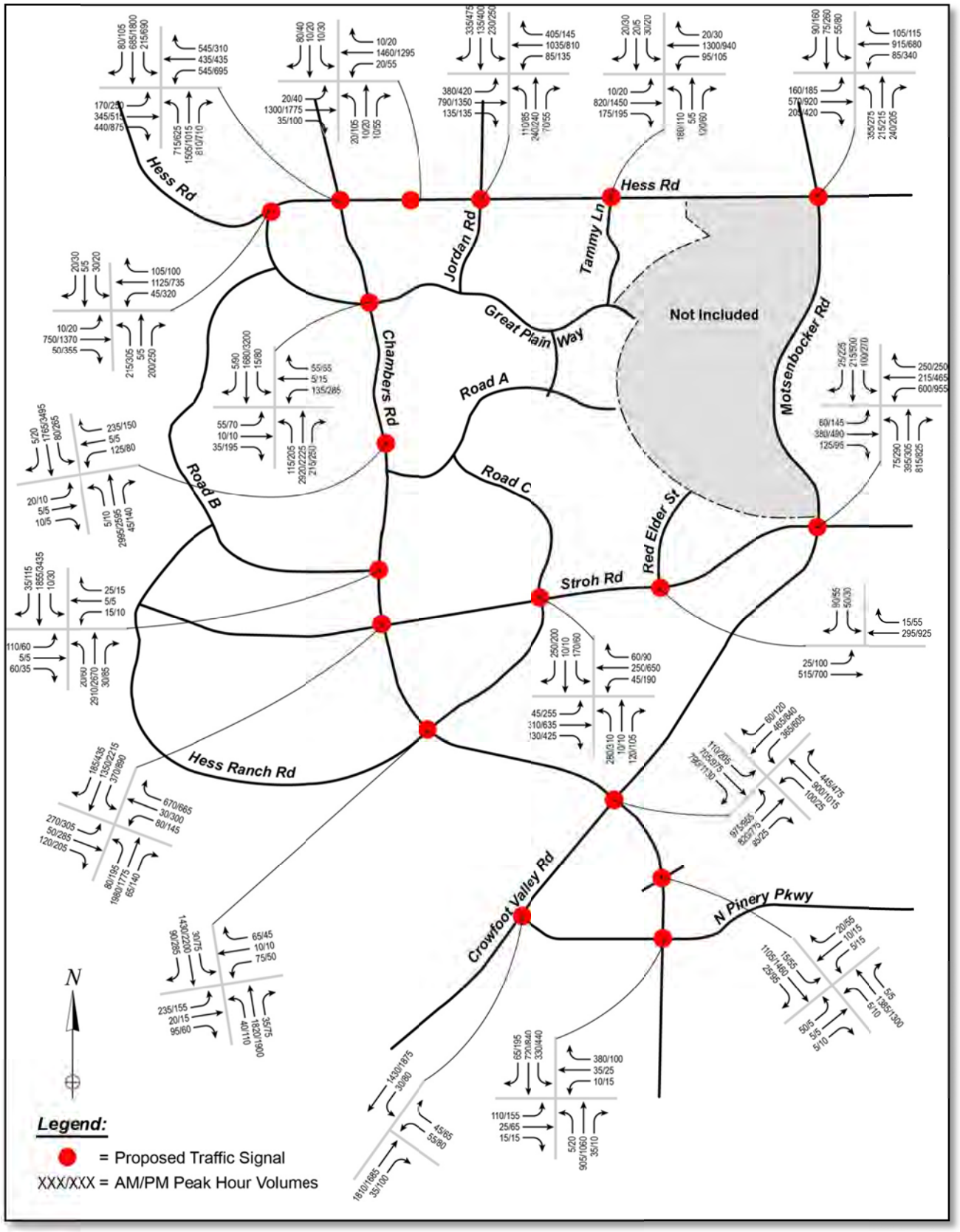


Figure 9. 2035 Peak Hour Intersection Traffic Volumes

If volumes are not projected to decrease after the specific commercial uses are known, possible mitigation measures would be to encourage additional site traffic to utilize the collector network rather than the arterial network, to construct additional right-in, right-out or ¾ movement accesses to reduce the volume turning onto and out of the intersecting streets, or to modify the commercial land uses to decrease the proposed number of trips in the area.

One potential solution to alleviate some of the anticipated congestion at the intersection of Hess Road and Chambers Road would be to construct a three lane cross section of Great Plain Way with two lanes in the northbound direction between Chambers Road and Hess Road. Constructing an additional lane would allow some of the traffic traveling from the Anthology and Hess Ranch areas to travel towards I-25 via Great Plain Way rather than having to use the Hess Road and Chambers Road intersection.

Table 5. 2035 Intersection Capacity Analysis

Intersection	AM Peak Hour		PM Peak Hour		Leg with LOS E or F?	
	LOS	Delay (1)	LOS	Delay (1)	AM	PM
Chambers Rd / Hess Rd	D	49.6	**F**	**84.3**	EB, WB	NB, SB, EB, WB
Chambers Rd / Great Plain Wy	B	17.8	D	52.5	WB	EB, WB, SB
Chambers Rd / Road A	D	39.8	**E**	**55.3**	WB	WB, SB
Chambers Rd / Road B	A	4.6	C	29.2		
Chambers Rd / Stroh Road	C	23.0	D	39.2	EB, WB	EB, WB
Chambers Rd / Hess Ranch Rd	C	20.6	B	18.5		
Chambers Rd / Crowfoot Valley Rd	D	49.9	**E**	**78.7**	EB, WB	NB, SB, EB, WB
Bayou Gulch Rd / PA 22, 27, 26, 23	A	4.7	A	7.4		
Bayou Gulch Rd / N Pinery Pkwy	C	28.5	C	22.0		
Hess Rd / Great Plain Way	B	13.4	C	30.2		NB
Hess Rd / PA 16 & 17	A	9.0	A	9.4		
Hess Rd / Jordan Rd	B	17.9	C	24.1		
Hess Rd / Tammy Lane	C	23.2	A	8.4		
Hess Rd / Motsenbocker Rd	C	30.4	C	32.8		
Stroh Rd / Road C (Hess Ranch Rd)	C	31.1	C	20.5		
Stroh Rd / Red Elder	B	14.8	A	2.9		
Stroh Rd / Motsenbocker Rd	C	30.4	C	34.2		
Crowfoot Valley Rd / N Pinery Pkwy	A	8.8	B	18.0		

(1) Average Control Delay in Seconds per Vehicle

Several intersections will require free right turn lanes with an added acceleration lane due to high projected right turning volumes. Acceleration lanes are required at these locations for the following movements:

6.0 SUMMARY AND RECOMMENDATIONS

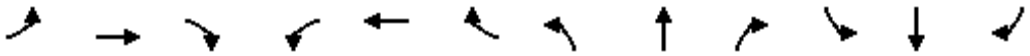
Based upon the analysis presented in this report, the following conclusions can be made regarding the traffic impacts and roadway network requirements of the proposed Anthology North development.

- When completed, the Anthology North development will encompass just over 1,200 acres of mixed residential and commercial planning areas as well as schools, parks and open space. Hess Ranch, the southern portion of the study area, will contain approximately 1,500 acres.
- The planned areas of the Anthology North and Hess Ranch developments are estimated to generate approximately 98,500 net off-site vehicle trips on an average weekday. The Institute of Transportation Engineers code for "Shopping Center" was used for the commercial planning areas because specific site uses have not yet been determined, which may overstate the traffic volumes generated. In addition, retail square footage was calculated as the maximum developable area of 20 percent of the land use net acreage, but based on market conditions it is likely actual development and the resulting trip generation will be lower. Using these assumptions, approximately 45 percent of the daily trips are projected to be commercial trips, even though the mixed use and commercial areas make up less than 8 percent of the total net area of land. Once specific land uses are determined an updated detailed traffic study may be submitted and the intersection and roadway laneage recommendations may be modified.
- The distribution of site-generated traffic is anticipated to be highest to the west and north given the site's location in the southeast Denver Metropolitan area. Chambers Road north of the development will carry a substantial portion of the site traffic as it leads to E-470, RidgeGate Parkway, Lincoln Avenue, and the Arapahoe Road corridor. Hess Road will also carry a significant portion of the site traffic to I-25. Crowfoot Valley Road will carry a considerable amount of development traffic to Castle Rock and the southwest.
- The roadway system proposed for the Anthology North and Hess Ranch developments is consistent with the roadways as defined in the *Town of Parker Roadway System Evaluation* and the *Town of Parker Transportation Master Plan* (March 2014).
- Most proposed signalized intersections are expected to operate at an acceptable LOS during the 2035 morning and evening peak hours with the recommended laneage improvements described in Section 5.2 and 5.3. It is recommended the intersections with movements that do not meet the Town's criteria of a LOS E or F will be revisited when the commercial land uses have been finalized.
- Based on the *State Highway Access Code* standards and the peak hour traffic volume estimates, it is estimated that most of the signalized intersections within the development will require an exclusive left turn and right turn deceleration lane or dual left turn lanes, and several intersections will require a channelized right turn lane with an acceleration lane.

- Progression for through traffic along Chambers Road, Stroh Road, and Hess Road will be challenging due to the constraints of the signal timing at the intersections of arterial roadways with high through and turning traffic volumes. An intermediate stop built into the progression is anticipated along Chambers Road at the Stroh Road intersection.
- Many of the planned 2035 roadway laneages are warranted by the development of land outside of the Anthology North and Hess Ranch developments as well as existing travel demand, particularly along Stroh Road, Chambers Road, Hess Road and Motsenbocker Road/Crowfoot Valley Road.
- Further analysis of specific site access, traffic controls and internal local streets will be necessary in conjunction with subsequent submittals for approval of individual development parcels. The need for additional development access, off-site access, specific signalization warrants, and improvements to the existing roadway network to support additional traffic will be evaluated at that time.

APPENDIX F

95TH PERCENTILE QUEUE RESULTS

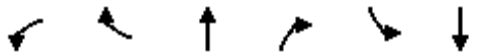


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	228	418	533	685	538	707	870	1832	989	304	832	103
v/c Ratio	0.59	0.89	0.72	1.17	0.80	1.05	0.90	0.94	1.16	0.55	0.62	0.14
Control Delay	56.8	73.2	29.9	136.9	56.5	78.8	54.8	46.3	104.5	50.3	41.4	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.8	73.2	29.9	136.9	56.5	78.8	54.8	46.3	104.5	50.3	41.4	5.4
Queue Length 50th (ft)	88	170	290	~325	210	~543	330	495	~699	112	210	4
Queue Length 95th (ft)	126	#259	428	#445	#324	#817	#435	#602	#955	159	258	36
Internal Link Dist (ft)		743			484			531			308	
Turn Bay Length (ft)	400		400	220			535		435	535		435
Base Capacity (vph)	514	471	758	586	675	676	996	1950	856	557	1346	768
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.89	0.70	1.17	0.80	1.05	0.87	0.94	1.16	0.55	0.62	0.13

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	86	174	2658	113	67	1152
v/c Ratio	0.35	0.47	0.85	0.11	0.37	0.30
Control Delay	36.3	10.1	17.5	2.3	39.8	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	10.1	17.5	2.3	39.8	3.6
Queue Length 50th (ft)	40	0	381	1	32	53
Queue Length 95th (ft)	85	54	#554	22	72	75
Internal Link Dist (ft)	266		338			708
Turn Bay Length (ft)		135			400	
Base Capacity (vph)	392	486	3134	1017	239	3946
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.36	0.85	0.11	0.28	0.29

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

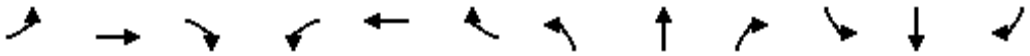
Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	11	1723	1962	17	22
v/c Ratio	0.04	0.68	0.82	0.02	0.08
Control Delay	28.4	7.2	13.7	5.5	28.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	28.4	7.2	13.7	5.5	28.8
Queue Length 50th (ft)	4	172	226	2	8
Queue Length 95th (ft)	20	224	#684	12	32
Internal Link Dist (ft)		597	568		222
Turn Bay Length (ft)	215			215	
Base Capacity (vph)	277	3368	2397	1071	434
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.04	0.51	0.82	0.02	0.05

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
1: E. Hess Rd & S. Chambers Rd.

01/21/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	359	625	1065	967	565	543	761	1234	864	1076	2190	141
v/c Ratio	0.80	1.19	1.51	1.43	0.75	0.72	0.93	0.77	1.18	1.44	1.47	0.18
Control Delay	75.0	155.7	266.0	245.0	60.7	35.5	72.8	49.1	122.9	247.5	251.9	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.0	155.7	266.0	245.0	60.7	35.5	72.8	49.1	122.9	247.5	251.9	10.8
Queue Length 50th (ft)	170	~373	~1358	~635	268	383	365	387	~745	~709	~1036	32
Queue Length 95th (ft)	227	#499	#1624	#770	339	537	#484	445	#1005	#846	#1127	74
Internal Link Dist (ft)		743			484			531			308	
Turn Bay Length (ft)	400		400	220			535		435	535		435
Base Capacity (vph)	485	524	706	674	757	755	816	1595	730	745	1490	779
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	1.19	1.51	1.43	0.75	0.72	0.93	0.77	1.18	1.44	1.47	0.18

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	290	158	1848	113	186	3136
v/c Ratio	0.79	0.35	0.76	0.14	0.74	0.91
Control Delay	46.5	7.1	19.8	3.2	51.5	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.5	7.1	19.8	3.2	51.5	16.5
Queue Length 50th (ft)	135	0	275	0	90	437
Queue Length 95th (ft)	#244	46	336	26	#181	#545
Internal Link Dist (ft)	266		338			708
Turn Bay Length (ft)		135			400	
Base Capacity (vph)	407	486	2431	816	267	3448
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.33	0.76	0.14	0.70	0.91

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	16	2658	2109	28	22
v/c Ratio	0.09	0.92	0.78	0.02	0.13
Control Delay	47.7	13.9	12.0	4.8	48.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	47.7	13.9	12.0	4.8	48.5
Queue Length 50th (ft)	11	548	267	3	15
Queue Length 95th (ft)	33	717	694	15	41
Internal Link Dist (ft)		597	568		222
Turn Bay Length (ft)	215			215	
Base Capacity (vph)	175	2941	2707	1211	281
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.09	0.90	0.78	0.02	0.08

Intersection Summary