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Saddlehorn Ranch  
Traffic Impact Analysis  
PCD File No. SP-19-006  
(LSC #184751)  
March 11, 2020

Traffic Engineer's Statement

This traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.



Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

*For*  
*ROI PROPERTY GROUP, LLC.*

*11-MAR-2020*  
Date



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March 11, 2020

Mr. Bill Guman  
William Guman & Associates, Ltd.  
731 North Weber Street, Suite 10  
Colorado Springs, CO 80903

RE: Saddlehorn Ranch  
El Paso County, Colorado  
Traffic Impact Analysis  
LSC 184751

Dear Mr. Guman:

LSC Transportation Consultants, Inc. has prepared this traffic impact analysis for the 824-acre Saddlehorn Ranch residential development site located southeast of the intersection of Curtis Road and Judge Orr Road in El Paso County, Colorado. The site is planned to be developed with 2.5-acre single-family residential lots. Figure 1 shows the site location. Access is proposed to Curtis Road and Judge Orr Road. This report has been prepared to accompany the Preliminary Plan and Final Plat submittals to the County.

## **REPORT CONTENTS**

The report contains the following:

- The proposed land use and access for the site.
- The existing and planned roadways in the study area including the, classifications, anticipated number of lanes, posted speed limits, lane geometries, traffic controls, etc.
- The existing traffic volumes and projected future 2040 background traffic volumes at the study area intersections.
- Estimates of the average weekday and peak-hour vehicle-trips to be generated by the development and the directional distribution on the area roadways.
- Assignment of the site's projected traffic volumes to the study area roadways and intersections for the short- and long-term horizon and the resulting total traffic volumes for the short and long term.
- The resulting traffic impacts, which have been quantified by determining the future levels of service at the study area intersections. The report also identifies the roadway link impacts (level of service) by evaluating the projected long-term background and total traffic volumes relative to the *Engineering Criteria Manual* (ECM) design ADTs by roadway classification.
- Recommended improvements.

## **SITE LAND USE AND ACCESS**

The 824-acre Saddlehorn Ranch site is located south of Judge Orr Road, east of Curtis Road, and is planned to be developed with 2.5-acre single-family residential lots. Phase 1 would include 49 lots located in the southwest portion of the site, as shown in the site plan phasing in Figure 2. At buildout, the development would contain 218 single-family homes.

Four full-movement access points are planned. The site plan provides for a future local road connection to the parcel to the south of the site.

- Barrosito Trail – 1,320 feet east of Curtis Road/Judge Orr
- Del Cambre Trail – 2,750 feet east of Curtis Road/Judge Orr
- Benito Wells Trail – 2,750 feet south of Curtis Road/Judge Orr
- Oscuro Trail – 5,280 feet south of Curtis Road/Judge Orr

## **EXISTING ROADWAY AND TRAFFIC CONDITIONS**

### **Area Roadways**

The roadways in the study area are shown on Figure 1 and are described below.

- **US Highway (US) 24** is located about one mile north of the site (via Curtis Road) and about 1.5 miles west of the site (via Judge Orr Road). US Highway 24 is also accessible from the southwest corner of the site via Falcon Highway. The travel distance to/from the intersection of US Highway 24/Falcon Highway via Falcon Highway is about four miles.

This two-lane State Highway extends east/west across Colorado connecting the Buena Vista, Colorado Springs, and Limon areas. US 24 is planned to be widened to four lanes through the Falcon area and is classified as an Expressway by the Colorado Department of Transportation (CDOT) and the *El Paso County Major Transportation Corridors Plan (MTCP)*. The posted speed limit on US 24 in the vicinity of Judge Orr Road is 55 miles per hour (mph). A parallel frontage road is planned in the future on the east side of US 24 that would extend from Judge Orr Road to Curtis Road.

- **Judge Orr Road** is a two-lane roadway that extends east from Eastonville Road across most of El Paso County. It is shown on the *El Paso County 2040 Major Transportation Corridors Plan* and the *Preserved Corridor Network Plan* as a four-lane Minor Arterial adjacent to the site (and west of Curtis Road). Posted speed limits adjacent to the site range from 45 to 55 mph. West of Curtis Road, the speed limit is 45 mph, while it generally increases to 55 mph east of Curtis Road. The intersection of US 24/Judge Orr is currently signalized. Due to the oblique angle of this intersection, the eastbound and westbound approaches are split-phased. The US 24 Access Control Plan/PEL Study shows future plans for realignment of Judge Orr at US Highway 24 to improve the intersection and provide an intersection angle closer to 90 degrees.

- **Curtis Road** is a two-lane roadway that extends south from the intersection of US Highway 24/ Stapleton Drive intersection to Drennan Road. It is shown as a two-lane, rural Principal Arterial on the 2040 El Paso County 2040 Major Transportation Corridors Plan and a four-lane Principal Arterial on the Preserved Corridor Network Plan. Adjacent to the site, the posted speed limit is 45 mph. Both intersections of Curtis Road/Judge Orr Road and Curtis Road/Falcon Highway are two-way, stop-sign controlled. The section north of Judge Orr was recently constructed to current ECM standards with paved shoulders, etc. Generally, the section between Judge Orr and Falcon Highway is an “unimproved,” two-lane paved road.

### Existing Traffic Conditions

Figure 3 shows the morning and afternoon peak-hour traffic volumes at the study area intersections based on counts conducted by LSC. The traffic count reports are attached. Figure 3 also shows the Colorado Department of Transportation Average Annual Daily Traffic Volumes (AADT) on US 24 and estimates of the average weekday traffic volumes based on factored peak-hour count data.

### Existing Levels of Service

Level of service (LOS) is a quantitative measure of the level of congestion or delay at an intersection. Level of service is indicated on a scale from “A” to “F.” LOS A represents control delay of less than 10 seconds for unsignalized and signalized intersections. LOS F represents control delay of more than 50 seconds for unsignalized intersections and more than 80 seconds for signalized intersections. Table 1 shows the level of service delay ranges.

**Table 1: Intersection Level of Service Ranges**

Level of Service	Signalized Intersections	Unsignalized Intersections
	Average Control Delay (seconds per vehicle)	Average Control Delay (seconds per vehicle) <sup>1</sup>
A	≤ 10.0	≤ 10.0
B	10.1 – 20.0	10.1 – 15.0
C	20.1 – 35.0	15.1 – 25.0
D	35.1 – 55.0	25.1 – 35.0
E	55.1 – 80.0	35.1 – 50.0
F	≥ 80.1	≥ 50.1
<sup>1</sup> For unsignalized intersections, if V/C is > 1.00, then LOS is LOS F regardless of the projected average control delay per vehicle		

Study area intersections have been analyzed to determine the existing levels of service. Table 3 through Table 8 show the level of service analysis results at the study intersections.



## 2040 BACKGROUND TRAFFIC

Background traffic is the traffic estimated to be on the study area roadways and intersections without the proposed development's trip generation or site-generated traffic volumes. Background traffic includes increases in through traffic and anticipated future traffic to be generated by other nearby development projects, but assumes zero traffic generated by the site. Figure 4 shows the projected 2040 background traffic volumes.

The 2040 background traffic volumes are generally based on the projections presented in the MTCP, but adjustments have been made to account for reduced trip generation from the former Santa Fe Springs development area. US Highway volumes are estimates by LSC based on the Colorado Department of Transportation *US 24 Planning and Environmental Linkages Study Final Corridor Conditions Report* dated December 2016.

## TRIP GENERATION

Estimates of the vehicle-trips to be generated by the proposed development have been developed using the nationally published trip generation rates found in *Trip Generation, 10th Edition, 2017* by the Institute of Transportation Engineers (ITE). Table 2 shows the trip generation estimate.

**Table 2: Estimated Site Vehicle-Trip Generation**

Analysis Period	Weekday		
	In	Out	Total
<b>Phase 1</b>			
A.M. Peak Hour	10	30	40
P.M. Peak Hour	32	19	51
Daily 24-hour	270	270	539
<b>Phases 2-5</b>			
A.M. Peak Hour	31	94	125
P.M. Peak Hour	106	62	168
Daily 24-hour	842	842	1685
<b>Buildout</b>			
A.M. Peak Hour	41	123	164
P.M. Peak Hour	138	81	219
Daily 24-hour	1112	1112	2224

### Phase 1

Following buildout of Phase 1, the site is projected to generate about 539 new vehicle-trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 10 vehicles would enter and 30 vehicles would exit the site. During the afternoon peak hour, which generally occurs

for one hour between 4:15 and 6:15 p.m., about 32 vehicles would enter and 19 vehicles would exit the site.

### **Buildout**

At **buildout** the site is projected to generate about 2,224 new vehicle-trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak hour about 41 vehicles would enter and 123 vehicles would exit the site. During the afternoon peak hour about 138 vehicles would enter and 81 vehicles would exit the site.

### **TRIP DISTRIBUTION AND ASSIGNMENT**

The estimated directional distribution of the site-generated traffic volumes on the adjacent roadways is an important factor in determining the site's traffic impacts. Figure 5 shows the directional distribution estimates for the projected site-generated vehicle-trips.

The estimates have been based on the following factors: the site's location with respect to the Falcon area's commercial, employment, school, and other residential areas; the balance of the Colorado Springs metropolitan area and the rural areas of the county to the east; the site's proposed land use; the site's proposed access and circulation system; and the existing and planned future area roadway system.

When the distribution percentages (from Figure 5) were applied to the trip generation estimates (from Table 2), the site-generated traffic volumes on the study area roadways were determined. Figure 6 shows the "Short-Term" site-generated traffic volumes following buildout of Phase 1. Figure 7 shows the "Long-Term" site-generated traffic volumes following buildout of the site. These volumes assume the 2040 roadway system including the extension of Stapleton Drive west to Briargate Parkway.

### **EXISTING PLUS PHASE 1 SITE-GENERATED TRAFFIC**

Figure 8 shows the short-term total traffic volumes at the study-area intersections. These volumes are the sum of the existing traffic volumes from Figure 3, plus the Phase 1 site-generated traffic volumes from Figure 6. The volumes shown in Figure 8 represent the short-term impacts of the Phase 1 development.

### **2040 TOTAL TRAFFIC**

Figure 9 shows the 2040 total traffic volumes at the study-area intersections. These volumes are the sum of the 2040 background traffic volumes from Figure 4, plus the buildout site-generated traffic volumes from Figure 7.

















## PROJECTED LEVELS OF SERVICE

Study area intersections have been analyzed to determine the projected levels of service (LOS) for the short-term and 2040 traffic volumes. Table 3 through Table 8 show the level of service analysis results. Signalized intersections were analyzed using Synchro. Unsignalized intersections and potential roundabouts were analyzed based on the unsignalized method of analysis procedures found in the *Highway Capacity Manual, 6th Edition* by the Transportation Research Board. The level of service (LOS) reports are attached.

### Curtis Road/Judge Orr Road

The intersection of Curtis Road/Judge Orr Road is projected to operate at a satisfactory level of service (LOS D or better) if the intersection were to remain a two-way, stop-sign-controlled (TWSC) intersection during the short-term. However, several individual turning movements would operate at LOS E or worse during the long-term if the intersection were to operate as a TWSC or all-way, stop-sign-controlled (AWSC) intersection, based on projected 2040 total traffic volumes. Converting the intersection of Curtis Road/Judge Orr Road to a roundabout in the long term (using the lane geometries shown in Table 6) would result in all individual turning movements operating at LOS D or better.

**Table 3: LOS Analysis Results – Curtis Road/Judge Orr Road**

Scenario	TWSC, AWSC													Roundabout				
	Traffic Control	NBL	NB T/R	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SB T/R	SBT	SBR	Overall LOS	NB	EB	WB	SB
																		
A.M. Peak Hour																		
2018 Existing	TWSC	B	B	A	-	-	A	-	-	B	B	-	-	Roundabout not analyzed for 2018 scenarios				
2018 Existing + Site	TWSC	F	D	A	-	-	A	-	-	E	-	F	A					
2040 Background	AWSC	C		B	C	C	B	D	C	B			B	A	A	B	A	B
	TWSC	F	E	A	-	-	A	-	-	F		F	B	B	A	B	A	B
2040 Background + Site	AWSC	C		B	C	C	B	E	C	B			B	B	A	B	A	B
P.M. Peak Hour																		
2018 Existing	TWSC	B	B	A	-	-	A	-	-	B	B	-	-	Roundabout not analyzed for 2018 scenarios				
2018 Existing + Site	TWSC	F	F	A	-	-	A	-	-	F		E	A					
2040 Background	AWSC	D		B	D	C	B	C	C	C		F	B	C	B	B	D	B
	TWSC	F	F	C	-	-	A	-	-	F		F	A	B	B	A	B	B
2040 Background + Site	AWSC	D	C	B	EBT	C	B	C	C	C			B	B	B	A	B	B













TWSC = two-way stop sign control

AWSC = all-way stop sign control

### US Highway 24/Judge Orr Road

The intersection of US 24/Judge Orr is projected to continue to operate at LOS B overall with the addition of site-generated traffic. By 2040, the intersection of US 24/Judge Orr was assumed to be realigned and both Judge Orr and US 24 were assumed to be widened to provide two through lanes in each direction. Detailed LOS results for the intersection of US 24/Judge Orr are shown in Table 4.























**Table 4: LOS Analysis Results – US 24/Judge Orr Road**

Scenario	US 24 + Judge Orr														
	Traffic Control	Overall LOS	EB	EBL	EBT	WB	WBL	WBT	NBL	NB T/R	NBT	SBL	SB T/R	SBT	
															
A.M. Peak Hour															
2018 Existing	Signal	B	B	-	-	D	-	-	A	A	-	A	B	-	
2018 Existing + Site															
2040 Background		C	-	-	E	-	E	D	E	-	B	A	-	C	
2040 Background + Site															
P.M. Peak Hour															
2018 Existing	Signal	B	B	-	-	C	-	-	A	B	-	A	B	-	
2018 Existing + Site															
2040 Background		C	-	D	E	-	D	D	E	-	C	D	-	C	
2040 Background + Site															

### US Highway 24/Stapleton Drive

Currently, the intersection of US 24/Stapleton Drive currently is two-way stop-sign-controlled but will be signalized in the long term. All minor street left and through turning movements are projected to remain LOS F during the short-term morning and evening peak hours if the intersection were to remain stop-controlled upon site buildout. If the intersection were to be signalized in the short term, the intersection of US 24/Stapleton would operate at LOS B overall during the short term and LOS C overall during the long term. All individual turning movements are projected to operate at LOS D or better during all short- and long-term traffic scenarios if the intersection were to be signalized. Detailed LOS analysis results for the intersection of US 24/Stapleton Road are shown in Table 5.














**Table 5: LOS Analysis Results – US 24/Stapleton Road**

Scenario	US 24 + Stapleton														Lanes by Year
	Traffic Control	Overall LOS	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR	2018
															
														2040	
A.M. Peak Hour															
2018 Existing	TWSC	-	F	F	B	F	F	A	A	-	-	A	-	-	
2018 Existing + Site															
2018 Existing	Signal	B	A	A	A	A	A	A	B	B	A	A	C	A	
2018 Existing + Site															
2040 Background	Signal	C	B	B	C	B	C	A	C	C	A	C	D	A	
2040 Background + Site														B	
P.M. Peak Hour															
2018 Existing	TWSC	-	F	F	B	F	F	B	A	-	-	A	-	-	
2018 Existing + Site															
2018 Existing	Signal	B	A	A	A	A	A	A	C	C	A	A	B	A	
2018 Existing + Site															
2040 Background	Signal	C	C	C	A	B	C	A	C	C	A	C	C	B	
2040 Background + Site						C				D			D	C	

## Falcon Highway/Curtis Road

The intersection of Falcon Highway/Curtis Road is projected to operate at a satisfactory level of service (LOS D or better) if the intersection were to remain a TWSC intersection during the short term. However, several individual turning movements would operate at LOS E or worse during the long term if the intersection were to operate as a TWSC or AWSC intersection, based on projected 2040 total traffic volumes. Converting the intersection of Falcon Highway/Curtis Road to a roundabout in the long term (using the lane geometries shown in Table 6) would result in all individual turning movements operating at LOS C or better.







**Table 6: LOS Analysis Results – Falcon Highway/Curtis Road**

Scenario	TWSC, AWSC								Roundabout						
	Traffic Control	NBL	NB T/R	EBL	EBR	WBL	SBL	SB T/R	Overall LOS	NBL	NB T/R	EB	WB	SB L/T	SBR
															
A.M. Peak Hour															
2018 Existing	TWSC	C	B	A	-	A	B	C	Roundabout not analyzed for 2018 scenarios						
2018 Existing + Site															
2040 Background	TWSC	F	D	A	-	A	E	F	B	A	A	B	B	C	A
	AWSC	C		C	D	F	B	F							
2040 Background + Site	TWSC	F	D	A	-	A	E	F	B	A	A	B	B	C	A
	AWSC	C		C	D	F	B	F							
P.M. Peak Hour															
2018 Existing	TWSC	C	C	A	-	A	C	B	Roundabout not analyzed for 2018 scenarios						
2018 Existing + Site															
2040 Background	TWSC	F	F	A	-	A	F	F	B	A	C	B	C	B	A
	AWSC			F	B	D	C	E							
2040 Background + Site	TWSC	F	F	A	-	A	F	F	B	A	C	B	C	B	A
	AWSC			F	B	D	C	F							
TWSC = two-way stop sign control															
AWSC = all-way stop sign control															

## Curtis Road/Site Access Intersections

All individual turning movements at both site access point intersections on Curtis Road are projected to operate at LOS C or better during all short- and long-term traffic scenarios, as shown in Table 7.





**Table 7: LOS Analysis Results – Curtis Road/Site Access Intersections**

Scenario	Benito Wells Trail			Oscuro Trail		
	Control	WB	SBL	Traffic Control	WB	SB
	Short-Term	-	-			
	Long-Term					
A.M. Peak Hour						
2018 Existing + Site	TWSC	-	-	TWSC	B	A
2040 Background + Site		C	A		C	A
P.M. Peak Hour						
2018 Existing + Site	TWSC	-	-	TWSC	B	A
2040 Background + Site		C	A		C	A

### Judge Orr Road/Site Access Intersections

All individual turning movements at both site access point intersections on Judge Orr Road are projected to operate at LOS B or better during both the short- and long-term morning and evening peak hours, as shown in Table 8.

**Table 8: LOS Analysis Results – Judge Orr Road/Site Access Intersections**

Scenario	Barrosito Trail			Del Cambre Trail		
	Traffic Control	NB	WB	Traffic Control	NB	WB
						
A.M. Peak Hour						
2018 Existing + Site	TWSC	-	-	TWSC	-	-
2040 Background + Site		B	A		B	A
P.M. Peak Hour						
2018 Existing + Site	TWSC	-	-	TWSC	-	-
2040 Background + Site		B	A		B	A
TWSC = two-way stop sign control						

TWSC = two-way stop sign control

### FUTURE ROADWAY IMPROVEMENTS

- Table 10 presents the roadway improvement recommendations including auxiliary turn lane needs, traffic control, anticipated right-of-way dedication, and corridor preservation.
- Auxiliary turn lanes at the site access points will need to be phased with the development. Table 10 also includes potential additional turn lane needs at offsite intersections within the study area.

- The short-term/Phase 1-only site generated traffic volumes show a southbound left turn volume over 10 vehicles per hour. This is the threshold for a left turn lane on a Principal Arterial. However, once the access to the north is added with a future phase, the left turn volume would not exceed the threshold. The short term, the southbound Phase 1 left turn volume would not exceed 25 left turning vehicles per hour, which is the threshold on Major Collectors/Minor Arterials. The short-term ADT and the proposed roadway cross section (with the deviation) are more consistent with a Rural Major Collector/Minor Arterial. A left turn lane is recommended for the access to the north with a future phase.
- US Highway 24/Stapleton is planned to be signalized. This project will likely need to escrow funds for this future signal on a pro-rata basis.
- Curtis Road, Judge Orr Road, and Stapleton Road north of Curtis Road are shown to need roadway upgrades on the 2040 MTCP based on anticipated growth in the general area and the Stapleton extension to Briargate Parkway.
- The intersections of Curtis/Judge Orr and Curtis/Falcon Highway may need to be upgraded to roundabout or traffic signal control by 2040 based on anticipated growth in the general area and the Stapleton extension to Briargate Parkway.

## CONCLUSIONS AND RECOMMENDATIONS

### Trip Generation

Following buildout of Phase 1, the site is projected to generate about 539 new vehicle-trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 10 vehicles would enter and 30 vehicles would exit the site. During the afternoon peak hour, which generally occurs for one hour between 4:15 and 6:15 p.m., about 32 vehicles would enter and 19 vehicles would exit the site.

At **buildout** the site is projected to generate about 2,224 new vehicle-trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak hour, about 41 vehicles would enter and 123 vehicles would exit the site. During the afternoon peak hour about 138 vehicles would enter and 81 vehicles would exit the site.

### Projected Levels of Service

- Level of service analysis results indicate that roundabout or traffic signal control may be needed at the intersections of Curtis Road/Judge Orr and Falcon Highway/Curtis Road during the long term in order for the intersections to operate at an acceptable level of service (LOS D or better).

- All Site access points on Judge Orr Road and Curtis Road are projected to operate at acceptable levels of service as two-way stop-sign-control intersections through the 20-year horizon.
- Please refer to the “Projected Levels of Service” section above for detailed LOS analysis results for the intersections of US 24/Stapleton Road, US 24/Judge Orr Road.

## **RECOMMENDED IMPROVEMENTS**

The following highlight the anticipated study area roadway and intersection improvements due to a combination of existing deficiencies, future background traffic, and projected site traffic. A list of improvements in the study area and assessment of responsibility is presented in Table 10. Also, please refer to the “Future Roadway Improvements” section above. Turn lane dimensions, including deceleration and stacking distances, transition tapers and redirect tapers, will need to conform to ECM standards.

### **ROW Dedication and Preservation**

This project will be required to dedicate right-of-way for future improvement to Judge Orr Road and Curtis Road. Details are presented in Table 10.

### **Subdivision Roadway Classifications**

All roadways within this subdivision should be classified as Rural Local.

### **El Paso County Road Impact Fee Program**

This project will be subject to participation in the El Paso County Road Impact Fee Program.

This project will request annexation into the 10 mil PID. The up-front fees will be per the current 2019 fee schedule for Single Family Detached housing.

### **Deviations from ECM Criteria**

#### **Curtis Road**

A previously-submitted deviation (by JR Engineering, dated December 3, 2019) requested a deviation from ECM Section 2.2.4, criteria for Curtis Road, a Rural Minor Arterial roadway. The ECM requires that Rural Minor Arterial cross-sections consist of a 12-foot travel lane with an 8-foot paved shoulder. The applicant has proposed an alternative in which Curtis Road would have 2-foot paved shoulders instead of 8-foot shoulders, as this is the maximum that can fit within the existing western right-of-way (ROW) without needing to acquire additional ROW from the adjacent property owner. Although a Rural Minor Arterial cross-section could be constructed



on the east side of Curtis Road, it is not the appropriate time to build out the full section (consisting of 8-foot paved shoulders) until development on both sides of Curtis Road can be constructed. Please refer to the attached deviation and deviation exhibit for more information.

Judge Orr Road

A previously-submitted deviation (by JR Engineering, dated December 3, 2019) requested a deviation from ECM Section 2.2.4, roadway functional classification criteria for Judge Orr Road, a Rural Minor Arterial roadway. Although Judge Orr Road is shown as a four-lane Rural Minor Arterial in the 2040 MTCP, the ECM does not have a standard cross-section for this type of roadway functional classification. The applicant assumed that a four-lane Rural Minor Arterial cross-section would add a 12-foot travel lane in each direction.

Additional ROW would be required to build the full street section, but additional ROW is not being obtained on the north side of Judge Orr Road for this development. Currently, Saddlehorn Ranch is dedicating an additional 40 feet of ROW to facilitate this in the future. Therefore, the applicant has submitted a deviation to request that Judge Orr Road remains in its existing condition (12-foot paved travel lanes with 4-foot gravel shoulders). Please refer to the attached deviation and deviation exhibit for more information.

\* \* \* \* \*

Please contact me if you have any questions regarding this report.

Respectfully Submitted,

LSC TRANSPORTATION CONSULTANTS, INC.

Jeffrey C. Hodsdon, P.E.  
Principal

JCH:JAB/jas

Enclosures: Table 9 and Table 10  
Figures 1-9  
Traffic Count Reports  
Level of Service Reports

## Tables and Figures

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### Table 9: Detailed Trip Generation Estimate

[illegible]

Table 10: Roadway Improvements for Saddlehorn Ranch			
Offsite Intersections			
Item #	Improvement	Timing	Responsibility
US Highway 24/Judge Orr Intersection			
1.1	Realignment of Judge Orr Road at US Highway 24 per CDOT Hwy 24 PEL Study	Future (the PEL study identified this as high priority project with a time frame of less than 5 years)	CDOT
1.2	Southwest-bound right-turn deceleration lane on US 24 approaching Judge Orr Road	As required by other development(s) or with realignment of US 24/ Judge Orr	CDOT or by others
1.3	Construct southwest-bound right-turn acceleration lane on US 24 at Judge Orr Road	As required by other development(s) or with realignment of US 24/ Judge Orr	CDOT or by others
1.4	Eastbound left-turn lane on Judge Orr Road approaching US 24	With realignment of US 24/ Judge Orr	CDOT
1.5	Westtbound dual left-turn lanes on Judge Orr Road approaching US 24	With realignment of US 24/ Judge Orr	CDOT
1.6	Northeast-bound right-turn deceleration lane on US 24 approaching Judge Orr Road	With realignment of US 24/ Judge Orr	CDOT
1.7	Eastbound right-turn deceleration lane on Judge Orr Road approaching US 24	As required by other development(s) or with realignment of US 24/ Judge Orr	CDOT or by others
US Highway 24/Stapleton Intersection			
2.1	Signalize the intersection	Once warrants are met	CDOT is collecting escrow from area developments impacting this intersection with each subdivision filing
Curtis Road/Falcon Highway			
3.1	Lengthen eastbound left-turn lane to ECM standards on Falcon Highway approaching Curtis Road	Currently warranted by ECM	Escrow for pro-rata share of improvement or construction at the time of Phase 2 development (fee program credit per fee program provisions)
3.2	<b>Long Term:</b> In the case of a future signalized intersection - Construct southbound right-turn deceleration lane on Curtis Road approaching Falcon Highway	Upon Signalization	Escrow for pro-rata share of improvement or construction if warranted at the time of development (fee program credit per fee program provisions)
3.2	<b>Long Term:</b> Reconstruct intersection as a modern roundabout (or signalize the intersection)	Once LOS of AWSC drops below acceptable levels (roundabout); or once signal warrants are met (for conversion to a signal or roundabout)	El Paso County -- This intersection will be fee-program eligible for a signal/roundabout and applicant will pay fee program traffic impact fees.
Adjacent County Arterial Roadway ROW Requirements			
4.1	Judge Orr Right-of-Way Dedication - 4 Lane Minor Arterial, Rural 130' to 150 estimated right-of-way dedication' (Note: 4-lane Rural <b>Principal</b> is 180')	Shown in 2040 MTCP	Applicant
4.2	Judge Orr - 4 Lane Minor Arterial - Beyond above dedication, no additional right-of-way preservation needed	Shown in 2060 Corridor Pres Plan	Applicant
4.3	Curtis Road - 2 Lane Rural Principal Arterial 130' to 150' estimated right-of-way dedication (Note: 4-lane Rural Principal is 180')	Shown in 2040 MTCP	Applicant
4.4	Curtis Road - 4 Lane Rural Principal Arterial 180' right-of-way preservation	Shown in 2060 Corridor Pres Plan	Applicant
Roadway Segment Improvements			
5.1	Falcon Highway - Upgrade to Two-Lane Rural Minor Arterial	Shown in 2040 MTCP	MTCP Project No. U5; Details TBD; applicant will pay fee program traffic impact fees.
5.2	Judge Orr Road - Widen to <b>Four Lane</b> Rural Minor Arterial	Shown in 2040 MTCP	MTCP Project No. C15; Details TBD; - applicant will pay fee program traffic impact fees.
5.3	Curtis Road - Upgrade to Two-Lane Rural Principal Arterial	Shown in 2040 MTCP	MTCP Project No. U1; Applicant per rezone condition of approval, potentially subject to fee program credit.
Internal Subdivision Roadways			
6.1	Construct internal streets to County Rural Local Standards	As development occurs and as needed for access	Applicant
Adjacent Intersection and Access Intersections			
Item #	Improvement	Timing	Responsibility
Judge Orr/Curtis Road Intersection			
7.1	Westbound right-turn deceleration lane	Once peak hour westbound right turn volume exceeds 50 vehicles per hour.	Escrow for improvement or construction if warranted at the time of development (fee program credit per fee program provisions)
7.2	Eastbound right-turn deceleration lane	Currently warranted by ECM	Escrow for improvement or construction at the time of Phase 2 development (fee program credit per fee program provisions)
7.3	Potentially sign for all way stop-sign control (AWSC)	Once warrants for AWSC are met	El Paso County
7.4	<b>Long Term:</b> Reconstruct intersection as a modern roundabout (or signalize the intersection)	Once LOS of AWSC drops below acceptable levels (roundabout); or once signal warrants are met (for conversion to a signal or roundabout)	El Paso County; This intersection will be fee-program eligible for a signal/roundabout and applicant will pay fee program traffic impact fees.
7.5	<b>Long Term:</b> In the case of a future signalized intersection - lengthening of northbound and southbound left-turn deceleration lanes.	As needed based on future speed limit and turning volume/stacking length criteria.	Escrow for improvement or construction if warranted at the time of development (fee program credit per fee program provisions)
Judge Orr/Barrosito Trail			
8.1	No Auxiliary Turn Lanes Required	-	-
Judge Orr/Del Cambre Trail			
9.1	No Auxiliary Turn Lanes Required	-	-
Curtis Road/Oscuro Trail			
10.1	<u>Short Term</u> No Auxiliary Turn Lanes Required	-	-
10.2	<u>Long Term</u> Construct northbound right-turn deceleration lane on Curtis Rd approaching the site access	With Phase 2/3 site development	Applicant
Curtis Road/North Site Access			
11.1	<u>Short Term</u> No Auxiliary Turn Lanes Required	-	-
11.2	<u>Long Term</u> Construct southbound left-turn deceleration lane on Curtis Rd approaching the site access	With Phase 2/3 site development	Applicant
11.3	<u>Long Term</u> Construct northbound right-turn deceleration lane on Curtis Rd approaching the site access	With Phase 2/3 site development	Applicant
Source: LSC Transportation Consultants, Inc.			

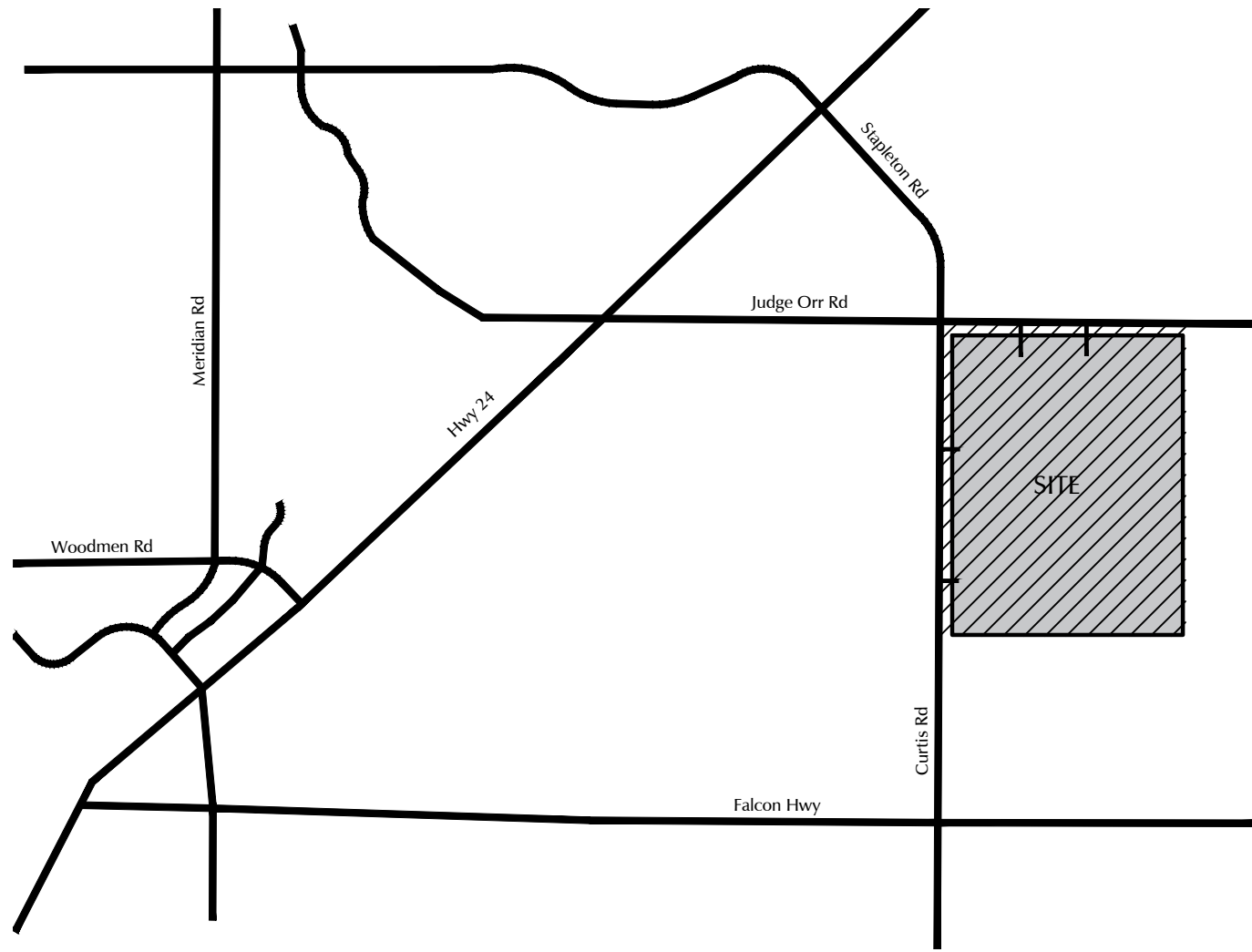


Figure 1  
**Vicinity Map**  
Saddlehorn Ranch (LSC #184751)

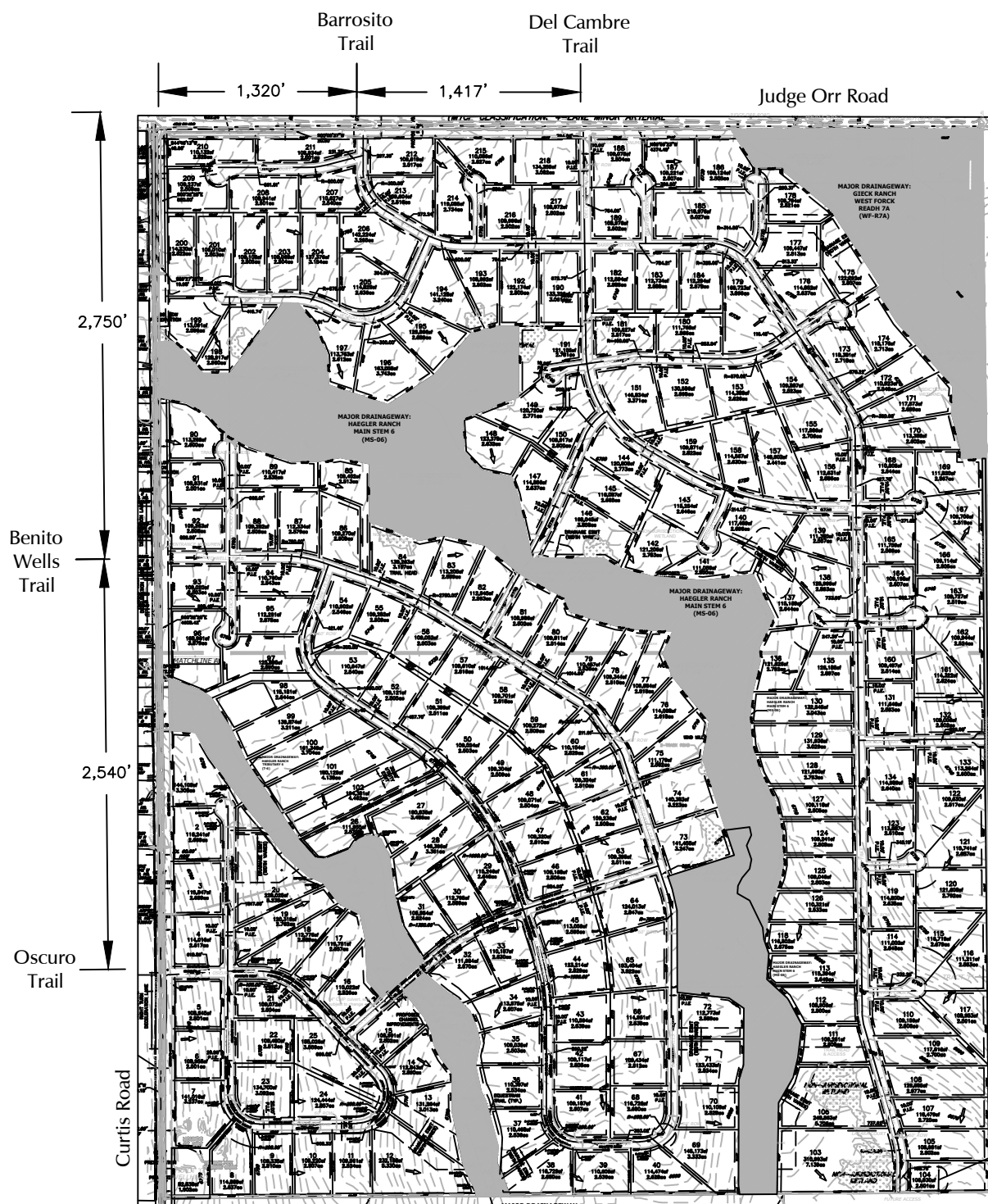
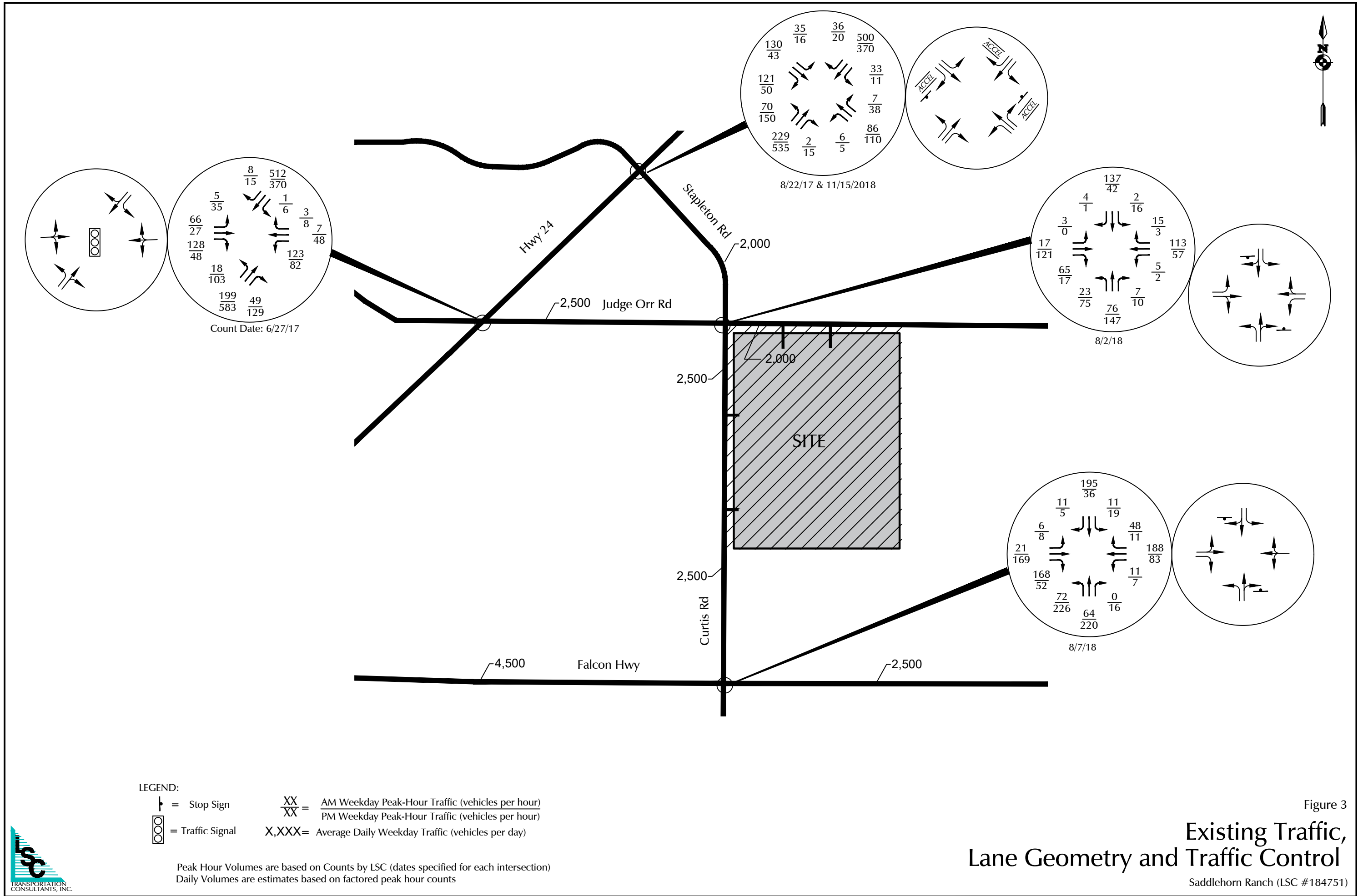
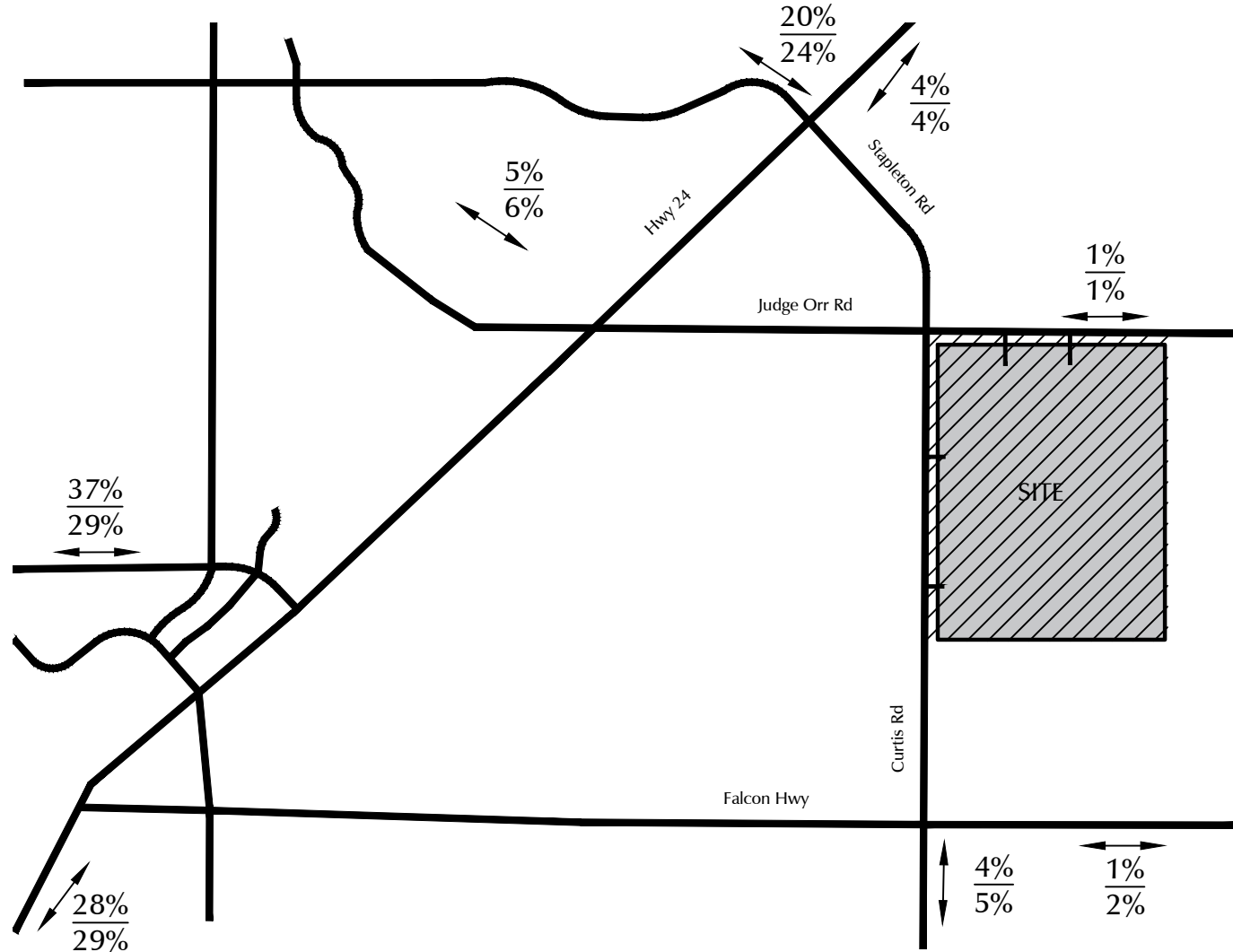


Figure 2

# Site Plan

Saddlehorn Ranch (LSC #184751)





Estimated Directional Distribution  
of Site-Generated Traffic

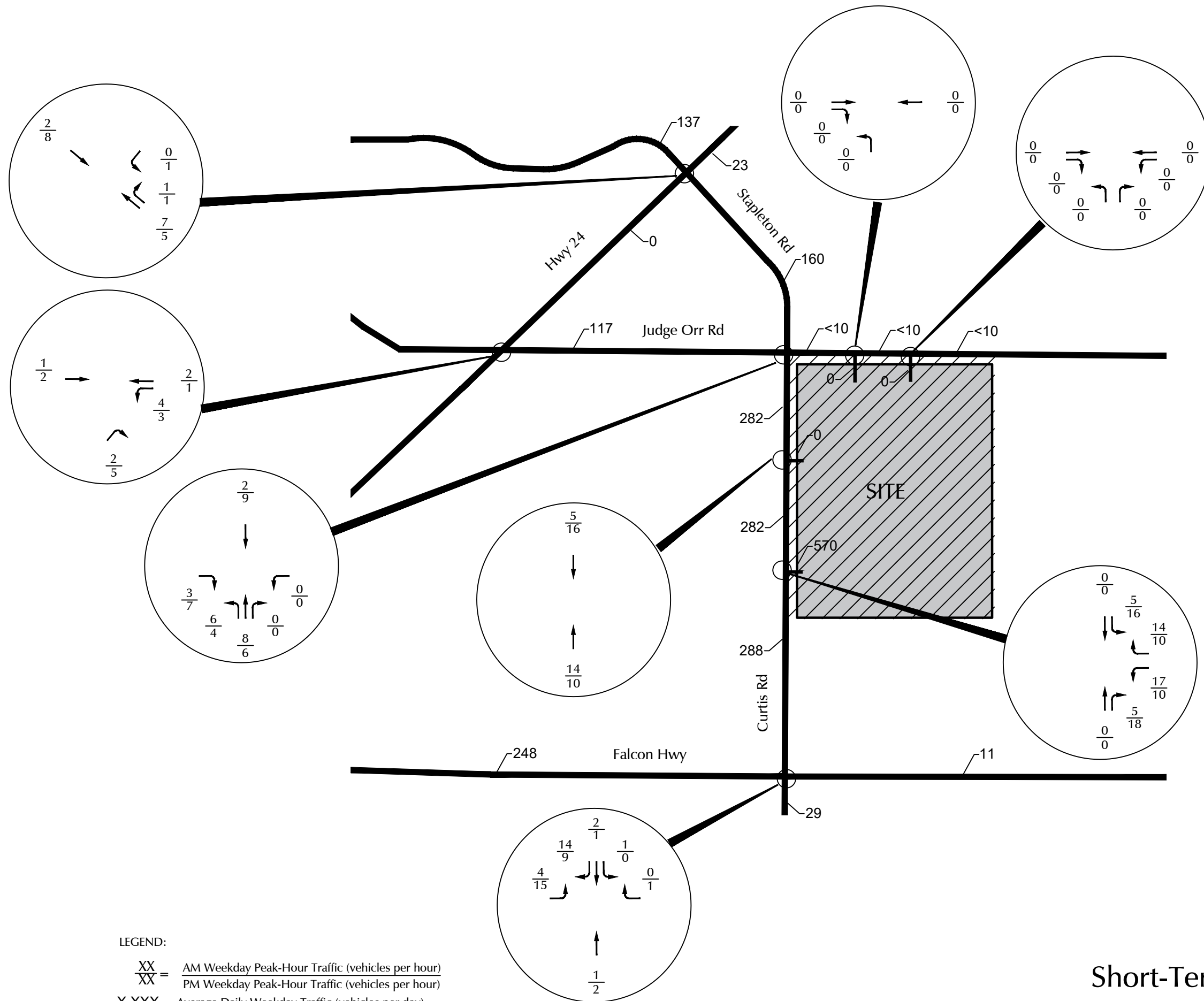
Figure 4

Saddlehorn Ranch (LSC #184751)

LEGEND:

$$\frac{\text{XX}\%}{\text{XX}\%} = \frac{\text{Percent Short-Term Distribution}}{\text{Percent Long-Term Distribution}}$$





LEGEND:

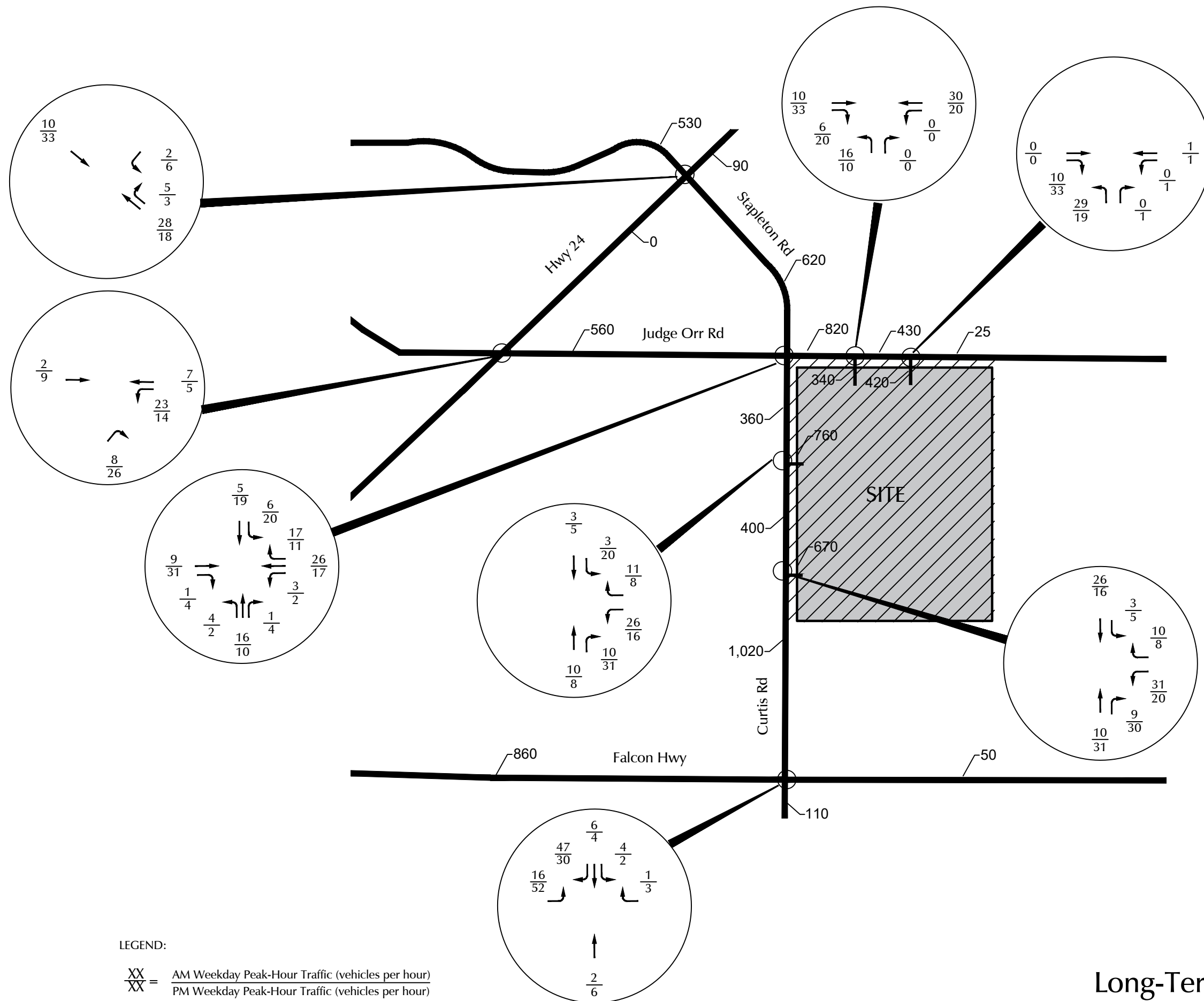
$\frac{XX}{XX}$  = AM Weekday Peak-Hour Traffic (vehicles per hour)  
 $\frac{XX}{XX}$  = PM Weekday Peak-Hour Traffic (vehicles per hour)

X,XXX= Average Daily Weekday Traffic (vehicles per day)



Figure 5  
Short-Term Site-Generated Traffic

Saddlehorn Ranch (LSC #184751)



LEGEND:

$\frac{XX}{XX}$  = AM Weekday Peak-Hour Traffic (vehicles per hour)  
PM Weekday Peak-Hour Traffic (vehicles per hour)

X,XXX = Average Daily Weekday Traffic (vehicles per day)

Figure 6

## Long-Term Site-Generated Traffic

Saddlehorn Ranch (LSC #184751)

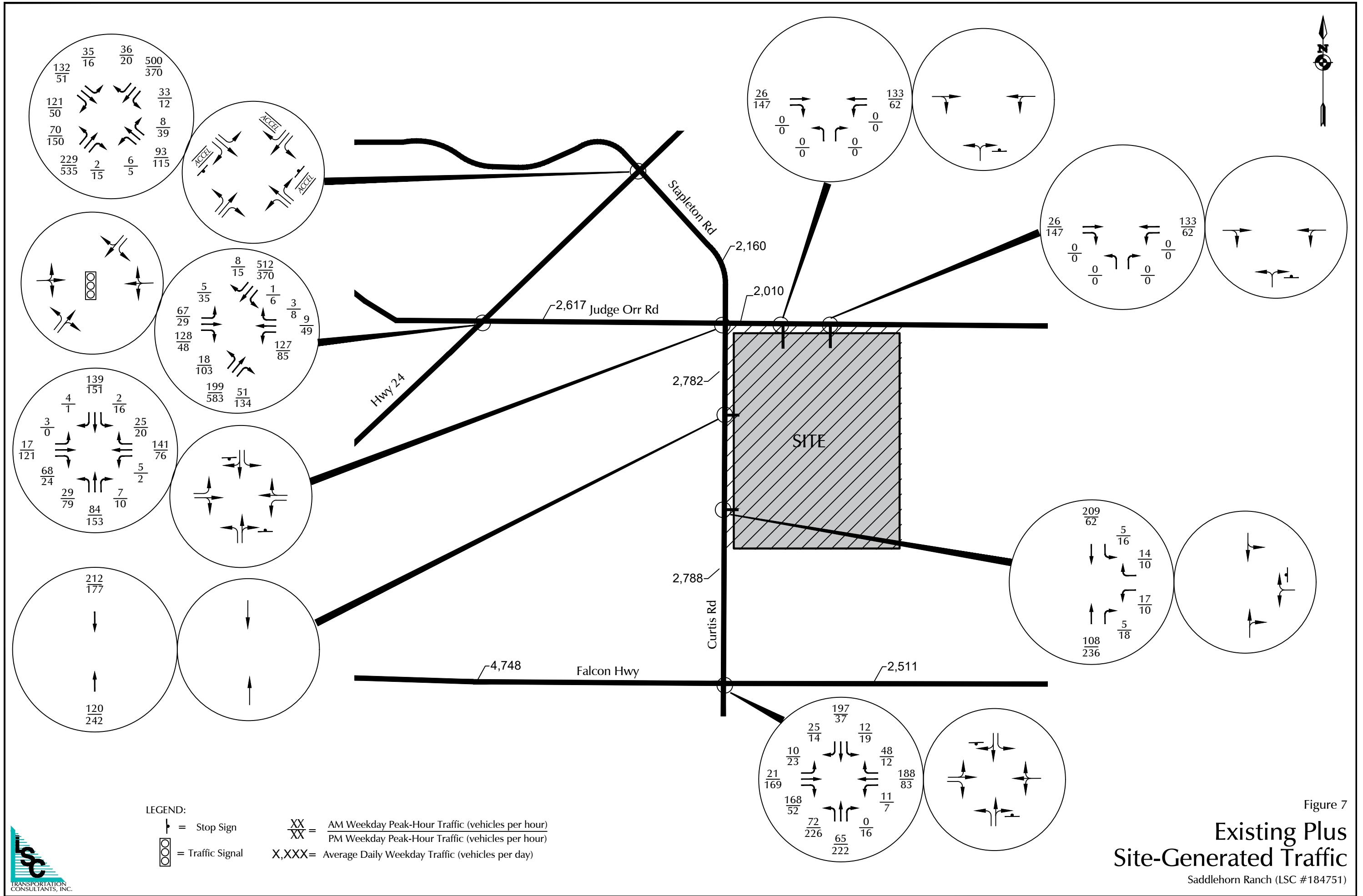


Figure 7  
**Existing Plus  
 Site-Generated Traffic**  
 Saddlehorn Ranch (LSC #184751)

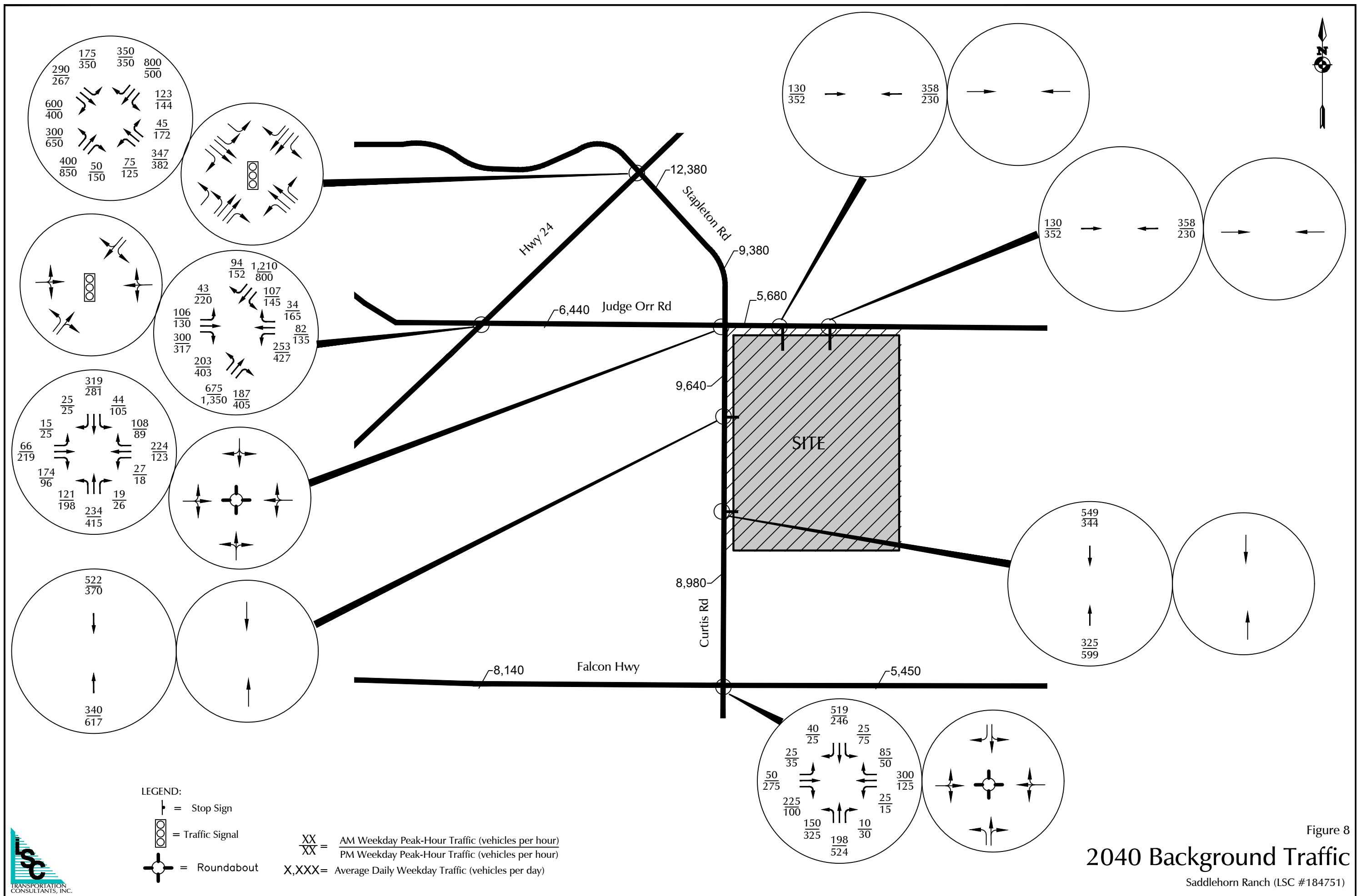


Figure 8  
**2040 Background Traffic**  
 Saddlehorn Ranch (LSC #184751)

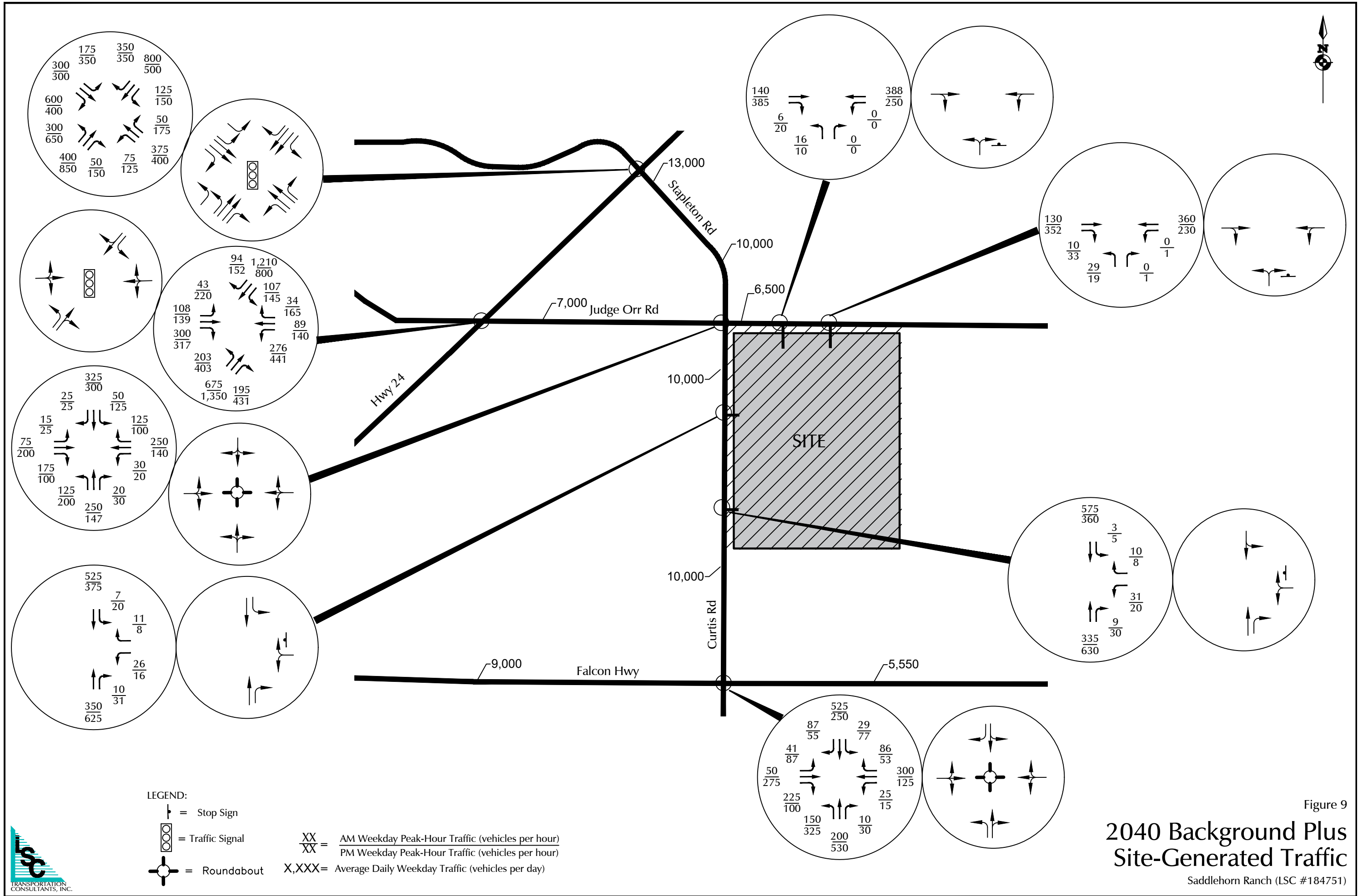


Figure 9  
**2040 Background Plus  
 Site-Generated Traffic**  
 Saddlehorn Ranch (LSC #184751)

# Traffic Counts

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# LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210

Colorado Springs, CO 80905

719-633-2868

File Name : Judge Orr Rd - Curtis Rd AM

Site Code : 187750

Start Date : 8/2/2018

Page No : 1

## Groups Printed- Unshifted

	Stapleton Rd Southbound				Judge Orr Rd Westbound				Curtis Rd Northbound				Judge Orr Rd Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
06:30	0	36	0	0	3	38	1	0	3	7	0	0	0	7	18	0	113
06:45	1	28	1	0	1	38	3	0	5	12	2	0	0	2	13	0	106
Total	1	64	1	0	4	76	4	0	8	19	2	0	0	9	31	0	219
07:00	0	33	0	0	2	30	3	0	8	18	0	0	0	5	20	0	119
07:15	0	36	0	0	1	22	5	0	6	26	1	0	2	4	23	0	126
07:30	1	40	3	0	1	23	4	0	4	20	4	0	1	6	9	0	116
07:45	2	26	0	0	1	17	6	0	8	12	0	0	0	4	8	0	84
Total	3	135	3	0	5	92	18	0	26	76	5	0	3	19	60	0	445
08:00	3	18	0	0	1	17	1	0	9	11	1	0	0	4	2	0	67
08:15	1	9	0	0	1	28	1	0	7	7	0	0	0	7	11	0	72
Grand Total	8	226	4	0	11	213	24	0	50	113	8	0	3	39	104	0	803
Apprch %	3.4	95	1.7	0	4.4	85.9	9.7	0	29.2	66.1	4.7	0	2.1	26.7	71.2	0	
Total %	1	28.1	0.5	0	1.4	26.5	3	0	6.2	14.1	1	0	0.4	4.9	13	0	

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545 E Pikes Peak Ave, Suite 210  
Colorado Springs, CO 80905  
719-633-2868

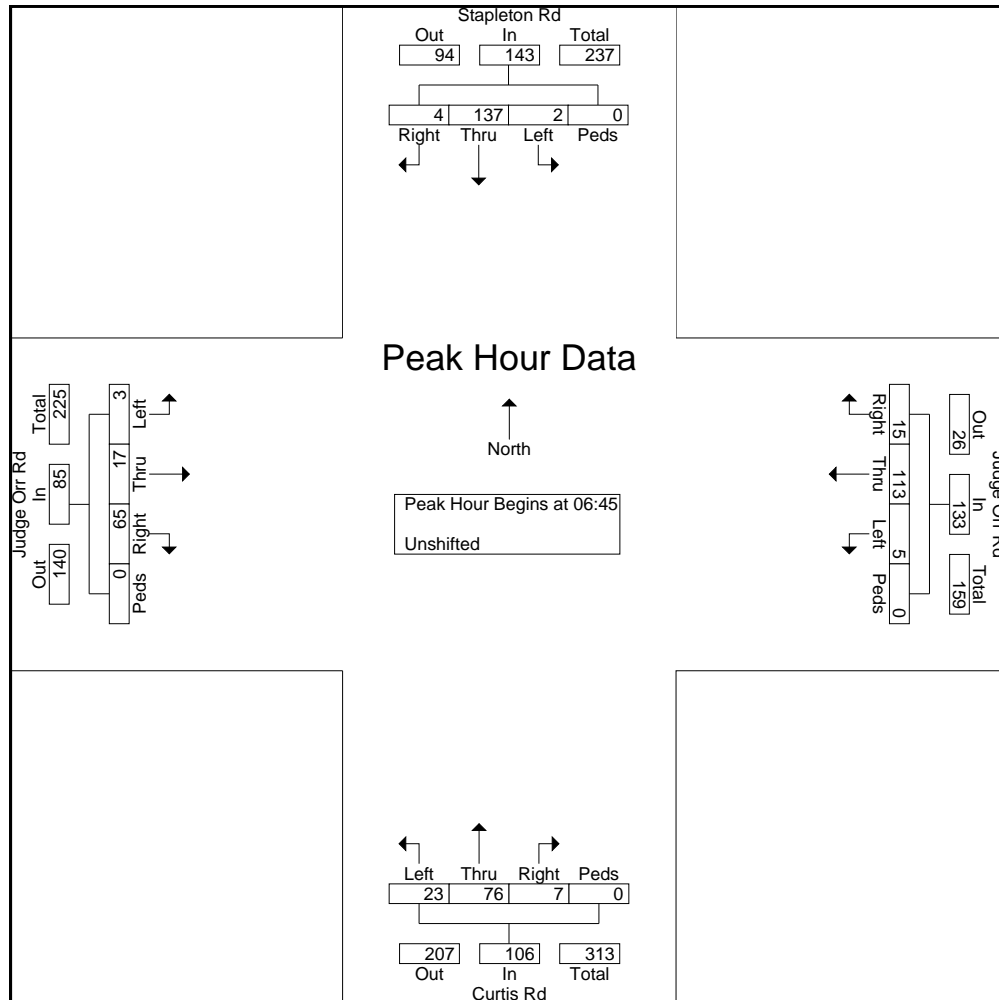
File Name : Judge Orr Rd - Curtis Rd AM

Site Code : 187750

Start Date : 8/2/2018

Page No : 2

	Stapleton Rd Southbound					Judge Orr Rd Westbound					Curtis Rd Northbound					Judge Orr Rd Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 to 08:15 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45																					
06:45	1	28	1	0	30	1	38	3	0	42	5	12	2	0	19	0	2	13	0	15	106
07:00	0	33	0	0	33	2	30	3	0	35	8	18	0	0	26	0	5	20	0	25	119
07:15	0	36	0	0	36	1	22	5	0	28	6	26	1	0	33	2	4	23	0	29	126
07:30	1	40	3	0	44	1	23	4	0	28	4	20	4	0	28	1	6	9	0	16	116
Total Volume	2	137	4	0	143	5	113	15	0	133	23	76	7	0	106	3	17	65	0	85	467
% App. Total	1.4	95.8	2.8	0		3.8	85	11.3	0		21.7	71.7	6.6	0		3.5	20	76.5	0		
PHF	.500	.856	.333	.000	.813	.625	.743	.750	.000	.792	.719	.731	.438	.000	.803	.375	.708	.707	.000	.733	.927





# LSC Transportation Consultants, Inc.

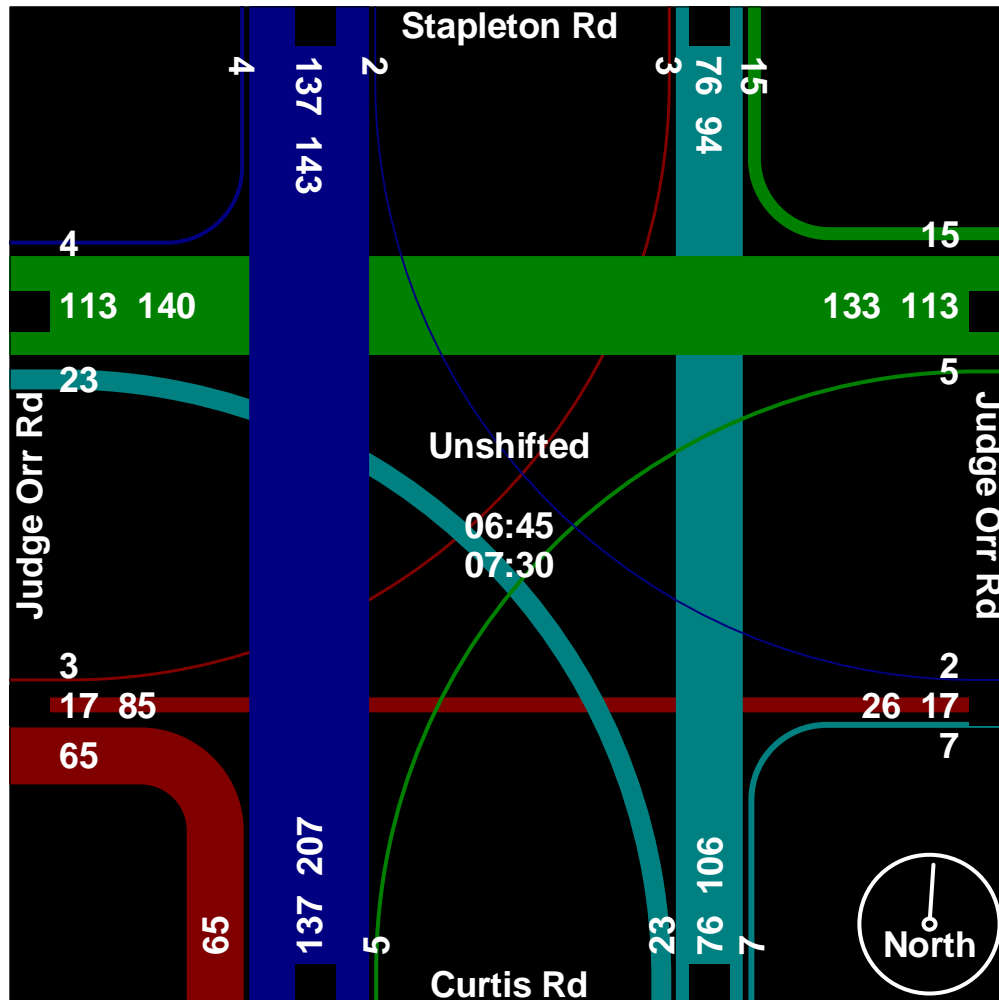
545 E Pikes Peak Ave, Suite 210  
Colorado Springs, CO 80905  
719-633-2868

File Name : Judge Orr Rd - Curtis Rd AM

Site Code : 187750

Start Date : 8/2/2018

Page No : 3



# LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210

Colorado Springs, CO 80905

719-633-2868

File Name : Curtis Rd -Judge Orr Rd PM

Site Code : 00184750

Start Date : 8/2/2018

Page No : 1

## Groups Printed- Unshifted

	Stapleton Rd Southbound				Judge Orr Rd Westbound				Curtis Rd Northbound				Judge Orr Rd Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
16:00	3	7	1	0	0	12	1	0	20	22	3	0	0	28	7	0	104
16:15	7	8	0	0	1	25	1	0	20	40	5	0	0	33	5	0	145
16:30	5	9	0	0	0	13	1	0	13	36	0	0	0	29	4	0	110
16:45	2	14	1	0	1	9	0	0	22	28	3	0	0	28	4	0	112
Total	17	38	2	0	2	59	3	0	75	126	11	0	0	118	20	0	471
17:00	2	11	0	0	0	10	1	0	20	43	2	0	0	31	4	0	124
17:15	3	13	0	0	1	9	0	0	14	29	3	0	0	30	4	0	106
17:30	4	13	1	0	1	7	1	0	9	22	3	0	0	33	5	0	99
17:45	8	8	1	0	0	8	1	0	8	24	4	0	1	25	3	0	91
Total	17	45	2	0	2	34	3	0	51	118	12	0	1	119	16	0	420
Grand Total	34	83	4	0	4	93	6	0	126	244	23	0	1	237	36	0	891
Apprch %	28.1	68.6	3.3	0	3.9	90.3	5.8	0	32.1	62.1	5.9	0	0.4	86.5	13.1	0	
Total %	3.8	9.3	0.4	0	0.4	10.4	0.7	0	14.1	27.4	2.6	0	0.1	26.6	4	0	

# LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210

Colorado Springs, CO 80905

719-633-2868

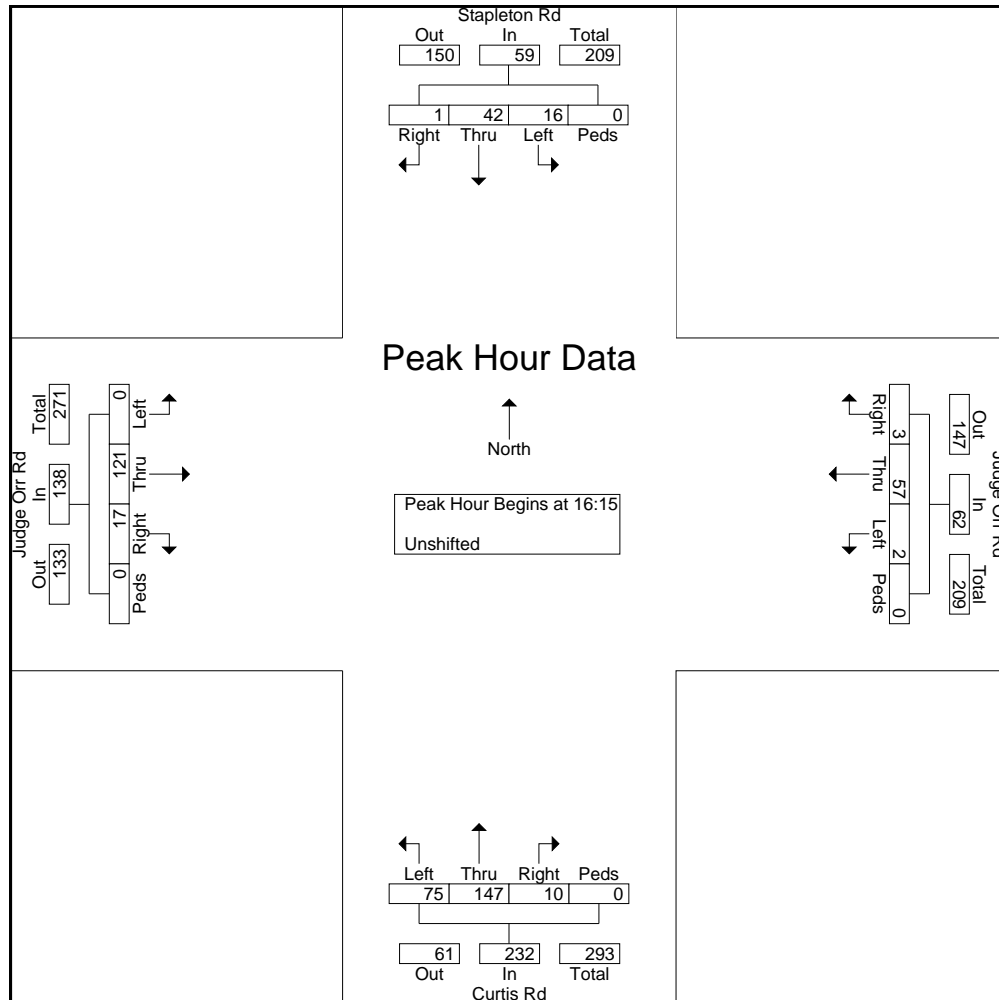
File Name : Curtis Rd -Judge Orr Rd PM

Site Code : 00184750

Start Date : 8/2/2018

Page No : 2

	Stapleton Rd Southbound					Judge Orr Rd Westbound					Curtis Rd Northbound					Judge Orr Rd Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:15																					
16:15	7	8	0	0	15	1	25	1	0	27	20	40	5	0	65	0	33	5	0	38	145
16:30	5	9	0	0	14	0	13	1	0	14	13	36	0	0	49	0	29	4	0	33	110
16:45	2	14	1	0	17	1	9	0	0	10	22	28	3	0	53	0	28	4	0	32	112
17:00	2	11	0	0	13	0	10	1	0	11	20	43	2	0	65	0	31	4	0	35	124
Total Volume	16	42	1	0	59	2	57	3	0	62	75	147	10	0	232	0	121	17	0	138	491
% App. Total	27.1	71.2	1.7	0		3.2	91.9	4.8	0		32.3	63.4	4.3	0		0	87.7	12.3	0		
PHF	.571	.750	.250	.000	.868	.500	.570	.750	.000	.574	.852	.855	.500	.000	.892	.000	.917	.850	.000	.908	.847



# LSC Transportation Consultants, Inc.

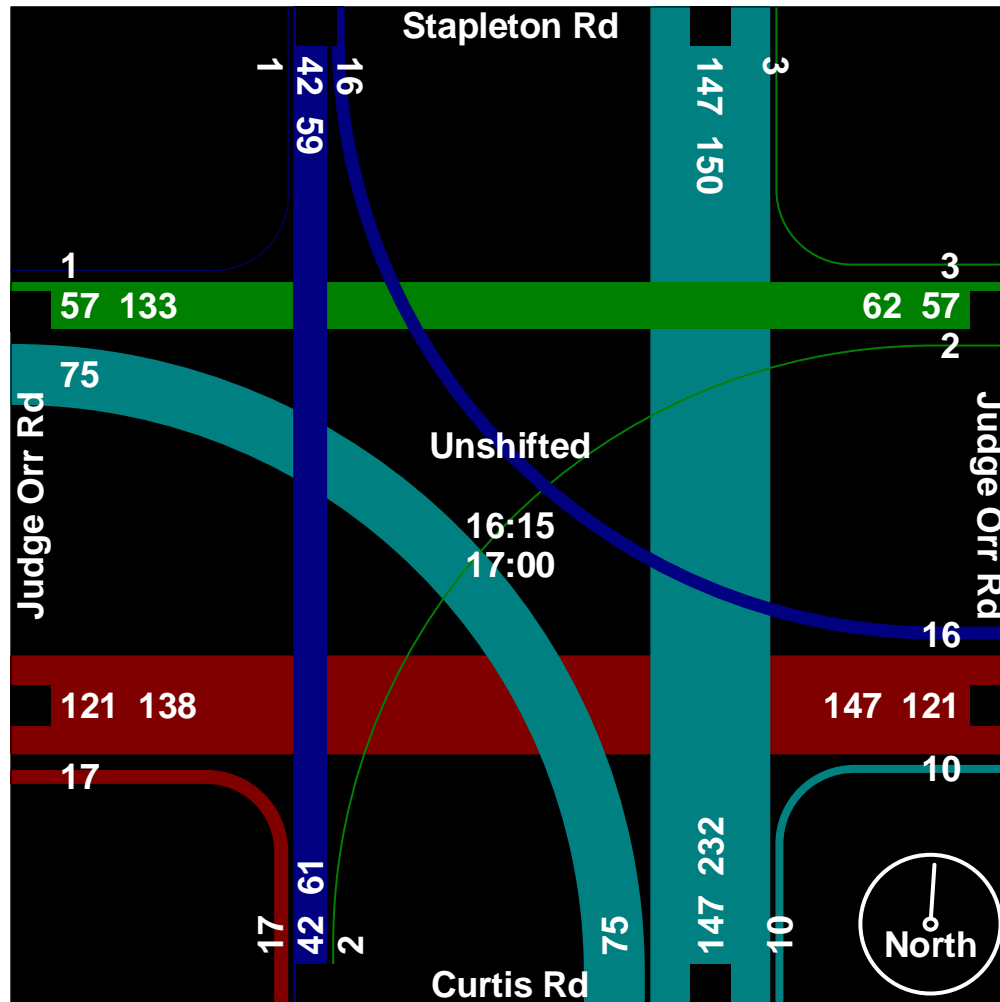
545 E Pikes Peak Ave, Suite 210  
Colorado Springs, CO 80905  
719-633-2868

File Name : Curtis Rd -Judge Orr Rd PM

Site Code : 00184750

Start Date : 8/2/2018

Page No : 3



Counts by LSC

LSC Transportation Consultants, Inc.

File Name : Hwy 24 - Judge Orr Rr AM

Site Code : 00000000

Start Date : 06/27/2017

Page No : 1

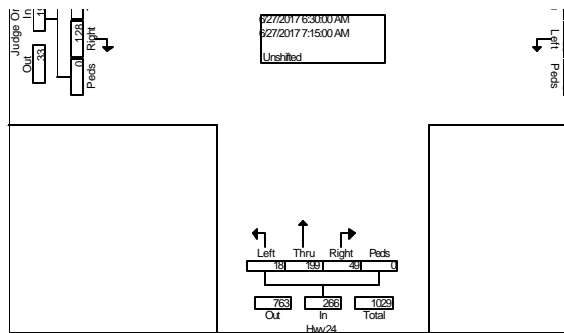
Groups Printed- Unshifted

	Hwy 24 From North				Judge Orr Rd From East				Hwy 24 From South				Judge Orr Rd From West				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	4	150	0	0	1	1	38	0	12	65	5	0	33	19	2	0	330
06:45 AM	2	127	0	0	1	2	26	0	12	40	6	0	38	9	0	0	263
Total	6	277	0	0	2	3	64	0	24	105	11	0	71	28	2	0	593
07:00 AM	2	124	0	0	0	2	33	0	7	49	1	0	33	25	0	0	276
07:15 AM	0	111	1	0	1	2	26	0	18	45	6	0	24	13	3	0	250
07:30 AM	0	123	0	0	0	6	31	0	13	56	11	0	25	15	3	0	283
07:45 AM	2	96	0	0	1	9	28	0	14	66	4	0	26	14	3	0	263
Total	4	454	1	0	2	19	118	0	52	216	22	0	108	67	9	0	1072
08:00 AM	3	91	2	0	0	4	21	0	13	69	7	0	14	9	5	0	238
08:15 AM	1	88	0	0	1	3	18	0	12	65	6	0	15	8	4	0	221
Grand Total	14	910	3	0	5	29	221	0	101	455	46	0	208	112	20	0	2124
Apprch %	1.5	98.2	0.3	0.0	2.0	11.4	86.7	0.0	16.8	75.6	7.6	0.0	61.2	32.9	5.9	0.0	
Total %	0.7	42.8	0.1	0.0	0.2	1.4	10.4	0.0	4.8	21.4	2.2	0.0	9.8	5.3	0.9	0.0	

Counts by LSC

File Name : Hwy 24 - Judge Orr Rr AM  
 Site Code : 00000000  
 Start Date : 06/27/2017  
 Page No : 2

	Hwy 24 From North					Judge Orr Rd From East					Hwy 24 From South					Judge Orr Rd From West					
Start Time	Rig ht	Thr u	Lef t	Pe ds	App. Total	Rig ht	Thr u	Lef t	Pe ds	App. Total	Rig ht	Thr u	Lef t	Pe ds	App. Total	Rig ht	Thr u	Lef t	Pe ds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	06:30 AM																				
Volume	8	512	1	0	521	3	7	123	0	133	49	199	18	0	266	128	66	5	0	199	1119
Percent	1.5	98.3	0.2	0.0		2.3	5.3	92.5	0.0		18.4	74.8	6.8	0.0		64.3	33.2	2.5	0.0		
06:30 Volume	4	150	0	0	154	1	1	38	0	40	12	65	5	0	82	33	19	2	0	54	330
Peak Factor																					0.848
High Int.	06:30 AM					06:30 AM					06:30 AM					07:00 AM					
Volume	4	150	0	0	154	1	1	38	0	40	12	65	5	0	82	33	25	0	0	58	
Peak Factor					0.846					0.831					0.811					0.858	



Counts by LSC

LSC Transportation Consultants, Inc.

File Name : Hwy 24 - Judge Orr Rr PM

Site Code : 00000000

Start Date : 06/27/2017

Page No : 1

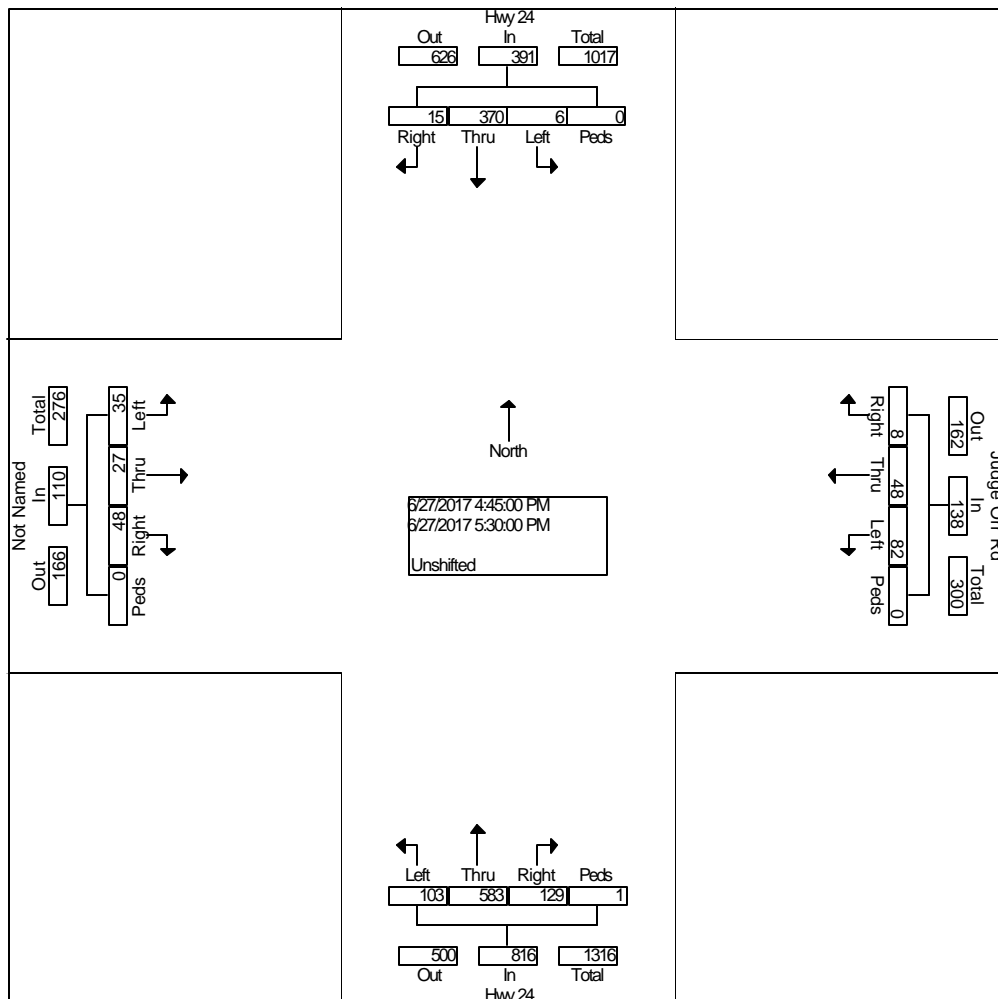
Groups Printed- Unshifted

	Hwy 24 From North				Judge Orr Rd From East				Hwy 24 From South				From West				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
04:00 PM	1	78	0	0	0	13	15	0	39	137	26	0	9	9	4	0	331
04:15 PM	2	80	2	0	1	17	16	0	42	149	29	0	8	10	5	0	361
04:30 PM	2	90	0	0	0	24	35	0	27	119	29	0	10	10	10	0	356
04:45 PM	3	101	2	0	5	21	15	0	42	144	27	1	6	5	10	0	382
Total	8	349	4	0	6	75	81	0	150	549	111	1	33	34	29	0	1430
05:00 PM	4	81	1	0	1	11	28	0	32	141	28	0	15	6	7	0	355
05:15 PM	4	95	2	0	2	10	21	0	32	134	19	0	13	11	11	0	354
05:30 PM	4	93	1	0	0	6	18	0	23	164	29	0	14	5	7	0	364
05:45 PM	3	89	1	0	0	8	16	0	21	152	26	0	12	7	5	0	340
Total	15	358	5	0	3	35	83	0	108	591	102	0	54	29	30	0	1413
Grand Total	23	707	9	0	9	110	164	0	258	1140	213	1	87	63	59	0	2843
Apprch %	3.1	95.7	1.2	0.0	3.2	38.9	58.0	0.0	16.0	70.7	13.2	0.1	41.6	30.1	28.2	0.0	
Total %	0.8	24.9	0.3	0.0	0.3	3.9	5.8	0.0	9.1	40.1	7.5	0.0	3.1	2.2	2.1	0.0	

# Counts by LSC

File Name : Hwy 24 - Judge Orr Rr PM  
 Site Code : 00000000  
 Start Date : 06/27/2017  
 Page No : 2

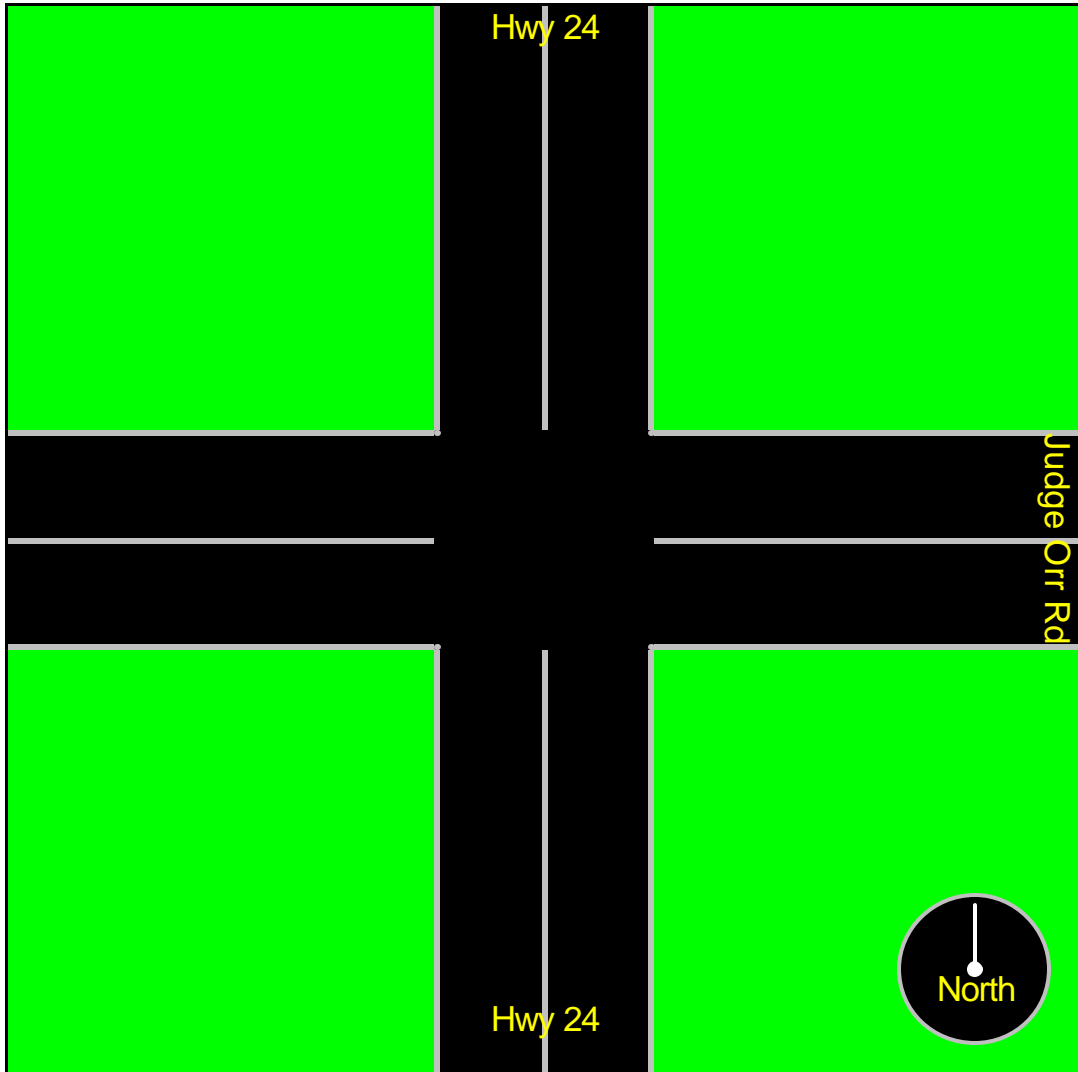
	Hwy 24 From North					Judge Orr Rd From East					Hwy 24 From South					From West					
Start Time	Rig ht	Thr u	Lef t	Pe ds	App. Total	Rig ht	Thr u	Lef t	Pe ds	App. Total	Rig ht	Thr u	Lef t	Pe ds	App. Total	Rig ht	Thr u	Lef t	Pe ds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	04:45 PM																				
Volume	15	370	6	0	391	8	48	82	0	138	12	58	10	1	816	48	27	35	0	110	1455
Percent	3.8	94.6	1.5	0.0		5.8	34.8	59.4	0.0		15.8	71.4	12.6	0.1		43.6	24.5	31.8	0.0		
04:45 Volume	3	101	2	0	106	5	21	15	0	41	42	144	27	1	214	6	5	10	0	21	382
Peak Factor																					0.952
High Int.	04:45 PM					04:45 PM					05:30 PM					05:15 PM					
Volume	3	101	2	0	106	5	21	15	0	41	23	164	29	0	216	13	11	11	0	35	
Peak Factor					0.92					0.84				0.94						0.78	6





Counts by LSC

File Name : Hwy 24 - Judge Orr Rr PM  
Site Code : 00000000  
Start Date : 06/27/2017  
Page No : 3



# LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210

Colorado Springs, CO 80905

719-633-2868

File Name : Hwy 24 - Stapleton Rd AM 11-18

Site Code : 184750

Start Date : 11/15/2018

Page No : 1

## Groups Printed- Unshifted

	Hwy 24 Southbound				Stapleton Dr Westbound				Hwy 24 Northbound				Stapleton Dr Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30	4	120	3	0	0	11	3	0	5	39	0	0	2	30	26	0	243
06:45	7	123	7	0	0	12	4	0	13	55	0	0	11	25	33	0	290
Total	11	243	10	0	0	23	7	0	18	94	0	0	13	55	59	0	533
07:00	9	125	8	0	1	22	4	0	24	70	0	0	12	37	33	0	345
07:15	7	139	11	0	0	29	4	0	18	51	0	0	10	39	27	0	335
07:30	6	115	10	0	1	24	0	0	15	48	1	0	3	28	28	0	279
07:45	6	106	9	0	0	11	4	0	6	43	1	0	5	19	19	0	229
Total	28	485	38	0	2	86	12	0	63	212	2	0	30	123	107	0	1188
08:00	2	74	6	0	4	11	2	0	13	66	0	0	1	10	17	0	206
08:15	3	86	5	0	3	9	0	0	8	60	2	0	2	9	13	0	200
Grand Total	44	888	59	0	9	129	21	0	102	432	4	0	46	197	196	0	2127
Apprch %	4.4	89.6	6	0	5.7	81.1	13.2	0	19	80.3	0.7	0	10.5	44.9	44.6	0	
Total %	2.1	41.7	2.8	0	0.4	6.1	1	0	4.8	20.3	0.2	0	2.2	9.3	9.2	0	

# LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210

Colorado Springs, CO 80905

719-633-2868

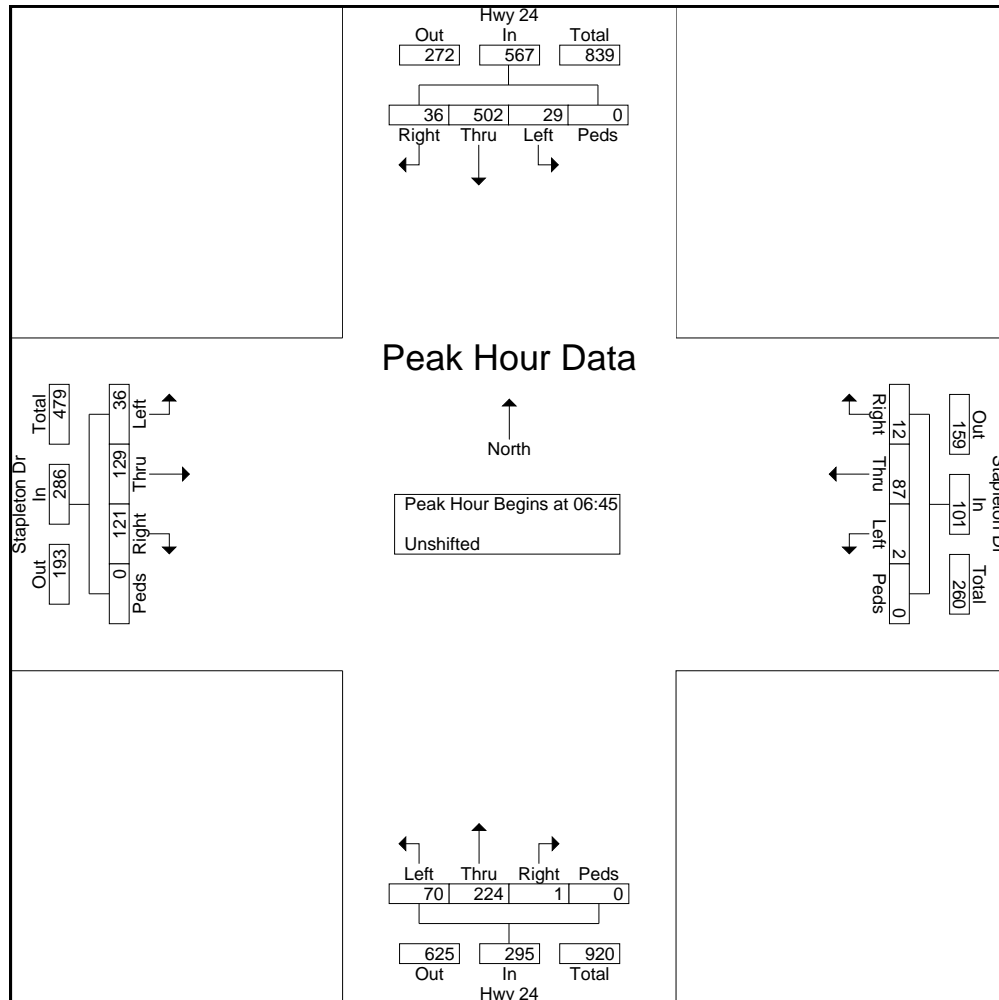
File Name : Hwy 24 - Stapleton Rd AM 11-18

Site Code : 184750

Start Date : 11/15/2018

Page No : 2

	Hwy 24 Southbound					Stapleton Dr Westbound					Hwy 24 Northbound					Stapleton Dr Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 to 08:15 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45																					
06:45	7	123	7	0	137	0	12	4	0	16	13	55	0	0	68	11	25	33	0	69	290
07:00	9	125	8	0	142	1	22	4	0	27	24	70	0	0	94	12	37	33	0	82	345
07:15	7	139	11	0	157	0	29	4	0	33	18	51	0	0	69	10	39	27	0	76	335
07:30	6	115	10	0	131	1	24	0	0	25	15	48	1	0	64	3	28	28	0	59	279
Total Volume	29	502	36	0	567	2	87	12	0	101	70	224	1	0	295	36	129	121	0	286	1249
% App. Total	5.1	88.5	6.3	0		2	86.1	11.9	0		23.7	75.9	0.3	0		12.6	45.1	42.3	0		
PHF	.806	.903	.818	.000	.903	.500	.750	.750	.000	.765	.729	.800	.250	.000	.785	.750	.827	.917	.000	.872	.905



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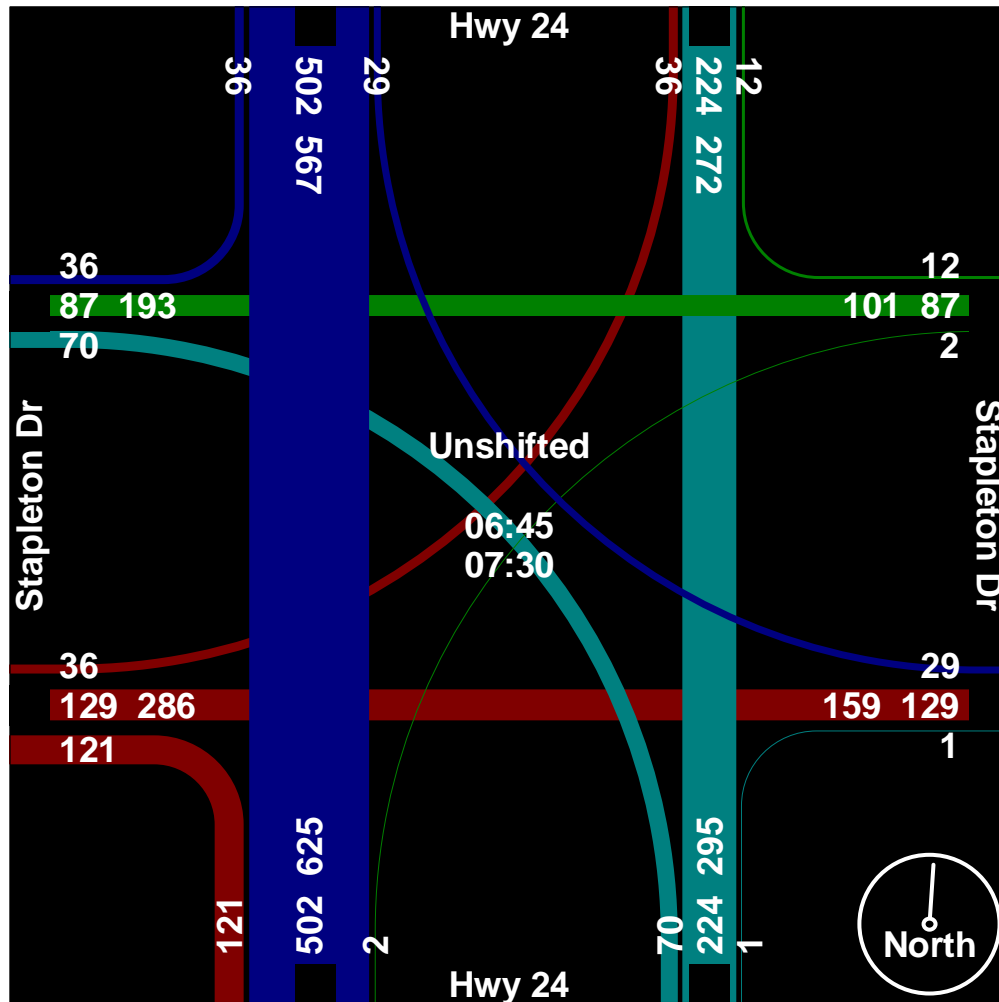
719-633-2868

File Name : Hwy 24 - Stapleton Rd AM 11-18

Site Code : 184750

Start Date : 11/15/2018

Page No : 3



Counts by LSC

LSC Transportation Consultants, Inc.

File Name : Hwy 24 - Stapleton Rd PM

Site Code : 00174480

Start Date : 08/22/2017

Page No : 1

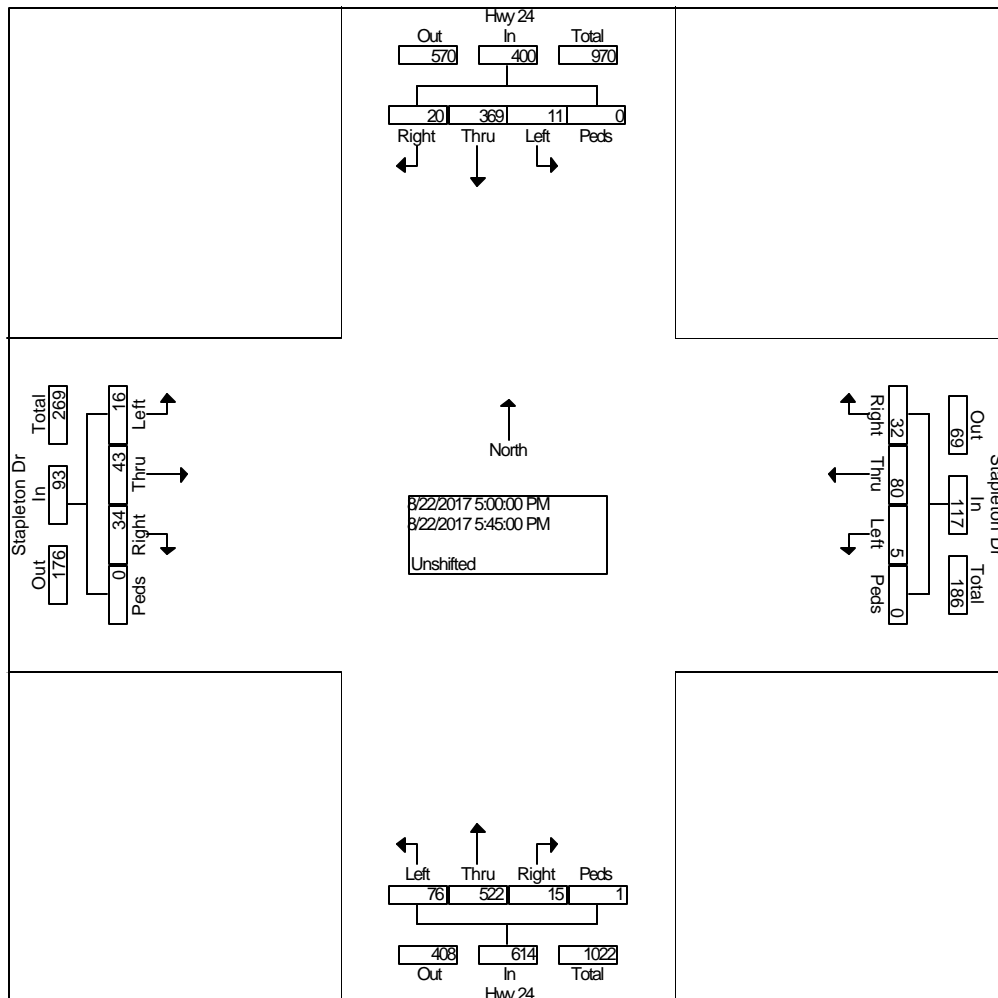
Groups Printed- Unshifted

	Hwy 24 From North				Stapleton Dr From East				Hwy 24 From South				Stapleton Dr From West				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
04:00 PM	5	103	2	0	3	19	2	0	2	98	17	1	12	10	4	0	278
04:15 PM	8	100	2	0	3	28	1	0	7	94	14	0	3	8	2	0	270
04:30 PM	3	95	1	0	8	28	1	0	3	119	16	0	8	4	8	0	294
04:45 PM	1	92	1	0	11	22	1	0	5	111	21	0	4	2	3	0	274
Total	17	390	6	0	25	97	5	0	17	422	68	1	27	24	17	0	1116
05:00 PM	9	109	1	0	11	25	0	0	3	109	17	1	10	14	4	0	313
05:15 PM	4	89	3	0	5	22	0	0	6	127	24	0	8	6	4	0	298
05:30 PM	5	77	2	0	9	14	2	0	0	155	22	0	6	12	5	0	309
05:45 PM	2	94	5	0	7	19	3	0	6	131	13	0	10	11	3	0	304
Total	20	369	11	0	32	80	5	0	15	522	76	1	34	43	16	0	1224
Grand Total	37	759	17	0	57	177	10	0	32	944	144	2	61	67	33	0	2340
Apprch %	4.6	93.4	2.1	0.0	23.4	72.5	4.1	0.0	2.9	84.1	12.8	0.2	37.9	41.6	20.5	0.0	
Total %	1.6	32.4	0.7	0.0	2.4	7.6	0.4	0.0	1.4	40.3	6.2	0.1	2.6	2.9	1.4	0.0	

# Counts by LSC

File Name : Hwy 24 - Stapleton Rd PM  
 Site Code : 00174480  
 Start Date : 08/22/2017  
 Page No : 2

	Hwy 24 From North					Stapleton Dr From East					Hwy 24 From South					Stapleton Dr From West					
Start Time	Rig ht	Thr u	Lef t	Pe ds	App. Total	Rig ht	Thr u	Lef t	Pe ds	App. Total	Rig ht	Thr u	Lef t	Pe ds	App. Total	Rig ht	Thr u	Lef t	Pe ds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	05:00 PM																				
Volume	20	369	11	0	400	32	80	5	0	117	15	522	76	1	614	34	43	16	0	93	1224
Percent	5.0	92.3	2.8	0.0		27.4	68.4	4.3	0.0		2.4	85.0	12.4	0.2		36.6	46.2	17.2	0.0		
05:00 Volume	9	109	1	0	119	11	25	0	0	36	3	109	17	1	130	10	14	4	0	28	313
Peak Factor																					0.978
High Int.	05:00 PM					05:00 PM					05:30 PM					05:00 PM					
Volume	9	109	1	0	119	11	25	0	0	36	0	155	22	0	177	10	14	4	0	28	
Peak Factor					0.840					0.813					0.867					0.830	



# LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210

Colorado Springs, CO 80905

719-633-2868

File Name : Curtis Rd-Falcon Hwy AM

Site Code : 00184750

Start Date : 8/7/2018

Page No : 1

## Groups Printed- Unshifted

	Curtis Rd Southbound				Falcon Hwy Westbound				Curtis Rd Northbound				Falcon Hwy Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
06:30	0	49	0	0	1	47	2	0	20	2	1	0	0	2	41	0	165
06:45	1	40	2	0	1	51	12	0	13	9	0	0	2	5	46	0	182
Total	1	89	2	0	2	98	14	0	33	11	1	0	2	7	87	0	347
07:00	1	55	2	0	4	54	21	0	14	24	0	0	2	4	40	0	221
07:15	4	54	3	0	4	41	5	0	24	17	0	0	1	4	41	0	198
07:30	5	46	4	0	2	42	10	0	21	14	0	0	1	8	41	0	194
07:45	0	26	0	0	0	34	4	0	11	11	2	0	0	21	28	0	137
Total	10	181	9	0	10	171	40	0	70	66	2	0	4	37	150	0	750
08:00	0	26	1	0	4	43	5	0	18	11	0	0	0	6	22	0	136
08:15	10	29	2	0	3	33	3	0	17	12	0	0	0	16	30	0	155
Grand Total	21	325	14	0	19	345	62	0	138	100	3	0	6	66	289	0	1388
Apprch %	5.8	90.3	3.9	0	4.5	81	14.6	0	57.3	41.5	1.2	0	1.7	18.3	80.1	0	
Total %	1.5	23.4	1	0	1.4	24.9	4.5	0	9.9	7.2	0.2	0	0.4	4.8	20.8	0	

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719-633-2868

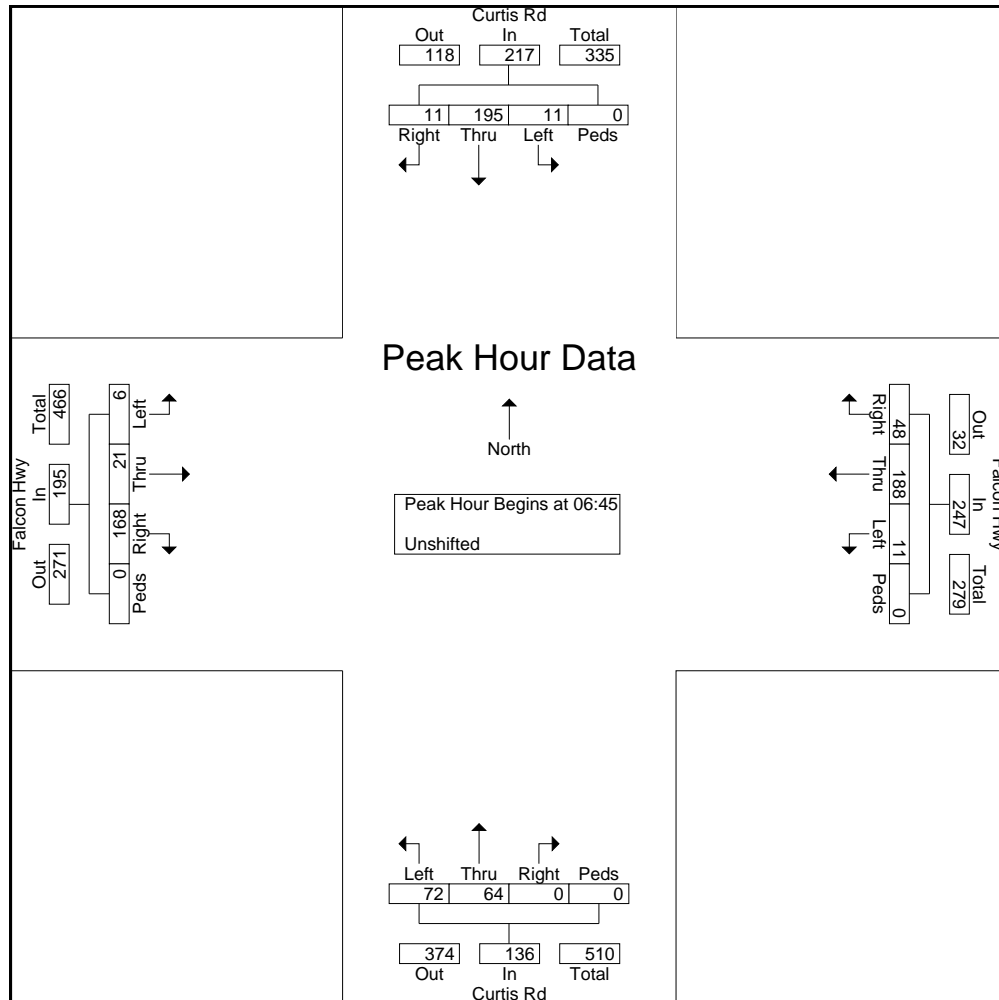
File Name : Curtis Rd-Falcon Hwy AM

Site Code : 00184750

Start Date : 8/7/2018

Page No : 2

	Curtis Rd Southbound					Falcon Hwy Westbound					Curtis Rd Northbound					Falcon Hwy Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 to 08:15 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45																					
06:45	1	40	2	0	43	1	51	12	0	64	13	9	0	0	22	2	5	46	0	53	182
07:00	1	55	2	0	58	4	54	21	0	79	14	24	0	0	38	2	4	40	0	46	221
07:15	4	54	3	0	61	4	41	5	0	50	24	17	0	0	41	1	4	41	0	46	198
07:30	5	46	4	0	55	2	42	10	0	54	21	14	0	0	35	1	8	41	0	50	194
Total Volume	11	195	11	0	217	11	188	48	0	247	72	64	0	0	136	6	21	168	0	195	795
% App. Total	5.1	89.9	5.1	0		4.5	76.1	19.4	0		52.9	47.1	0	0		3.1	10.8	86.2	0		
PHF	.550	.886	.688	.000	.889	.688	.870	.571	.000	.782	.750	.667	.000	.000	.829	.750	.656	.913	.000	.920	.899





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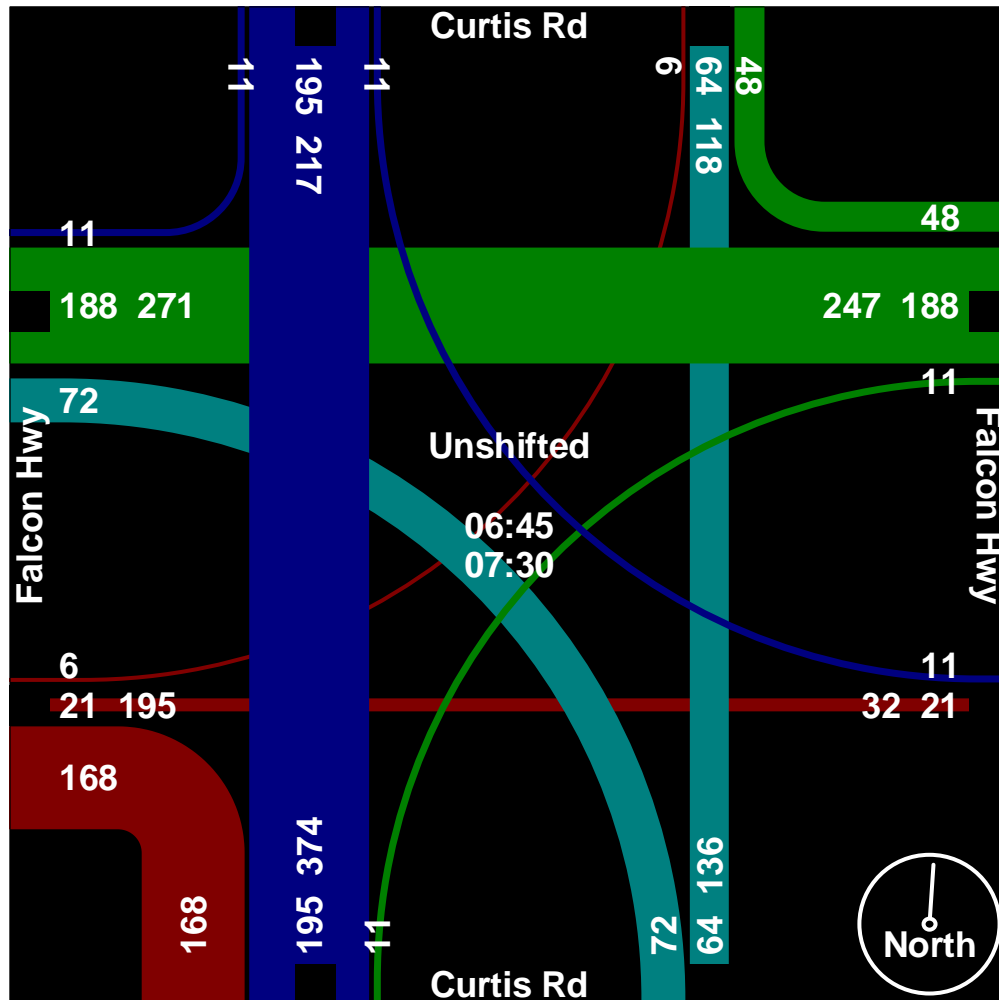
545 E Pikes Peak Ave, Suite 210  
Colorado Springs, CO 80905  
719-633-2868

File Name : Curtis Rd-Falcon Hwy AM

Site Code : 00184750

Start Date : 8/7/2018

Page No : 3



# LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210

Colorado Springs, CO 80905

719-633-2868

File Name : Curtis Rd-Falcon Hwy PM

Site Code : 00184750

Start Date : 8/7/2018

Page No : 1

## Groups Printed- Unshifted

	Curtis Rd Southbound				Falcon Hwy Westbound				Curtis rd Northbound				Falcon Hwy Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
16:00	4	10	1	0	2	22	1	0	47	35	4	0	0	47	11	0	184
16:15	3	9	2	0	3	19	3	0	69	71	6	0	4	35	10	0	234
16:30	5	10	1	0	2	16	4	0	65	58	1	0	3	39	10	0	214
16:45	7	7	1	0	0	26	3	0	45	56	5	0	1	48	21	0	220
Total	19	36	5	0	7	83	11	0	226	220	16	0	8	169	52	0	852
17:00	2	8	1	0	2	18	4	0	32	42	2	0	5	43	18	0	177
17:15	3	9	1	0	0	22	2	0	37	29	8	0	3	49	17	0	180
17:30	5	10	1	0	1	19	3	0	28	21	6	0	2	50	22	0	168
17:45	5	7	1	0	3	18	2	0	16	20	3	0	2	52	15	0	144
Total	15	34	4	0	6	77	11	0	113	112	19	0	12	194	72	0	669
Grand Total	34	70	9	0	13	160	22	0	339	332	35	0	20	363	124	0	1521
Apprch %	30.1	61.9	8	0	6.7	82.1	11.3	0	48	47	5	0	3.9	71.6	24.5	0	
Total %	2.2	4.6	0.6	0	0.9	10.5	1.4	0	22.3	21.8	2.3	0	1.3	23.9	8.2	0	

# LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210  
Colorado Springs, CO 80905  
719-633-2868

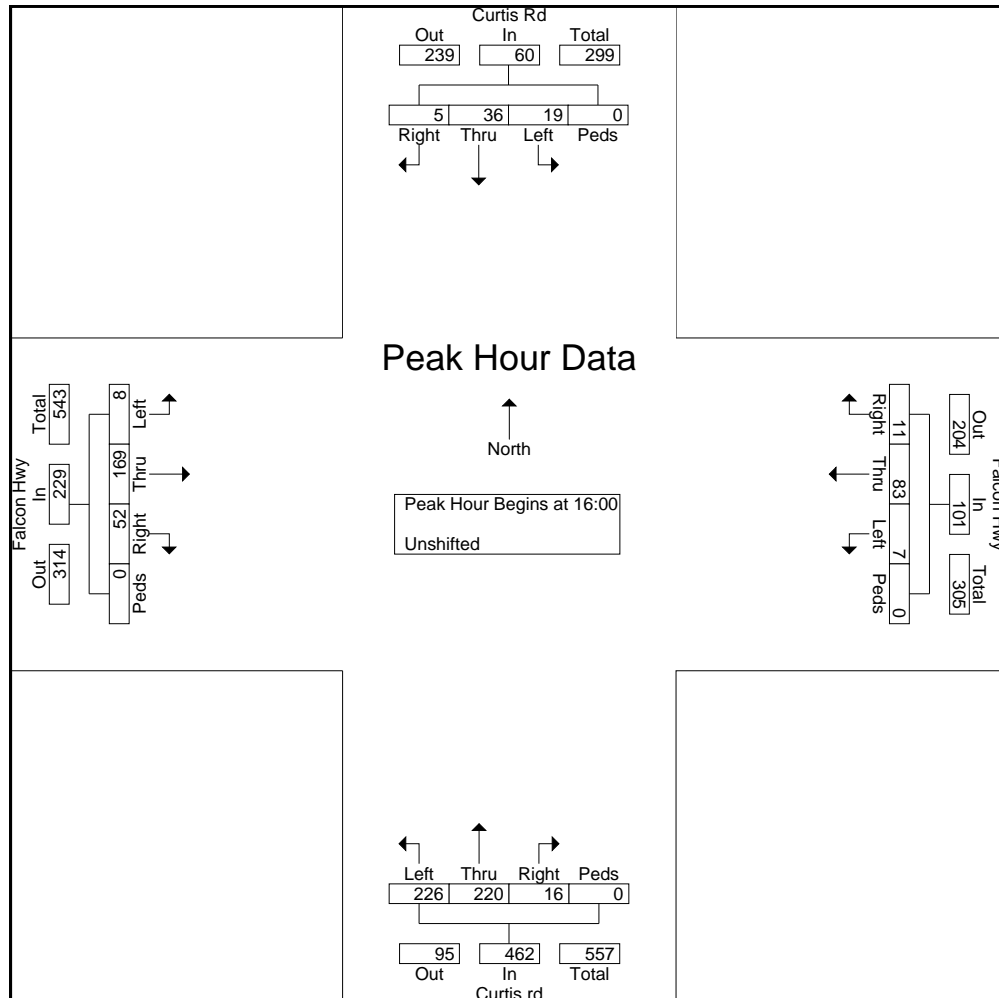
File Name : Curtis Rd-Falcon Hwy PM

Site Code : 00184750

Start Date : 8/7/2018

Page No : 2

	Curtis Rd Southbound					Falcon Hwy Westbound					Curtis rd Northbound					Falcon Hwy Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	4	10	1	0	15	2	22	1	0	25	47	35	4	0	86	0	47	11	0	58	184
16:15	3	9	2	0	14	3	19	3	0	25	69	71	6	0	146	4	35	10	0	49	234
16:30	5	10	1	0	16	2	16	4	0	22	65	58	1	0	124	3	39	10	0	52	214
16:45	7	7	1	0	15	0	26	3	0	29	45	56	5	0	106	1	48	21	0	70	220
Total Volume	19	36	5	0	60	7	83	11	0	101	226	220	16	0	462	8	169	52	0	229	852
% App. Total	31.7	60	8.3	0		6.9	82.2	10.9	0		48.9	47.6	3.5	0		3.5	73.8	22.7	0		
PHF	.679	.900	.625	.000	.938	.583	.798	.688	.000	.871	.819	.775	.667	.000	.791	.500	.880	.619	.000	.818	.910



# LSC Transportation Consultants, Inc.

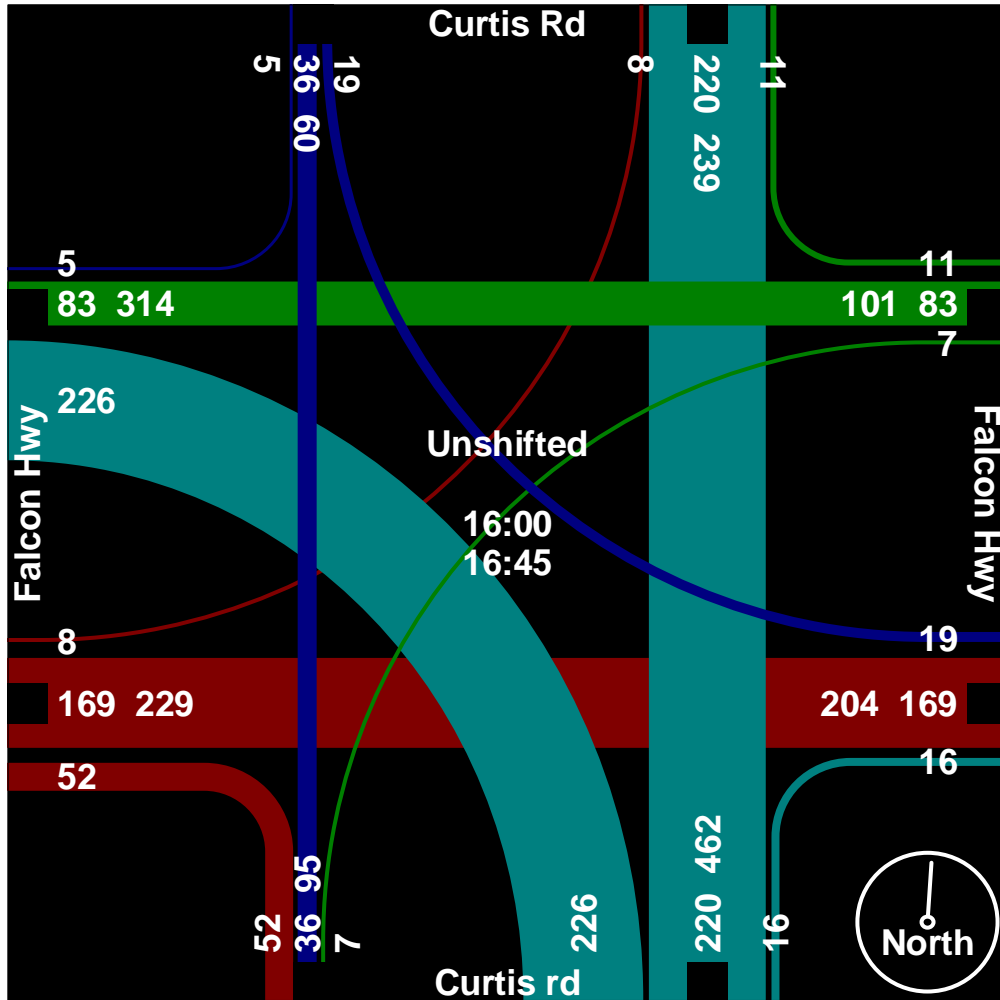
545 E Pikes Peak Ave, Suite 210  
Colorado Springs, CO 80905  
719-633-2868

File Name : Curtis Rd-Falcon Hwy PM

Site Code : 00184750

Start Date : 8/7/2018

Page No : 3











# Levels of Service

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## **Synchro LOS Reports**




### **Site Accesses**

Intersection						
Int Delay, s/veh	1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	14	108	5	5	209
Future Vol, veh/h	17	14	108	5	5	209
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	-	-	-	-	-
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	18	15	117	5	5	227
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	357	120	0	0	122	0
Stage 1	120	-	-	-	-	-
Stage 2	237	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	641	931	-	-	1465	-
Stage 1	905	-	-	-	-	-
Stage 2	802	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	638	931	-	-	1465	-
Mov Cap-2 Maneuver	638	-	-	-	-	-
Stage 1	905	-	-	-	-	-
Stage 2	799	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.1	0		0.2		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	744	1465	-	
HCM Lane V/C Ratio	-	-	0.045	0.004	-	
HCM Control Delay (s)	-	-	10.1	7.5	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	


Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	26	11	350	10	7	525
Future Vol, veh/h	26	11	350	10	7	525
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	-	-	290	290	-
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	31	13	412	12	8	618
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1046	412	0	0	424	0
Stage 1	412	-	-	-	-	-
Stage 2	634	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	253	640	-	-	1135	-
Stage 1	669	-	-	-	-	-
Stage 2	529	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	251	640	-	-	1135	-
Mov Cap-2 Maneuver	251	-	-	-	-	-
Stage 1	664	-	-	-	-	-
Stage 2	529	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	18.7	0		0.1		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	306	1135	-	
HCM Lane V/C Ratio	-	-	0.142	0.007	-	
HCM Control Delay (s)	-	-	18.7	8.2	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	0.5	0	-	









Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	10	236	18	16	62
Future Vol, veh/h	10	10	236	18	16	62
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	-	-	-	-	-
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	11	11	257	20	17	67
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	368	267	0	0	277	0
Stage 1	267	-	-	-	-	-
Stage 2	101	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	632	772	-	-	1286	-
Stage 1	778	-	-	-	-	-
Stage 2	923	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	623	772	-	-	1286	-
Mov Cap-2 Maneuver	623	-	-	-	-	-
Stage 1	778	-	-	-	-	-
Stage 2	910	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.4	0		1.6		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	690		1286	-	
HCM Lane V/C Ratio	-	0.032		0.014	-	
HCM Control Delay (s)	-	10.4		7.8	0	
HCM Lane LOS	-	B		A	A	
HCM 95th %tile Q(veh)	-	0.1		0	-	

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	140	6	0	388	16	0
Future Vol, veh/h	140	6	0	388	16	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	-	-	-	-	0	-
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	165	7	0	456	19	0
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	172	0	625	169
Stage 1	-	-	-	-	169	-
Stage 2	-	-	-	-	456	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1405	-	449	875
Stage 1	-	-	-	-	861	-
Stage 2	-	-	-	-	638	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1405	-	449	875
Mov Cap-2 Maneuver	-	-	-	-	449	-
Stage 1	-	-	-	-	861	-
Stage 2	-	-	-	-	638	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0		13.4		
HCM LOS	B					
Minor Lane/Major Mvm	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	449	-	-	1405	-	
HCM Lane V/C Ratio	0.042	-	-	-	-	
HCM Control Delay (s)	13.4	-	-	0	-	
HCM Lane LOS	B	-	-	A	-	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	


Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y	Y	↑	↑	↑	↑
Traffic Vol, veh/h	31	10	335	9	3	575
Future Vol, veh/h	31	10	335	9	3	575
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	-	-	290	-	-
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	36	12	394	11	4	676
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1078	394	0	0	405	0
Stage 1	394	-	-	-	-	-
Stage 2	684	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuve	242	655	-	-	1154	-
Stage 1	681	-	-	-	-	-
Stage 2	501	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuve	241	655	-	-	1154	-
Mov Cap-2 Maneuve	241	-	-	-	-	-
Stage 1	681	-	-	-	-	-
Stage 2	498	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay	20.2	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBL	NBLn1	SBL	SBT	
Capacity (veh/h)	-	-	285	1154	-	
HCM Lane V/C Ratio	-	-	0.169	0.003	-	
HCM Control Delay (s)	-	-	20.2	8.1	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	0.6	0	-	

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	130	10	0	360	29	0
Future Vol, veh/h	130	10	0	360	29	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	-	-	-	-	0	-
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	153	12	0	424	34	0
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	165	0	583	159
Stage 1	-	-	-	-	159	-
Stage 2	-	-	-	-	424	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1413	-	475	886
Stage 1	-	-	-	-	870	-
Stage 2	-	-	-	-	660	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1413	-	475	886
Mov Cap-2 Maneuver	-	-	-	-	475	-
Stage 1	-	-	-	-	870	-
Stage 2	-	-	-	-	660	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0		13.2		
HCM LOS	B					
Minor Lane/Major Mvm	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	475	-	-	1413	-	
HCM Lane V/C Ratio	0.072	-	-	-	-	
HCM Control Delay (s)	13.2	-	-	0	-	
HCM Lane LOS	B	-	-	A	-	
HCM 95th %tile Q(veh)	0.2	-	-	0	-	

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	8	625	31	20	375
Future Vol, veh/h	16	8	625	31	20	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	-	-	290	290	-
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	19	9	735	36	24	441
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1224	735	0	0	771	0
Stage 1	735	-	-	-	-	-
Stage 2	489	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	198	420	-	-	844	-
Stage 1	474	-	-	-	-	-
Stage 2	616	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	192	420	-	-	844	-
Mov Cap-2 Maneuver	192	-	-	-	-	-
Stage 1	461	-	-	-	-	-
Stage 2	616	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	22.5	0		0.5		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	234	844	-	
HCM Lane V/C Ratio	-	-	0.121	0.028	-	
HCM Control Delay (s)	-	-	22.5	9.4	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-	

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	385	20	0	250	10	0
Future Vol, veh/h	385	20	0	250	10	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	-	-	-	-	0	-
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	453	24	0	294	12	0
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	477	0	759	465
Stage 1	-	-	-	-	465	-
Stage 2	-	-	-	-	294	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1085	-	374	597
Stage 1	-	-	-	-	632	-
Stage 2	-	-	-	-	756	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1085	-	374	597
Mov Cap-2 Maneuver	-	-	-	-	374	-
Stage 1	-	-	-	-	632	-
Stage 2	-	-	-	-	756	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0		14.9		
HCM LOS	B					
Minor Lane/Major Mvm	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	374	-	-	1085	-	
HCM Lane V/C Ratio	0.031	-	-	-	-	
HCM Control Delay (s)	14.9	-	-	0	-	
HCM Lane LOS	B	-	-	A	-	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	









Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑	↗		↖
Traffic Vol, veh/h	20	8	630	30	5	360
Future Vol, veh/h	20	8	630	30	5	360
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	-	-	290	-	-
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	24	9	741	35	6	424
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1177	741	0	0	776	0
Stage 1	741	-	-	-	-	-
Stage 2	436	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	211	416	-	-	840	-
Stage 1	471	-	-	-	-	-
Stage 2	652	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	209	416	-	-	840	-
Mov Cap-2 Maneuver	209	-	-	-	-	-
Stage 1	471	-	-	-	-	-
Stage 2	646	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	22	0		0.1		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	244	840	-	
HCM Lane V/C Ratio	-	-	0.135	0.007	-	
HCM Control Delay (s)	-	-	22	9.3	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	0.5	0	-	









Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	352	33	1	230	19	1
Future Vol, veh/h	352	33	1	230	19	1
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	-
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	414	39	1	271	22	1
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	453	0	707	434
Stage 1	-	-	-	-	434	-
Stage 2	-	-	-	-	273	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1108	-	402	622
Stage 1	-	-	-	-	653	-
Stage 2	-	-	-	-	773	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1108	-	402	622
Mov Cap-2 Maneuver	-	-	-	-	402	-
Stage 1	-	-	-	-	653	-
Stage 2	-	-	-	-	772	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0		14.3		
HCM LOS	B					
Minor Lane/Major Mvm	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	409	-	-	1108	-	
HCM Lane V/C Ratio	0.058	-	-	0.001	-	
HCM Control Delay (s)	14.3	-	-	8.3	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.2	-	-	0	-	



## **Synchro LOS Reports**

**Judge Orr Road/Curtis Road**

Intersection												
Int Delay, s/veh	6.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	17	65	5	113	15	23	76	7	2	138	4
Future Vol, veh/h	3	17	65	5	113	15	23	76	7	2	138	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	- None		-	- None		-	- None		-	- None	
Storage Length	250	-	-	240	-	-	250	-	-	260	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	0	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	79	79	79	80	80	80	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	23	89	6	143	19	29	95	9	2	170	5
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	162	0	0	112	0	0	328	250	68	293	285	153
Stage 1	-	-	-	-	-	-	76	76	-	165	165	-
Stage 2	-	-	-	-	-	-	252	174	-	128	120	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1417	-	-	1478	-	-	625	653	995	659	624	893
Stage 1	-	-	-	-	-	-	933	832	-	837	762	-
Stage 2	-	-	-	-	-	-	752	755	-	876	796	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1417	-	-	1478	-	-	487	648	995	577	620	893
Mov Cap-2 Maneuver	-	-	-	-	-	-	487	648	-	577	620	-
Stage 1	-	-	-	-	-	-	930	830	-	834	759	-
Stage 2	-	-	-	-	-	-	578	752	-	767	794	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0.3			11.7			13		
HCM LOS							B			B		
Minor Lane/Major Mvm	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	487	668	1417	-	-	1478	-	-	577	625		
HCM Lane V/C Ratio	0.059	0.155	0.003	-	-	0.004	-	-	0.004	0.28		
HCM Control Delay (s)	12.9	11.4	7.5	-	-	7.4	-	-	11.3	13		
HCM Lane LOS	B	B	A	-	-	A	-	-	B	B		
HCM 95th %tile Q(veh)	0.2	0.5	0	-	-	0	-	-	0	1.1		

Intersection												
Int Delay, s/veh	6.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	121	17	2	57	3	75	147	10	16	42	1
Future Vol, veh/h	0	121	17	2	57	3	75	147	10	16	42	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	- None		-	- None		-	- None		-	- None	
Storage Length	250	-	-	240	-	-	250	-	-	260	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	0	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	75	75	75	89	89	89	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	133	19	3	76	4	84	165	11	18	48	1









Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	80	0	0	152	0	0	252	229	143	315	236	78
Stage 1	-	-	-	-	-	-	143	143	-	84	84	-
Stage 2	-	-	-	-	-	-	109	86	-	231	152	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	518	-	-	1429	-	-	701	671	905	638	665	983
Stage 1	-	-	-	-	-	-	860	779	-	924	825	-
Stage 2	-	-	-	-	-	-	896	824	-	772	772	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	518	-	-	1429	-	-	660	670	905	510	664	983
Mov Cap-2 Maneuver	-	-	-	-	-	-	660	670	-	510	664	-
Stage 1	-	-	-	-	-	-	860	779	-	924	823	-
Stage 2	-	-	-	-	-	-	841	822	-	601	772	-









Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.2			11.8			11.2		
HCM LOS							B			B		

Minor Lane/Major Mvm	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	660	681	1518	-	-	1429	-	-	510	669
HCM Lane V/C Ratio	0.128	0.259	-	-	-	0.002	-	-	0.036	0.074
HCM Control Delay (s)	11.3	12.1	0	-	-	7.5	-	-	12.3	10.8
HCM Lane LOS	B	B	A	-	-	A	-	-	B	B
HCM 95th %tile Q(veh)	0.4	1	0	-	-	0	-	-	0.1	0.2

HCM 6th TWSC  
9: Curtis & Judge Orr

Existing + Site  
AM (TWSC)













Intersection												
Int Delay, s/veh	6.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	17	68	5	141	25	29	84	7	2	139	4
Future Vol, veh/h	3	17	68	5	141	25	29	84	7	2	139	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	-	240	-	-	250	-	-	260	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	79	79	79	80	80	80	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	23	93	6	178	32	36	105	9	2	172	5
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	210	0	0	116	0	0	373	300	70	341	330	194
Stage 1	-	-	-	-	-	-	78	78	-	206	206	-
Stage 2	-	-	-	-	-	-	295	222	-	135	124	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1361	-	-	1473	-	-	584	612	993	613	589	847
Stage 1	-	-	-	-	-	-	931	830	-	796	731	-
Stage 2	-	-	-	-	-	-	713	720	-	868	793	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1361	-	-	1473	-	-	447	608	993	524	585	847
Mov Cap-2 Maneuver	-	-	-	-	-	-	447	608	-	524	585	-
Stage 1	-	-	-	-	-	-	928	828	-	794	728	-
Stage 2	-	-	-	-	-	-	540	717	-	749	791	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0.2			12.4			13.7		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1 NBLn2		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	447	627	1361	-	-	1473	-	-	524	590		
HCM Lane V/C Ratio	0.081	0.181	0.003	-	-	0.004	-	-	0.005	0.299		
HCM Control Delay (s)	13.8	12	7.7	-	-	7.5	-	-	11.9	13.7		
HCM Lane LOS	B	B	A	-	-	A	-	-	B	B		
HCM 95th %tile Q(veh)	0.3	0.7	0	-	-	0	-	-	0	1.3		

Intersection												
Int Delay, s/veh	8.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	121	24	2	76	20	79	153	10	16	151	1
Future Vol, veh/h	0	121	24	2	76	20	79	153	10	16	151	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	-	240	-	-	250	-	-	260	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	75	75	75	89	89	89	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	133	26	3	101	27	89	172	11	18	174	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	128	0	0	159	0	0	354	280	146	359	280	115
Stage 1	-	-	-	-	-	-	146	146	-	121	121	-
Stage 2	-	-	-	-	-	-	208	134	-	238	159	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1458	-	-	1420	-	-	601	628	901	596	628	937
Stage 1	-	-	-	-	-	-	857	776	-	883	796	-
Stage 2	-	-	-	-	-	-	794	785	-	765	766	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1458	-	-	1420	-	-	471	627	901	463	627	937
Mov Cap-2 Maneuver	-	-	-	-	-	-	471	627	-	463	627	-
Stage 1	-	-	-	-	-	-	857	776	-	883	794	-
Stage 2	-	-	-	-	-	-	618	783	-	588	766	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	13.4	12.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	471	639	1458	-	-	1420	-	-	463	628
HCM Lane V/C Ratio	0.188	0.287	-	-	-	0.002	-	-	0.04	0.278
HCM Control Delay (s)	14.4	12.9	0	-	-	7.5	-	-	13.1	12.9
HCM Lane LOS	B	B	A	-	-	A	-	-	B	B
HCM 95th %tile Q(veh)	0.7	1.2	0	-	-	0	-	-	0.1	1.1

Intersection												
Int Delay, s/veh	20.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	66	174	27	224	108	121	234	19	44	319	25
Future Vol, veh/h	15	66	174	27	224	108	121	234	19	44	319	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	- None		-	- None		-	- None		-	- None	
Storage Length	250	-	250	240	-	240	250	-	-	260	-	0
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	0	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	78	205	32	264	127	142	275	22	52	375	29













Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	391	0	0	283	0	0	708	569	78	693	647	264
Stage 1	-	-	-	-	-	-	114	114	-	328	328	-
Stage 2	-	-	-	-	-	-	594	455	-	365	319	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	168	-	-	1279	-	-	350	432	983	358	390	775
Stage 1	-	-	-	-	-	-	891	801	-	685	647	-
Stage 2	-	-	-	-	-	-	491	569	-	654	653	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	168	-	-	1279	-	-	-	415	983	159~	374	775
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	415	-	159~	374	-
Stage 1	-	-	-	-	-	-	878	789	-	675	631	-
Stage 2	-	-	-	-	-	-	187	555	-	410	643	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5	0.6		71.8
HCM LOS			-	F

Minor Lane/Major Mvm	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	-	434	1168	-	-	1279	-	-	159	374	775
HCM Lane V/C Ratio	-	0.686	0.015	-	-	0.025	-	-	0.326	1.003	0.038
HCM Control Delay (s)	-	29.5	8.1	-	-	7.9	-	-	38.2	81.3	9.8
HCM Lane LOS	-	D	A	-	-	A	-	-	E	F	A
HCM 95th %tile Q(veh)	-	5.1	0	-	-	0.1	-	-	1.3	11.9	0.1

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

Intersection												
Intersection Delay, s/veh	33.4											
Intersection LOS	D											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	66	174	27	224	108	121	234	19	44	319	25
Future Vol, veh/h	15	66	174	27	224	108	121	234	19	44	319	25
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	78	205	32	264	127	142	275	22	52	375	29
Number of Lanes	1	1	1	1	1	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	3
HCM Control Delay	19.4	25	28.1	55.5
HCM LOS	C	C	D	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	92%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Right, %	0%	8%	0%	0%	100%	0%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	253	15	66	174	27	224	108	44	319	25
LT Vol	121	0	15	0	0	27	0	0	44	0	0
Through Vol	0	234	0	66	0	0	224	0	0	319	0
RT Vol	0	19	0	0	174	0	0	108	0	0	25
Lane Flow Rate	142	298	18	78	205	32	264	127	52	375	29
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.374	0.737	0.051	0.213	0.52	0.088	0.691	0.307	0.139	0.951	0.069
Departure Headway (Hd)	9.462	8.909	10.387	9.868	9.143	9.951	9.435	8.712	9.633	9.123	8.409
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	380	405	344	363	393	359	382	412	371	398	424
Service Time	7.242	6.689	8.183	7.665	6.939	7.739	7.222	6.499	7.416	6.906	6.192
HCM Lane V/C Ratio	0.374	0.736	0.052	0.215	0.522	0.089	0.691	0.308	0.14	0.942	0.068
HCM Control Delay	17.8	33	13.7	15.3	21.5	13.7	31	15.3	14	64.6	11.8
HCM Lane LOS	C	D	B	C	C	B	D	C	B	F	B
HCM 95th-tile Q	1.7	5.8	0.2	0.8	2.9	0.3	5	1.3	0.5	10.7	0.2

<b>Intersection</b>				
Intersection Delay, s/veh	9.5			
Intersection LOS	A			
<b>Approach</b>	<b>EB</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	301	423	439	456
Demand Flow Rate, veh/h	307	432	447	465
Vehicles Circulating, veh/h	468	443	151	447
Vehicles Exiting, veh/h	444	155	624	428
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.5	10.6	6.9	11.5
Approach LOS	A	B	A	B
<b>Lane</b>	<b>Left</b>	<b>Left</b>	<b>Left</b>	<b>Left</b>
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	307	432	447	465
Cap Entry Lane, veh/h	856	878	1183	875
Entry HV Adj Factor	0.982	0.979	0.981	0.980
Flow Entry, veh/h	301	423	439	456
Cap Entry, veh/h	841	859	1160	857
V/C Ratio	0.359	0.492	0.378	0.532
Control Delay, s/veh	8.5	10.6	6.9	11.5
LOS	A	B	A	B
95th %tile Queue, veh	2	3	2	3



Intersection												
Int Delay, s/veh	147											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↱		↰	↑	↱
Traffic Vol, veh/h	25	219	96	18	123	89	198	415	26	105	281	25
Future Vol, veh/h	25	219	96	18	123	89	198	415	26	105	281	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	250	240	-	240	250	-	-	260	-	260
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	0	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	258	113	21	145	105	233	488	31	124	331	29













Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	250	0	0	371	0	0	736	608	258	819	616	145
Stage 1	-	-	-	-	-	-	316	316	-	187	187	-
Stage 2	-	-	-	-	-	-	420	292	-	632	429	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	316	-	-	1188	-	-	335~410	781	294	406	902	
Stage 1	-	-	-	-	-	-	695	655	-	815	745	-
Stage 2	-	-	-	-	-	-	611	671	-	468	584	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	316	-	-	1188	-	-	~90~394	781	-	390	902	
Mov Cap-2 Maneuver	-	-	-	-	-	-	~90~394	-	-	390	-	
Stage 1	-	-	-	-	-	-	680	641	-	797	732	-
Stage 2	-	-	-	-	-	-	318	659	-	~105	571	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.6	\$ 372.2	
HCM LOS			F	-

Minor Lane/Major Mvm	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	90	406	1316	-	-	1188	-	-	-	390	902
HCM Lane V/C Ratio	2.588	1.278	0.022	-	-	0.018	-	-	-	0.848	0.033
HCM Control Delay (s)	\$ 819.8	171.3	7.8	-	-	8.1	-	-	-	48.5	9.1
HCM Lane LOS	F	F	A	-	-	A	-	-	-	E	A
HCM 95th %tile Q(veh)	21.9	22.7	0.1	-	-	0.1	-	-	-	8	0.1

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

Intersection												
Intersection Delay, s/veh	69											
Intersection LOS	F											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	219	96	18	123	89	198	415	26	105	281	25
Future Vol, veh/h	25	219	96	18	123	89	198	415	26	105	281	25
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	258	113	21	145	105	233	488	31	124	331	29
Number of Lanes	1	1	1	1	1	1	1	1	0	1	1	1













Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	3
HCM Control Delay	27.7	19	126.5	41.6
HCM LOS	D	C	F	E

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	94%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Right, %	0%	6%	0%	0%	100%	0%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	198	441	25	219	96	18	123	89	105	281	25
LT Vol	198	0	25	0	0	18	0	0	105	0	0
Through Vol	0	415	0	219	0	0	123	0	0	281	0
RT Vol	0	26	0	0	96	0	0	89	0	0	25
Lane Flow Rate	233	519	29	258	113	21	145	105	124	331	29
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.611	1.283	0.084	0.7	0.285	0.063	0.412	0.278	0.343	0.871	0.072
Departure Headway (Hd)	9.443	8.902	10.951	10.432	9.706	11.499	10.977	10.247	10.529	10.016	9.298
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	380	410	329	348	373	313	330	353	343	364	388
Service Time	7.242	6.7	8.651	8.132	7.406	9.199	8.677	7.947	8.229	7.716	6.998
HCM Lane V/C Ratio	0.613	1.266	0.088	0.741	0.303	0.067	0.439	0.297	0.362	0.909	0.075
HCM Control Delay	26.1	171.6	14.7	34.2	16.2	15	21.2	16.8	18.6	52.7	12.7
HCM Lane LOS	D	F	B	D	C	B	C	C	C	F	B
HCM 95th-tile Q	3.9	22.6	0.3	5	1.2	0.2	1.9	1.1	1.5	8.3	0.2

Intersection				
Intersection Delay, s/veh	17.5			
Intersection LOS	C			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	400	271	752	484
Demand Flow Rate, veh/h	408	276	768	494
Vehicles Circulating, veh/h	485	766	419	407
Vehicles Exiting, veh/h	416	421	474	635
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.8	12.4	26.9	11.4
Approach LOS	B	B	D	B
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	408	276	768	494
Cap Entry Lane, veh/h	841	632	900	911
Entry HV Adj Factor	0.980	0.982	0.979	0.981
Flow Entry, veh/h	400	271	752	484
Cap Entry, veh/h	825	621	882	893
V/C Ratio	0.485	0.437	0.853	0.542
Control Delay, s/veh	10.8	12.4	26.9	11.4
LOS	B	B	D	B
95th %tile Queue, veh	3	2	11	3

Intersection

Int Delay, s/veh 27.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	75	175	30	250	125	125	250	20	50	325	25
Future Vol, veh/h	15	75	175	30	250	125	125	250	20	50	325	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	250	240	-	240	250	-	-	260	-	260
Veh in Median Storage, #	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	88	206	35	294	147	147	294	24	59	382	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	441	0	0	294	0	0	767	635	88	750	694	294
Stage 1	-	-	-	-	-	-	124	124	-	364	364	-
Stage 2	-	-	-	-	-	-	643	511	-	386	330	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	119	-	-	1268	-	-	319	396	970	328	366	745
Stage 1	-	-	-	-	-	-	880	793	-	655	624	-
Stage 2	-	-	-	-	-	-	462	537	-	637	646	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	119	-	-	1268	-	-	-	379	970	112	350	745
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	379	-	112	350	-
Stage 1	-	-	-	-	-	-	866	780	-	645	607	-
Stage 2	-	-	-	-	-	-	160	522	-	381	636	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.6		98.7
HCM LOS			-	F

Minor Lane/Major Mvm	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	-	397	1119	-	-	1268	-	-	112	350	745
HCM Lane V/C Ratio	-	0.8	0.016	-	-	0.028	-	-	0.525	1.092	0.039
HCM Control Delay (s)	-	41.8	8.3	-	-	7.9	-	-	68.2	110.2	10
HCM Lane LOS	-	E	A	-	-	A	-	-	F	F	B
HCM 95th %tile Q(veh)	-	7	0	-	-	0.1	-	-	2.4	14.2	0.1













Notes

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

Intersection

Intersection Delay, s/veh 41.9

Intersection LOS E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	75	175	30	250	125	125	250	20	50	325	25
Future Vol, veh/h	15	75	175	30	250	125	125	250	20	50	325	25
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	88	206	35	294	147	147	294	24	59	382	29
Number of Lanes	1	1	1	1	1	1	1	1	0	1	1	1













Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	3
HCM Control Delay	21.2	31.5	36.5	71.4
HCM LOS	C	D	E	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	93%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Right, %	0%	7%	0%	0%	100%	0%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	125	270	15	75	175	30	250	125	50	325	25
LT Vol	125	0	15	0	0	30	0	0	50	0	0
Through Vol	0	250	0	75	0	0	250	0	0	325	0
RT Vol	0	20	0	0	175	0	0	125	0	0	25
Lane Flow Rate	147	318	18	88	206	35	294	147	59	382	29
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.406	0.83	0.052	0.249	0.547	0.099	0.785	0.367	0.166	1.023	0.073
Departure Headway (Hd)	9.944	9.407	11.046	10.525	9.796	10.455	9.937	9.211	10.143	9.631	8.915
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	363	388	326	343	371	345	368	393	354	379	401
Service Time	7.658	7.106	8.746	8.225	7.496	8.155	7.637	6.911	7.903	7.391	6.674
HCM Lane V/C Ratio	0.405	0.82	0.055	0.257	0.555	0.101	0.799	0.374	0.167	1.008	0.072
HCM Control Delay	19.3	44.4	14.4	16.7	23.7	14.3	40.7	17.2	14.9	84.6	12.4
HCM Lane LOS	C	E	B	C	C	B	E	C	B	F	B
HCM 95th-tile Q	1.9	7.6	0.2	1	3.1	0.3	6.5	1.7	0.6	12.5	0.2

Intersection				
Intersection Delay, s/veh	10.6			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	312	476	465	470
Demand Flow Rate, veh/h	318	486	474	480
Vehicles Circulating, veh/h	486	468	168	486
Vehicles Exiting, veh/h	480	174	636	468
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.9	12.6	7.3	12.9
Approach LOS	A	B	A	B
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	318	486	474	480
Cap Entry Lane, veh/h	841	856	1163	841
Entry HV Adj Factor	0.982	0.980	0.981	0.980
Flow Entry, veh/h	312	476	465	470
Cap Entry, veh/h	825	839	1141	824
V/C Ratio	0.378	0.568	0.408	0.571
Control Delay, s/veh	8.9	12.6	7.3	12.9
LOS	A	B	A	B
95th %tile Queue, veh	2	4	2	4

Intersection

Int Delay, s/veh 932.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	250	100	20	140	100	200	147	30	125	300	25
Future Vol, veh/h	25	250	100	20	140	100	200	147	30	125	300	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	250	240	-	240	250	-	-	260	-	260
Veh in Median Storage, #	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	294	118	24	165	118	235	173	35	147	353	29

Major/Minor	Major1		Major2		Minor1		Minor2	
Conflicting Flow All	283	0	0	412	0	0	815	683
Stage 1	-	-	-	-	-	-	352	352
Stage 2	-	-	-	-	-	-	463	331
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018
Pot Cap-1 Maneuver	1279	-	-	1147	-	-	296	372
Stage 1	-	-	-	-	-	-	665	632
Stage 2	-	-	-	-	-	-	579	645
Platoon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1279	-	-	1147	-	-	~ 16	356
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 16	356
Stage 1	-	-	-	-	-	-	650	617
Stage 2	-	-	-	-	-	-	276	631













Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.6	\$ 3528.8	72.3
HCM LOS			F	F

Minor Lane/Major Mvm	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	16	391	1279	-	-	1147	-	-	194	356	879
HCM Lane V/C Ratio	14.706	0.533	0.023	-	-	0.021	-	-	0.758	0.991	0.033
HCM Control Delay (s)	6630.3	24.2	7.9	-	-	8.2	-	-	65.5	80.4	9.2
HCM Lane LOS	F	C	A	-	-	A	-	-	F	F	A
HCM 95th %tile Q(veh)	30.3	3	0.1	-	-	0.1	-	-	5.1	11.3	0.1

Notes

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

Intersection												
Intersection Delay, s/veh	32.7											
Intersection LOS	D											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	250	100	20	140	100	200	147	30	125	300	25
Future Vol, veh/h	25	250	100	20	140	100	200	147	30	125	300	25
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	294	118	24	165	118	235	173	35	147	353	29
Number of Lanes	1	1	1	1	1	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	3
HCM Control Delay	33	19.4	25.8	45.8
HCM LOS	D	C	D	E

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	83%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Right, %	0%	17%	0%	0%	100%	0%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	200	177	25	250	100	20	140	100	125	300	25
LT Vol	200	0	25	0	0	20	0	0	125	0	0
Through Vol	0	147	0	250	0	0	140	0	0	300	0
RT Vol	0	30	0	0	100	0	0	100	0	0	25
Lane Flow Rate	235	208	29	294	118	24	165	118	147	353	29
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.644	0.534	0.084	0.797	0.295	0.071	0.474	0.312	0.405	0.921	0.071
Departure Headway (Hd)	9.856	9.238	10.267	9.75	9.027	10.88	10.361	9.534	9.909	9.399	8.684
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	365	389	348	371	396	331	349	375	362	385	411
Service Time	7.65	7.031	8.065	7.548	6.825	8.58	8.061	7.334	7.706	7.195	6.479
HCM Lane V/C Ratio	0.644	0.535	0.083	0.792	0.298	0.073	0.473	0.315	0.406	0.917	0.071
HCM Control Delay	29	22.2	14	41.8	15.6	14.4	22.1	16.6	19.4	59.6	12.1
HCM Lane LOS	D	C	B	E	C	B	C	C	C	F	B
HCM 95th-tile Q	4.3	3	0.3	6.8	1.2	0.2	2.4	1.3	1.9	9.7	0.2



Intersection				
Intersection Delay, s/veh	12.0			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	441	307	443	529
Demand Flow Rate, veh/h	450	312	452	540
Vehicles Circulating, veh/h	534	446	480	432
Vehicles Exiting, veh/h	438	486	504	326
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	13.1	8.3	11.9	13.4
Approach LOS	B	A	B	B
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	450	312	452	540
Cap Entry Lane, veh/h	800	876	846	888
Entry HV Adj Factor	0.980	0.983	0.979	0.980
Flow Entry, veh/h	441	307	443	529
Cap Entry, veh/h	785	861	828	870
V/C Ratio	0.562	0.356	0.534	0.608
Control Delay, s/veh	13.1	8.3	11.9	13.4
LOS	B	A	B	B
95th %tile Queue, veh	4	2	3	4

## **Synchro LOS Reports**

**Curtis Road/Falcon Highway**

Intersection												
Int Delay, s/veh	8.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↱		↰	↱	
Traffic Vol, veh/h	6	21	168	11	188	48	72	64	0	11	195	11
Future Vol, veh/h	6	21	168	11	188	48	72	64	0	11	195	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	295	-	-	-	340	-	-	290	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	0	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	78	78	78	83	83	100	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	23	183	14	241	62	87	77	0	12	219	12
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	303	0	0	206	0	0	453	368	23	467	520	272
Stage 1	-	-	-	-	-	-	37	37	-	300	300	-
Stage 2	-	-	-	-	-	-	416	331	-	167	220	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1258	-	-	1365	-	-	517	561	1054	506	461	767
Stage 1	-	-	-	-	-	-	978	864	-	709	666	-
Stage 2	-	-	-	-	-	-	614	645	-	835	721	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1258	-	-	1365	-	-	311	551	1054	446	453	767
Mov Cap-2 Maneuver	-	-	-	-	-	-	311	551	-	446	453	-
Stage 1	-	-	-	-	-	-	972	859	-	705	658	-
Stage 2	-	-	-	-	-	-	398	637	-	755	717	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.3			17			19.9		
HCM LOS							C			C		
Minor Lane/Major Mvm	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	311	551	1258	-	-	1365	-	-	446	463		
HCM Lane V/C Ratio	0.279	0.14	0.005	-	-	0.01	-	-	0.028	0.5		
HCM Control Delay (s)	21	12.6	7.9	0	-	7.7	0	-	13.3	20.3		
HCM Lane LOS	C	B	A	A	-	A	A	-	B	C		
HCM 95th %tile Q(veh)	1.1	0.5	0	-	-	0	-	-	0.1	2.7		

Intersection												
Int Delay, s/veh	11											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↱		↰	↱	
Traffic Vol, veh/h	8	169	52	7	83	11	226	220	16	19	36	5
Future Vol, veh/h	8	169	52	7	83	11	226	220	16	19	36	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	295	-	-	-	340	-	-	290	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	0	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	87	87	87	79	79	79	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	186	57	8	95	13	286	278	20	20	38	5








Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	108	0	0	243	0	0	343	328	186	500	379	102
Stage 1	-	-	-	-	-	-	204	204	-	118	118	-
Stage 2	-	-	-	-	-	-	139	124	-	382	261	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1483	-	-	1323	-	-	611	591	856	481	553	953
Stage 1	-	-	-	-	-	-	798	733	-	887	798	-
Stage 2	-	-	-	-	-	-	864	793	-	640	692	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1483	-	-	1323	-	-	569	583	856	291	546	953
Mov Cap-2 Maneuver	-	-	-	-	-	-	569	583	-	291	546	-
Stage 1	-	-	-	-	-	-	792	728	-	881	793	-
Stage 2	-	-	-	-	-	-	813	788	-	383	687	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0.5			17.3			13.9		
HCM LOS							C			B		

Minor Lane/Major Mvm	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	569	596	1483	-	-	1323	-	-	291	576
HCM Lane V/C Ratio	0.503	0.501	0.006	-	-	0.006	-	-	0.069	0.076
HCM Control Delay (s)	17.6	17	7.4	0	-	7.7	0	-	18.3	11.8
HCM Lane LOS	C	C	A	A	-	A	A	-	C	B
HCM 95th %tile Q(veh)	2.8	2.8	0	-	-	0	-	-	0.2	0.2

HCM 6th TWSC  
10: Curtis & Falcon Hwy

Existing + Site  
AM (TWSC)

Intersection												
Int Delay, s/veh	8.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	21	168	11	188	48	72	65	0	12	197	25
Future Vol, veh/h	10	21	168	11	188	48	72	65	0	12	197	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	295	-	-	-	340	-	-	290	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	78	78	78	83	83	100	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	23	183	14	241	62	87	78	0	13	221	28
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	303	0	0	206	0	0	470	376	23	476	528	272
Stage 1	-	-	-	-	-	-	45	45	-	300	300	-
Stage 2	-	-	-	-	-	-	425	331	-	176	228	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1258	-	-	1365	-	-	504	555	1054	499	456	767
Stage 1	-	-	-	-	-	-	969	857	-	709	666	-
Stage 2	-	-	-	-	-	-	607	645	-	826	715	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1258	-	-	1365	-	-	291	543	1054	437	446	767
Mov Cap-2 Maneuver	-	-	-	-	-	-	291	543	-	437	446	-
Stage 1	-	-	-	-	-	-	959	848	-	702	658	-
Stage 2	-	-	-	-	-	-	383	637	-	742	708	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			0.3			17.9			20.7		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1		NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	291		543	1258	-	-	1365	-	-	437	468	
HCM Lane V/C Ratio	0.298		0.144	0.009	-	-	0.01	-	-	0.031	0.533	
HCM Control Delay (s)	22.5		12.7	7.9	0	-	7.7	0	-	13.5	21.1	
HCM Lane LOS	C		B	A	A	-	A	A	-	B	C	
HCM 95th %tile Q(veh)	1.2		0.5	0	-	-	0	-	-	0.1	3.1	

HCM 6th TWSC  
10: Curtis & Falcon Hwy

Existing + Site  
PM (TWSC)

Intersection												
Int Delay, s/veh	11.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↱		↰	↱	
Traffic Vol, veh/h	23	169	52	7	83	12	226	222	16	19	37	14
Future Vol, veh/h	23	169	52	7	83	12	226	222	16	19	37	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	295	-	-	-	340	-	-	290	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	87	87	87	79	79	79	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	25	186	57	8	95	14	286	281	20	20	39	15
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	109	0	0	243	0	0	381	361	186	533	411	102
Stage 1	-	-	-	-	-	-	236	236	-	118	118	-
Stage 2	-	-	-	-	-	-	145	125	-	415	293	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1481	-	-	1323	-	-	577	566	856	458	531	953
Stage 1	-	-	-	-	-	-	767	710	-	887	798	-
Stage 2	-	-	-	-	-	-	858	792	-	615	670	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1481	-	-	1323	-	-	524	551	856	263	517	953
Mov Cap-2 Maneuver	-	-	-	-	-	-	524	551	-	263	517	-
Stage 1	-	-	-	-	-	-	752	696	-	869	793	-
Stage 2	-	-	-	-	-	-	798	787	-	351	657	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			0.5			19.1			13.9		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	524	565	1481	-	-	1323	-	-	263	591		
HCM Lane V/C Ratio	0.546	0.533	0.017	-	-	0.006	-	-	0.077	0.092		
HCM Control Delay (s)	19.8	18.4	7.5	0	-	7.7	0	-	19.8	11.7		
HCM Lane LOS	C	C	A	A	-	A	A	-	C	B		
HCM 95th %tile Q(veh)	3.3	3.1	0.1	-	-	0	-	-	0.2	0.3		

Intersection

Int Delay, s/veh 203.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱	↱		↱	↱	↱	↱		↱	↱	
Traffic Vol, veh/h	25	50	225	25	300	85	150	198	10	25	519	40
Future Vol, veh/h	25	50	225	25	300	85	150	198	10	25	519	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	295	-	-	-	340	-	-	290	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	0	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	59	265	29	353	100	176	233	12	29	611	47

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	453	0	0	324	0	0	907	628	59	833	843	403
Stage 1	-	-	-	-	-	-	117	117	-	461	461	-
Stage 2	-	-	-	-	-	-	790	511	-	372	382	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	108	-	-	1236	-	-	257	400	1007	288~	300	647
Stage 1	-	-	-	-	-	-	888	799	-	581~	565	-
Stage 2	-	-	-	-	-	-	383	537	-	648	613	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	108	-	-	1236	-	-	-	374	1007	137~	281	647
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	374	-	137~	281	-
Stage 1	-	-	-	-	-	-	859	773	-	562~	547	-
Stage 2	-	-	-	-	-	-	-	520	-	433~	593	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.5		\$ 574.7
HCM LOS			-	F

Minor Lane/Major Mvm	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	386	1108	-	-	1236	-	-	137	293
HCM Lane V/C Ratio	-	0.634	0.027	-	-	0.024	-	-	0.215	2.245
HCM Control Delay (s)	-	29.1	8.3	0	-	8	0	-	38.5	598.7
HCM Lane LOS	-	D	A	A	-	A	A	-	E	F
HCM 95th %tile Q(veh)	-	4.2	0.1	-	-	0.1	-	-	0.8	50.5

Notes

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

Intersection

Intersection Delay, s/veh 148.6

Intersection LOS F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰		↰	↱		↰	↱	
Traffic Vol, veh/h	25	50	225	25	300	85	150	198	10	25	519	40
Future Vol, veh/h	25	50	225	25	300	85	150	198	10	25	519	40
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	59	265	29	353	100	176	233	12	29	611	47
Number of Lanes	0	1	1	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	2
HCM Control Delay	26.4	142.7	27.2	290
HCM LOS	D	F	D	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	33%	0%	6%	100%	0%
Vol Thru, %	0%	95%	67%	0%	73%	0%	93%
Vol Right, %	0%	5%	0%	100%	21%	0%	7%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	150	208	75	225	410	25	559
LT Vol	150	0	25	0	25	25	0
Through Vol	0	198	50	0	300	0	519
RT Vol	0	10	0	225	85	0	40
Lane Flow Rate	176	245	88	265	482	29	658
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.469	0.613	0.23	0.627	1.192	0.076	1.594
Departure Headway (Hd)	11.506	10.936	11.422	10.501	10.362	9.91	9.332
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	316	333	317	347	357	364	395
Service Time	9.206	8.636	9.122	8.201	8.362	7.61	7.032
HCM Lane V/C Ratio	0.557	0.736	0.278	0.764	1.35	0.08	1.666
HCM Control Delay	24	29.5	17.5	29.3	142.7	13.4	302.4
HCM Lane LOS	C	D	C	D	F	B	F
HCM 95th-tile Q	2.4	3.8	0.9	4	17.3	0.2	35.2



Intersection						
Intersection Delay, s/veh	13.6					
Intersection LOS	B					
Approach	EB	WB	NB		SB	
Entry Lanes	1	1	2		2	
Conflicting Circle Lanes	1	1	1		1	
Adj Approach Flow, veh/h	353	482	421		687	
Demand Flow Rate, veh/h	360	492	430		701	
Vehicles Circulating, veh/h	683	448	120		570	
Vehicles Exiting, veh/h	588	102	923		370	
Ped Vol Crossing Leg, #/h	0	0	0		0	
Ped Cap Adj	1.000	1.000	1.000		1.000	
Approach Delay, s/veh	13.7	12.3	4.4		20.2	
Approach LOS	B	B	A		C	
Lane	Left	Left	Left	Right	Left	Right
Designated Moves	LTR	LTR	L	TR	LT	R
Assumed Moves	LTR	LTR	L	TR	LT	R
RT Channelized						
Lane Util	1.000	1.000	0.419	0.581	0.932	0.068
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.535	2.535
Critical Headway, s	4.976	4.976	4.544	4.544	4.544	4.544
Entry Flow, veh/h	360	492	180	250	653	48
Cap Entry Lane, veh/h	688	874	1273	1273	845	845
Entry HV Adj Factor	0.980	0.980	0.978	0.981	0.980	0.979
Flow Entry, veh/h	353	482	176	245	640	47
Cap Entry, veh/h	674	856	1245	1249	828	828
V/C Ratio	0.524	0.563	0.141	0.196	0.772	0.057
Control Delay, s/veh	13.7	12.3	4.1	4.6	21.3	4.9
LOS	B	B	A	A	C	A
95th %tile Queue, veh	3	4	0	1	8	0

Intersection

Int Delay, s/veh 489.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱	↱		↱	↱	↱	↱		↱	↱	
Traffic Vol, veh/h	35	275	100	15	125	50	325	524	30	75	246	25
Future Vol, veh/h	35	275	100	15	125	50	325	524	30	75	246	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	295	-	-	-	340	-	-	290	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	0	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	324	118	18	147	59	382	616	35	88	289	29

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	206	0	0	442	0	0	778	648	324	1004	737	177
Stage 1	-	-	-	-	-	-	406	406	-	213	213	-
Stage 2	-	-	-	-	-	-	372	242	-	791	524	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	365	-	-	1118	-	-	~ 314	~ 389	717	220	346	866
Stage 1	-	-	-	-	-	-	622	~ 598	-	789	726	-
Stage 2	-	-	-	-	-	-	648	705	-	383	530	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	365	-	-	1118	-	-	~ 70	~ 367	717	-	326	866
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 70	~ 367	-	-	326	-
Stage 1	-	-	-	-	-	-	597	~ 574	-	757	713	-
Stage 2	-	-	-	-	-	-	~ 365	692	-	-	509	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.7	\$ 1015.2	
HCM LOS			F	-

Minor Lane/Major Mvm	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	70	377	1365	-	-	1118	-	-	-	346
HCM Lane V/C Ratio	5.462	1.729	0.03	-	-	0.016	-	-	-	0.921
HCM Control Delay (s)	2125	\$ 363.8	7.7	0	-	8.3	0	-	-	65.8
HCM Lane LOS	F	F	A	A	-	A	A	-	-	F
HCM 95th %tile Q(veh)	42.4	40.4	0.1	-	-	0	-	-	-	9.4

Notes

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

Intersection												
Intersection Delay, s/veh 116.8												
Intersection LOS F												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰		↰	↱		↰	↱	
Traffic Vol, veh/h	35	275	100	15	125	50	325	524	30	75	246	25
Future Vol, veh/h	35	275	100	15	125	50	325	524	30	75	246	25
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	324	118	18	147	59	382	616	35	88	289	29
Number of Lanes	0	1	1	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	2
HCM Control Delay	44	25.5	203.2	33.5
HCM LOS	E	D	F	D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	11%	0%	8%	100%	0%
Vol Thru, %	0%	95%	89%	0%	66%	0%	91%
Vol Right, %	0%	5%	0%	100%	26%	0%	9%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	325	554	310	100	190	75	271
LT Vol	325	0	35	0	15	75	0
Through Vol	0	524	275	0	125	0	246
RT Vol	0	30	0	100	50	0	25
Lane Flow Rate	382	652	365	118	224	88	319
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.97	1.552	0.895	0.264	0.583	0.231	0.785
Departure Headway (Hd)	9.133	8.573	9.233	8.447	9.726	9.862	9.271
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	398	424	394	428	373	366	392
Service Time	6.904	6.343	6.933	6.147	7.726	7.562	6.971
HCM Lane V/C Ratio	0.96	1.538	0.926	0.276	0.601	0.24	0.814
HCM Control Delay	68.9	282	53.7	14.1	25.5	15.5	38.5
HCM Lane LOS	F	F	F	B	D	C	E
HCM 95th-tile Q	11.2	35.6	9.2	1	3.5	0.9	6.7

Intersection						
Intersection Delay, s/veh	12.8					
Intersection LOS	B					
Approach	EB	WB	NB		SB	
Entry Lanes	1	1	2		2	
Conflicting Circle Lanes	1	1	1		1	
Adj Approach Flow, veh/h	483	224	1033		406	
Demand Flow Rate, veh/h	492	228	1054		415	
Vehicles Circulating, veh/h	403	1060	462		558	
Vehicles Exiting, veh/h	570	456	433		730	
Ped Vol Crossing Leg, #/h	0	0	0		0	
Ped Cap Adj	1.000	1.000	1.000		1.000	
Approach Delay, s/veh	11.3	17.5	13.7		9.6	
Approach LOS	B	C	B		A	
Lane	Left	Left	Left	Right	Left	Right
Designated Moves	LTR	LTR	L	TR	LT	R
Assumed Moves	LTR	LTR	L	TR	LT	R
RT Channelized						
Lane Util	1.000	1.000	0.370	0.630	0.928	0.072
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.535	2.535
Critical Headway, s	4.976	4.976	4.544	4.544	4.544	4.544
Entry Flow, veh/h	492	228	390	664	385	30
Cap Entry Lane, veh/h	915	468	933	933	855	855
Entry HV Adj Factor	0.981	0.983	0.979	0.980	0.980	0.967
Flow Entry, veh/h	483	224	382	651	377	29
Cap Entry, veh/h	897	460	914	914	837	826
V/C Ratio	0.538	0.487	0.418	0.712	0.451	0.035
Control Delay, s/veh	11.3	17.5	8.8	16.6	10.0	4.7
LOS	B	C	A	C	B	A
95th %tile Queue, veh	3	3	2	6	2	0

Intersection

Int Delay, s/veh 257.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱	↱		↱	↱	↱	↱		↱	↱	
Traffic Vol, veh/h	41	50	225	25	300	86	150	200	10	29	525	87
Future Vol, veh/h	41	50	225	25	300	86	150	200	10	29	525	87
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	295	-	-	-	340	-	-	290	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	0	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	59	265	29	353	101	176	235	12	34	618	102

Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	454	0	0	324	0	0	977	667	59	873	882	404	
Stage 1	-	-	-	-	-	-	155	155	-	462	462	-	
Stage 2	-	-	-	-	-	-	822	512	-	411	420	-	
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-	
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318	
Pot Cap-1 Maneuver	107	-	-	1236	-	-	230	380	1007	271~	285	647	
Stage 1	-	-	-	-	-	-	847	769	-	580~	565	-	
Stage 2	-	-	-	-	-	-	368	536	-	618~	589	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	107	-	-	1236	-	-	-	348	1007	115~	261	647	
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	348	-	115~	261	-	
Stage 1	-	-	-	-	-	-	800	727	-	548~	547	-	
Stage 2	-	-	-	-	-	-	-	519	-	390~	557	-	

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.5		\$ 694.2
HCM LOS			-	F

Minor Lane/Major Mvm	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	359	1107	-	-	1236	-	-	115	285
HCM Lane V/C Ratio	-	0.688	0.044	-	-	0.024	-	-	0.297	2.526
HCM Control Delay (s)	-	34.5	8.4	0	-	8	0	-	49	724.8
HCM Lane LOS	-	D	A	A	-	A	A	-	E	F
HCM 95th %tile Q(veh)	-	4.9	0.1	-	-	0.1	-	-	1.1	59

Notes

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

Intersection

Intersection Delay, s/veh 176.8

Intersection LOS F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰		↰	↱		↰	↱	
Traffic Vol, veh/h	41	50	225	25	300	86	150	200	10	29	525	87
Future Vol, veh/h	41	50	225	25	300	86	150	200	10	29	525	87
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	59	265	29	353	101	176	235	12	34	618	102
Number of Lanes	0	1	1	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	2
HCM Control Delay	27.1	148.3	28.4	352.3
HCM LOS	D	F	D	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	45%	0%	6%	100%	0%
Vol Thru, %	0%	95%	55%	0%	73%	0%	86%
Vol Right, %	0%	5%	0%	100%	21%	0%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	150	210	91	225	411	29	612
LT Vol	150	0	41	0	25	29	0
Through Vol	0	200	50	0	300	0	525
RT Vol	0	10	0	225	86	0	87
Lane Flow Rate	176	247	107	265	484	34	720
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.471	0.623	0.282	0.629	1.203	0.088	1.746
Departure Headway (Hd)	11.87	11.299	11.847	10.861	10.745	9.986	9.355
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	305	321	305	336	343	361	396
Service Time	9.57	8.999	9.547	8.561	8.745	7.686	7.055
HCM Lane V/C Ratio	0.577	0.769	0.351	0.789	1.411	0.094	1.818
HCM Control Delay	24.7	31	19.1	30.3	148.3	13.6	368.4
HCM Lane LOS	C	D	C	D	F	B	F
HCM 95th-tile Q	2.4	3.9	1.1	4	17.3	0.3	41.9

Intersection						
Intersection Delay, s/veh	14.1					
Intersection LOS	B					
Approach	EB	WB	NB		SB	
Entry Lanes	1	1	2		2	
Conflicting Circle Lanes	1	1	1		1	
Adj Approach Flow, veh/h	372	483	423		754	
Demand Flow Rate, veh/h	379	493	432		769	
Vehicles Circulating, veh/h	695	469	144		570	
Vehicles Exiting, veh/h	644	107	930		392	
Ped Vol Crossing Leg, #/h	0	0	0		0	
Ped Cap Adj	1.000	1.000	1.000		1.000	
Approach Delay, s/veh	14.8	12.9	4.5		20.0	
Approach LOS	B	B	A		C	
Lane	Left	Left	Left	Right	Left	Right
Designated Moves	LTR	LTR	L	TR	LT	R
Assumed Moves	LTR	LTR	L	TR	LT	R
RT Channelized						
Lane Util	1.000	1.000	0.417	0.583	0.865	0.135
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.535	2.535
Critical Headway, s	4.976	4.976	4.544	4.544	4.544	4.544
Entry Flow, veh/h	379	493	180	252	665	104
Cap Entry Lane, veh/h	679	855	1246	1246	845	845
Entry HV Adj Factor	0.981	0.980	0.978	0.981	0.980	0.981
Flow Entry, veh/h	372	483	176	247	652	102
Cap Entry, veh/h	666	838	1218	1222	828	829
V/C Ratio	0.558	0.576	0.144	0.202	0.787	0.123
Control Delay, s/veh	14.8	12.9	4.2	4.7	22.3	5.6
LOS	B	B	A	A	C	A
95th %tile Queue, veh	3	4	1	1	8	0

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱	↱		↱	↱	↱	↱		↱	↱	
Traffic Vol, veh/h	87	275	100	15	125	53	325	530	30	77	250	55
Future Vol, veh/h	87	275	100	15	125	53	325	530	30	77	250	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	295	-	-	-	340	-	-	290	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	0	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	102	324	118	18	147	62	382	624	35	91	294	65

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	209	0	0	442	0	0	922	773	324	1131	860	178
Stage 1	-	-	-	-	-	-	528	528	-	214	214	-
Stage 2	-	-	-	-	-	-	394	245	-	917	646	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	362	-	-	1118	-	-	~ 251	~ 330	717	181	~ 294	865
Stage 1	-	-	-	-	-	-	534	~ 528	-	788	725	-
Stage 2	-	-	-	-	-	-	631	703	-	326	467	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	362	-	-	1118	-	-	~ 291	717	-	~ 260	865	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 291	-	-	~ 260	-	-
Stage 1	-	-	-	-	-	-	480	~ 475	-	708	712	-
Stage 2	-	-	-	-	-	-	~ 336	690	-	-	420	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	4.5	0.6		
HCM LOS			-	-

Minor Lane/Major Mvm	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	301	1362	-	-	1118	-	-	-	298
HCM Lane V/C Ratio	-	2.189	0.075	-	-	0.016	-	-	-	1.204
HCM Control Delay (s)	\$	573.1	7.9	0	-	8.3	0	-	-	156
HCM Lane LOS	-	F	A	A	-	A	A	-	-	F
HCM 95th %tile Q(veh)	-	49.7	0.2	-	-	0	-	-	-	16

Notes

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



Intersection												
Intersection Delay, s/veh 135.3												
Intersection LOS F												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰↱		↰	↱		↰	↱	
Traffic Vol, veh/h	87	275	100	15	125	53	325	530	30	77	250	55
Future Vol, veh/h	87	275	100	15	125	53	325	530	30	77	250	55
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	102	324	118	18	147	62	382	624	35	91	294	65
Number of Lanes	0	1	1	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	2
HCM Control Delay	81.9	28.7	224.2	47.9
HCM LOS	F	D	F	E

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	24%	0%	8%	100%	0%
Vol Thru, %	0%	95%	76%	0%	65%	0%	82%
Vol Right, %	0%	5%	0%	100%	27%	0%	18%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	325	560	362	100	193	77	305
LT Vol	325	0	87	0	15	77	0
Through Vol	0	530	275	0	125	0	250
RT Vol	0	30	0	100	53	0	55
Lane Flow Rate	382	659	426	118	227	91	359
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.993	1.612	1.08	0.272	0.62	0.243	0.9
Departure Headway (Hd)	9.759	9.195	9.507	8.652	10.273	10.199	9.542
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	375	402	383	418	354	354	384
Service Time	7.459	6.895	7.207	6.352	8.273	7.899	7.242
HCM Lane V/C Ratio	1.019	1.639	1.112	0.282	0.641	0.257	0.935
HCM Control Delay	76.9	309.7	100.5	14.6	28.7	16.1	55.9
HCM Lane LOS	F	F	F	B	D	C	F
HCM 95th-tile Q	11.6	36.4	14.4	1.1	4	0.9	9.2

























Intersection						
Intersection Delay, s/veh	14.6					
Intersection LOS	B					
Approach	EB	WB	NB		SB	
Entry Lanes	1	1	2		2	
Conflicting Circle Lanes	1	1	1		1	
Adj Approach Flow, veh/h	544	227	1041		450	
Demand Flow Rate, veh/h	554	231	1062		459	
Vehicles Circulating, veh/h	411	1130	527		558	
Vehicles Exiting, veh/h	606	459	438		803	
Ped Vol Crossing Leg, #/h	0	0	0		0	
Ped Cap Adj	1.000	1.000	1.000		1.000	
Approach Delay, s/veh	13.2	20.1	16.3		9.5	
Approach LOS	B	C	C		A	
Lane	Left	Left	Left	Right	Left	Right
Designated Moves	LTR	LTR	L	TR	LT	R
Assumed Moves	LTR	LTR	L	TR	LT	R
RT Channelized						
Lane Util	1.000	1.000	0.367	0.633	0.856	0.144
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.535	2.535
Critical Headway, s	4.976	4.976	4.544	4.544	4.544	4.544
Entry Flow, veh/h	554	231	390	672	393	66
Cap Entry Lane, veh/h	907	436	879	879	855	855
Entry HV Adj Factor	0.981	0.983	0.979	0.980	0.980	0.985
Flow Entry, veh/h	544	227	382	659	385	65
Cap Entry, veh/h	890	428	861	861	837	842
V/C Ratio	0.611	0.530	0.444	0.764	0.460	0.077
Control Delay, s/veh	13.2	20.1	9.7	20.2	10.2	5.0
LOS	B	C	A	C	B	A
95th %tile Queue, veh	4	3	2	8	2	0

## **Synchro LOS Reports**

**US 24/Stapleton Road**

Lanes, Volumes, Timings  
8: US 24 & Curtis/Stapleton

Existing  
AM













												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	35	130	121	6	86	7	70	229	2	33	500	36
Future Volume (vph)	35	130	121	6	86	7	70	229	2	33	500	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	190		325	215		215	890		1000	790		790
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	240			200			190			190		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.638			0.662			0.222			0.580		
Satd. Flow (perm)	1188	1863	1583	1233	1863	1583	414	1863	1583	1080	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			143			143			143			143
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4560			5565			6479			6170	
Travel Time (s)		69.1			84.3			80.3			76.5	
Peak Hour Factor	0.87	0.87	0.87	0.76	0.76	0.76	0.78	0.78	0.78	0.90	0.90	0.90
Adj. Flow (vph)	40	149	139	8	113	9	90	294	3	37	556	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	149	139	8	113	9	90	294	3	37	556	40
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (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
Detector 1 Queue (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
Detector 1 Delay (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
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8

Existing AM  
Lanes, Volumes, Timings

Synchro 10 Report  
JAB

Lanes, Volumes, Timings  
8: US 24 & Curtis/Stapleton

Existing  
AM

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	9.5	23.5	23.5	9.5	23.5	23.5	10.0	37.5	37.5	9.5	37.0	37.0
Total Split (%)	11.9%	29.4%	29.4%	11.9%	29.4%	29.4%	12.5%	46.9%	46.9%	11.9%	46.3%	46.3%
Maximum Green (s)	5.0	19.0	19.0	5.0	19.0	19.0	5.5	33.0	33.0	5.0	32.5	32.5
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	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effect Green (s)	12.6	11.9	11.9	11.9	10.4	10.4	28.1	26.5	26.5	25.6	21.8	21.8
Actuated g/C Ratio	0.24	0.22	0.22	0.22	0.20	0.20	0.53	0.50	0.50	0.48	0.41	0.41
v/c Ratio	0.12	0.36	0.30	0.02	0.31	0.02	0.23	0.32	0.00	0.06	0.72	0.05
Control Delay	18.4	24.1	6.7	17.5	25.8	0.1	8.0	11.3	0.0	6.9	20.9	0.1
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	18.4	24.1	6.7	17.5	25.8	0.1	8.0	11.3	0.0	6.9	20.9	0.1
LOS	B	C	A	B	C	A	A	B	A	A	C	A
Approach Delay		16.0			23.5			10.5			18.8	
Approach LOS		B			C			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 53

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 16.4









Intersection LOS: B

Intersection Capacity Utilization 50.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: US 24 & Curtis/Stapleton

			
Ø1	Ø2	Ø3	Ø4
9.5 s	23.5 s	9.5 s	37.5 s
			
Ø5	Ø6	Ø7	Ø8
9.5 s	23.5 s	10 s	37 s

























HCM 6th TWSC  
8: US 24 & Curtis/Stapleton

Existing  
AM (TWSC)

Intersection													
Int Delay, s/veh	17.6												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR	
Lane Configurations	↱	↱	↱	↱	↱	↱	↱	↱	↱	↱	↱	↱	
Traffic Vol, veh/h	35	130	121	6	86	7	70	229	2	33	500	36	
Future Vol, veh/h	35	130	121	6	86	7	70	229	2	33	500	36	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	190	-	325	215	-	215	890	-	1000	790	-	790	
Veh in Median Storage, #	0	-	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	87	87	87	76	76	76	78	78	78	90	90	90	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	40	149	139	8	113	9	90	294	3	37	556	40	
Major/Minor	Minor2		Minor1		Major1		Major2						
Conflicting Flow	All1167	1107	556	1268	1144	294	596	0	0	297	0	0	
Stage 1	630	630	-	474	474	-	-	-	-	-	-	-	
Stage 2	537	477	-	794	670	-	-	-	-	-	-	-	
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-	
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-	
Pot Cap-1 Maneuver	171	210	531	145	200	745	980	-	-	1264	-	-	
Stage 1	470	475	-	571	558	-	-	-	-	-	-	-	
Stage 2	528	556	-	381	455	-	-	-	-	-	-	-	
Platoon blocked, %								-	-	-	-	-	
Mov Cap-1 Maneuver	75	185	531	32	176	745	980	-	-	1264	-	-	
Mov Cap-2 Maneuver	75	185	-	32	176	-	-	-	-	-	-	-	
Stage 1	427	461	-	518	507	-	-	-	-	-	-	-	
Stage 2	368	505	-	184	442	-	-	-	-	-	-	-	
Approach	SE		NW		NE		SW						
HCM Control Delay, s	52.5		58.8		2.1		0.5						
HCM LOS	F		F										
Minor Lane/Major Mvmt	NEL	NET	NER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR	
Capacity (veh/h)	980	-	-	32	176	745	75	185	531	1264	-	-	
HCM Lane V/C Ratio	0.092	-	-	0.247	0.643	0.012	0.536	0.808	0.262	0.029	-	-	
HCM Control Delay (s)	9	-	-	151	56.3	9.9	98.6	75.8	14.2	7.9	-	-	
HCM Lane LOS	A	-	-	F	F	A	F	F	B	A	-	-	
HCM 95th %tile Q(veh)	0.3	-	-	0.8	3.7	0	2.3	5.6	1	0.1	-	-	

Lanes, Volumes, Timings  
8: US 24 & Curtis/Stapleton

Existing  
PM













												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	16	43	50	5	110	38	150	535	15	11	370	20
Future Volume (vph)	16	43	50	5	110	38	150	535	15	11	370	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	190		325	215		215	890		1000	790		790
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	240			200			190			190		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.670			0.723			0.290			0.320		
Satd. Flow (perm)	1248	1863	1583	1347	1863	1583	540	1863	1583	596	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			143			143			143			143
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4560			5565			6479			6170	
Travel Time (s)		69.1			84.3			80.3			76.5	
Peak Hour Factor	0.83	0.83	0.83	0.81	0.81	0.81	0.87	0.87	0.87	0.84	0.84	0.84
Adj. Flow (vph)	19	52	60	6	136	47	172	615	17	13	440	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	52	60	6	136	47	172	615	17	13	440	24
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (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
Detector 1 Queue (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
Detector 1 Delay (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
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8

Existing PM  
Lanes, Volumes, Timings

Synchro 10 Report  
JAB

Lanes, Volumes, Timings  
8: US 24 & Curtis/Stapleton

Existing  
PM

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	9.5	23.0	23.0	9.5	23.0	23.0	12.0	38.0	38.0	9.5	35.5	35.5
Total Split (%)	11.9%	28.8%	28.8%	11.9%	28.8%	28.8%	15.0%	47.5%	47.5%	11.9%	44.4%	44.4%
Maximum Green (s)	5.0	18.5	18.5	5.0	18.5	18.5	7.5	33.5	33.5	5.0	31.0	31.0
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	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effect Green (s)	10.6	10.0	10.0	10.6	10.0	10.0	27.5	26.5	26.5	22.5	18.7	18.7
Actuated g/C Ratio	0.22	0.20	0.20	0.22	0.20	0.20	0.56	0.54	0.54	0.46	0.38	0.38
v/c Ratio	0.06	0.14	0.14	0.02	0.36	0.11	0.34	0.61	0.02	0.03	0.62	0.03
Control Delay	17.9	21.7	0.7	17.6	24.1	0.5	7.5	12.8	0.1	6.2	18.3	0.1
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	17.9	21.7	0.7	17.6	24.1	0.5	7.5	12.8	0.1	6.2	18.3	0.1
LOS	B	C	A	B	C	A	A	B	A	A	B	A
Approach Delay		11.5			18.0			11.4			17.1	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 49.1

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 13.9









Intersection LOS: B

Intersection Capacity Utilization 51.1%

ICU Level of Service A

Analysis Period (min) 15













Splits and Phases: 8: US 24 & Curtis/Stapleton

			
Ø1	Ø2	Ø3	Ø4
9.5 s	23 s	9.5 s	38 s
			
Ø5	Ø6	Ø7	Ø8
9.5 s	23 s	12 s	35.5 s



Intersection

Int Delay, s/veh 22.1

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	16	43	50	5	110	38	150	535	15	11	370	20
Future Vol, veh/h	16	43	50	5	110	38	150	535	15	11	370	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	190	-	325	215	-	215	890	-	1000	790	-	790
Veh in Median Storage, #	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	81	81	81	87	87	87	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	19	52	60	6	136	47	172	615	17	13	440	24

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	1525	1442	440	1493
Stage 1	466	466	-	959
Stage 2	1059	976	-	534
Critical Hdwy	7.12	6.52	6.22	7.12
Critical Hdwy Stg 1	6.12	5.52	-	6.12
Critical Hdwy Stg 2	6.12	5.52	-	6.12
Follow-up Hdwy	3.518	4.018	3.318	3.518
Pot Cap-1 Maneuver	96	132	617	102~131
Stage 1	577	562	-	309
Stage 2	271	329	-	530
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	110	617	51~109
Mov Cap-2 Maneuver	-	110	-	51~109
Stage 1	486	554	-	260
Stage 2	107	277	-	428

Approach	SE	NW	NE	SW
HCM Control Delay, s		178.7	1.9	0.2
HCM LOS	-	F		

























Minor Lane/Major Mvmt	NEL	NET	NER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Capacity (veh/h)	1097	-	-	51	109	491	-	110	617	951	-	-
HCM Lane V/C Ratio	0.157	-	-	0.121	1.246	0.096	-	0.471	0.098	0.014	-	-
HCM Control Delay (s)	8.9	-	-	85.1	240.2	13.1	-	64	11.5	8.8	-	-
HCM Lane LOS	A	-	-	F	F	B	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0.6	-	-	0.4	9	0.3	-	2.1	0.3	0	-	-

Notes

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

Lanes, Volumes, Timings  
8: US 24 & Curtis/Stapleton

Existing + Site  
AM (Signal)













												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	35	132	121	6	93	9	70	229	2	33	500	36
Future Volume (vph)	35	132	121	6	93	9	70	229	2	33	500	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	190		325	215		215	890		1000	790		790
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	240			200			190			190		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.634			0.660			0.220			0.580		
Satd. Flow (perm)	1181	1863	1583	1229	1863	1583	410	1863	1583	1080	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			143			143			143			143
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4560			5565			6479			6170	
Travel Time (s)		69.1			84.3			80.3			76.5	
Peak Hour Factor	0.87	0.87	0.87	0.76	0.76	0.76	0.78	0.78	0.78	0.90	0.90	0.90
Adj. Flow (vph)	40	152	139	8	122	12	90	294	3	37	556	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	152	139	8	122	12	90	294	3	37	556	40
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (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
Detector 1 Queue (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
Detector 1 Delay (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
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8

Existing + Site AM (Signal)  
Lanes, Volumes, Timings

Synchro 10 Report  
JAB

Lanes, Volumes, Timings  
8: US 24 & Curtis/Stapleton

Existing + Site  
AM (Signal)

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	9.5	23.5	23.5	9.5	23.5	23.5	10.0	37.5	37.5	9.5	37.0	37.0
Total Split (%)	11.9%	29.4%	29.4%	11.9%	29.4%	29.4%	12.5%	46.9%	46.9%	11.9%	46.3%	46.3%
Maximum Green (s)	5.0	19.0	19.0	5.0	19.0	19.0	5.5	33.0	33.0	5.0	32.5	32.5
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	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effect Green (s)	12.8	12.1	12.1	12.1	10.6	10.6	28.2	26.6	26.6	25.6	21.9	21.9
Actuated g/C Ratio	0.24	0.23	0.23	0.23	0.20	0.20	0.53	0.50	0.50	0.48	0.41	0.41
v/c Ratio	0.12	0.36	0.30	0.02	0.33	0.03	0.24	0.32	0.00	0.06	0.73	0.05
Control Delay	18.4	24.0	6.7	17.5	26.0	0.1	8.1	11.4	0.0	7.0	21.1	0.1
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	18.4	24.0	6.7	17.5	26.0	0.1	8.1	11.4	0.0	7.0	21.1	0.1
LOS	B	C	A	B	C	A	A	B	A	A	C	A
Approach Delay		16.1			23.4			10.6			18.9	
Approach LOS		B			C			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 53.3

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 16.6









Intersection LOS: B

Intersection Capacity Utilization 50.3%

ICU Level of Service A













Analysis Period (min) 15

Splits and Phases: 8: US 24 & Curtis/Stapleton

			
Ø1	Ø2	Ø3	Ø4
9.5 s	23.5 s	9.5 s	37.5 s
			
Ø5	Ø6	Ø7	Ø8
9.5 s	23.5 s	10 s	37 s

























HCM 6th TWSC  
8: US 24 & Curtis/Stapleton

Existing + Site  
AM (TWSC)

Intersection												
Int Delay, s/veh	19.3											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	35	132	121	6	93	9	70	229	2	33	500	36
Future Vol, veh/h	35	132	121	6	93	9	70	229	2	33	500	36
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	190	-	325	215	-	215	890	-	1000	790	-	790
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	76	76	76	78	78	78	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	40	152	139	8	122	12	90	294	3	37	556	40
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1173	1107	556	1270	1144	294	596	0	0	297	0	0
Stage 1	630	630	-	474	474	-	-	-	-	-	-	-
Stage 2	543	477	-	796	670	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	169	210	531	145	200	745	980	-	-	1264	-	-
Stage 1	470	475	-	571	558	-	-	-	-	-	-	-
Stage 2	524	556	-	380	455	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	67	185	531	31	176	745	980	-	-	1264	-	-
Mov Cap-2 Maneuver	67	185	-	31	176	-	-	-	-	-	-	-
Stage 1	427	461	-	518	507	-	-	-	-	-	-	-
Stage 2	355	505	-	183	442	-	-	-	-	-	-	-
Approach	SE		NW		NE		SW					
HCM Control Delay, s	56.2		63.2		2.1		0.5					
HCM LOS	F		F									
Minor Lane/Major Mvmt	NEL	NET	NERNWLn1	NWLn2	NWLn3	SELn1	SELn2	SELn3	SWL	SWT	SWR	
Capacity (veh/h)	980	-	-	31	176	745	67	185	531	1264	-	-
HCM Lane V/C Ratio	0.092	-	-	0.255	0.695	0.016	0.6	0.82	0.262	0.029	-	-
HCM Control Delay (s)	9	-	-	157	62.3	9.9	119.2	77.9	14.2	7.9	-	-
HCM Lane LOS	A	-	-	F	F	A	F	F	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.8	4.2	0	2.6	5.7	1	0.1	-	-

Lanes, Volumes, Timings  
8: US 24 & Curtis/Stapleton

Existing + Site  
PM (Signal)













												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	16	51	50	5	115	39	150	535	15	12	370	20
Future Volume (vph)	16	51	50	5	115	39	150	535	15	12	370	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	190		325	215		215	890		1000	790		790
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	240			200			190			190		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.666			0.717			0.290			0.318		
Satd. Flow (perm)	1241	1863	1583	1336	1863	1583	540	1863	1583	592	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			143			143			143			143
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4560			5565			6479			6170	
Travel Time (s)		69.1			84.3			80.3			76.5	
Peak Hour Factor	0.83	0.83	0.83	0.81	0.81	0.81	0.87	0.87	0.87	0.84	0.84	0.84
Adj. Flow (vph)	19	61	60	6	142	48	172	615	17	14	440	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	61	60	6	142	48	172	615	17	14	440	24
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (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
Detector 1 Queue (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
Detector 1 Delay (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
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8

Existing + Site PM (Signal)  
Lanes, Volumes, Timings

Synchro 10 Report  
JAB

Lanes, Volumes, Timings  
8: US 24 & Curtis/Stapleton

Existing + Site  
PM (Signal)

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	9.5	23.0	23.0	9.5	23.0	23.0	12.0	38.0	38.0	9.5	35.5	35.5
Total Split (%)	11.9%	28.8%	28.8%	11.9%	28.8%	28.8%	15.0%	47.5%	47.5%	11.9%	44.4%	44.4%
Maximum Green (s)	5.0	18.5	18.5	5.0	18.5	18.5	7.5	33.5	33.5	5.0	31.0	31.0
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	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effect Green (s)	10.8	10.2	10.2	10.8	10.2	10.2	27.6	26.6	26.6	22.5	18.8	18.8
Actuated g/C Ratio	0.22	0.21	0.21	0.22	0.21	0.21	0.56	0.54	0.54	0.46	0.38	0.38
v/c Ratio	0.06	0.16	0.14	0.02	0.37	0.11	0.34	0.61	0.02	0.03	0.62	0.03
Control Delay	17.9	21.7	0.6	17.6	24.1	0.5	7.6	13.0	0.1	6.3	18.5	0.1
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	17.9	21.7	0.6	17.6	24.1	0.5	7.6	13.0	0.1	6.3	18.5	0.1
LOS	B	C	A	B	C	A	A	B	A	A	B	A
Approach Delay		12.2			18.1			11.6			17.2	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 49.4

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 14.1









Intersection LOS: B

Intersection Capacity Utilization 51.1%

ICU Level of Service A













Analysis Period (min) 15

Splits and Phases: 8: US 24 & Curtis/Stapleton

			
Ø1	Ø2	Ø3	Ø4
9.5 s	23 s	9.5 s	38 s
			
Ø5	Ø6	Ø7	Ø8
9.5 s	23 s	12 s	35.5 s

























HCM 6th TWSC  
8: US 24 & Curtis/Stapleton

Existing + Site  
PM (TWSC)

Intersection												
Int Delay, s/veh	24.7											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	16	51	50	5	115	39	150	535	15	12	370	20
Future Vol, veh/h	16	51	50	5	115	39	150	535	15	12	370	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	190	-	325	215	-	215	890	-	1000	790	-	790
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	81	81	81	87	87	87	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	19	61	60	6	142	48	172	615	17	14	440	24
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1531	1444	440	1500	1451	615	464	0	0	632	0	0
Stage 1	468	468	-	959	959	-	-	-	-	-	-	-
Stage 2	1063	976	-	541	492	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	96	132	617	100	~ 131	491	1097	-	-	951	-	-
Stage 1	575	561	-	309	335	-	-	-	-	-	-	-
Stage 2	270	329	-	525	548	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	110	617	45	~ 109	491	1097	-	-	951	-	-
Mov Cap-2 Maneuver	-	110	-	45	~ 109	-	-	-	-	-	-	-
Stage 1	485	553	-	260	282	-	-	-	-	-	-	-
Stage 2	102	277	-	415	540	-	-	-	-	-	-	-
Approach	SE		NW		NE		SW					
HCM Control Delay, s			195		1.9		0.3					
HCM LOS	-		F									
Minor Lane/Major Mvmt	NEL	NET	NERNWLn1	NWLn2	NWLn3	SELn1	SELn2	SELn3	SWL	SWT	SWR	
Capacity (veh/h)	1097	-	-	45	109	491	-	110	617	951	-	-
HCM Lane V/C Ratio	0.157	-	-	0.137	1.303	0.098	-	0.559	0.098	0.015	-	-
HCM Control Delay (s)	8.9	-	-	97.3	261	13.1	-	72.9	11.5	8.8	-	-
HCM Lane LOS	A	-	-	F	F	B	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0.6	-	-	0.4	9.6	0.3	-	2.6	0.3	0	-	-
Notes												
~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon												

Lanes, Volumes, Timings  
8: US 24 & Curtis/Stapleton

2040 Background  
AM (TWSC)

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	175	290	600	75	347	45	300	400	50	123	800	350
Future Volume (vph)	175	290	600	75	347	45	300	400	50	123	800	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	190		325	215		215	890		1000	790		790
Storage Lanes	2		2	1		1	2		1	1		1
Taper Length (ft)	240			200			190			190		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.453			0.539			0.147			0.391		
Satd. Flow (perm)	1637	3539	1583	1004	3539	1583	531	3539	1583	728	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			328			116			116			328
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4560			2900			6479			6170	
Travel Time (s)		69.1			43.9			80.3			76.5	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	206	341	706	88	408	53	326	435	54	134	870	380
Shared Lane Traffic (%)												
Lane Group Flow (vph)	206	341	706	88	408	53	326	435	54	134	870	380
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (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
Detector 1 Queue (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
Detector 1 Delay (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
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8













2040 Background AM (TWSC)  
Lanes, Volumes, Timings

Synchro 10 Report  
JAB



Lanes, Volumes, Timings  
8: US 24 & Curtis/Stapleton









2040 Background  
AM (TWSC)

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	9.6	44.4	44.4	9.6	44.4	44.4	13.0	31.8	31.8	13.2	32.0	32.0
Total Split (%)	9.7%	44.8%	44.8%	9.7%	44.8%	44.8%	13.1%	32.1%	32.1%	13.3%	32.3%	32.3%
Maximum Green (s)	5.1	39.9	39.9	5.1	39.9	39.9	8.5	27.3	27.3	8.7	27.5	27.5
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	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	46.3	42.2	42.2	45.2	40.0	40.0	35.7	27.2	27.2	35.5	27.1	27.1
Actuated g/C Ratio	0.47	0.43	0.43	0.46	0.40	0.40	0.36	0.27	0.27	0.36	0.27	0.27
v/c Ratio	0.24	0.23	0.82	0.18	0.29	0.07	0.74	0.45	0.10	0.39	0.90	0.57
Control Delay	13.9	19.3	23.0	14.1	20.6	0.2	31.1	31.4	0.4	22.4	48.0	9.2
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	13.9	19.3	23.0	14.1	20.6	0.2	31.1	31.4	0.4	22.4	48.0	9.2
LOS	B	B	C	B	C	A	C	C	A	C	D	A
Approach Delay		20.5			17.6			29.2			34.9	
Approach LOS		C			B			C			C	

Intersection Summary

























Area Type: Other  
 Cycle Length: 99  
 Actuated Cycle Length: 99  
 Offset: 0 (0%), Referenced to phase 2:NWTL and 6:SETL, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.90  
 Intersection Signal Delay: 26.8 Intersection LOS: C  
 Intersection Capacity Utilization 74.7% ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 8: US 24 & Curtis/Stapleton

			
Ø1	Ø2 (R)	Ø3	Ø4
9.6 s	44.4 s	13.2 s	31.8 s
			
Ø5	Ø6 (R)	Ø7	Ø8
9.6 s	44.4 s	13 s	32 s













Lanes, Volumes, Timings  
8: US 24 & Curtis/Stapleton

2040 Background  
PM (TWSC)

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	350	267	400	125	382	172	650	850	150	144	500	350
Future Volume (vph)	350	267	400	125	382	172	650	850	150	144	500	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	190		325	215		215	890		1000	790		790
Storage Lanes	2		2	1		1	2		1	1		1
Taper Length (ft)	240			200			190			190		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.382			0.558			0.220			0.226		
Satd. Flow (perm)	1380	3539	1583	1039	3539	1583	795	3539	1583	421	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			420			205			163			236
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4560			2900			6479			6170	
Travel Time (s)		69.1			43.9			80.3			76.5	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	412	314	471	147	449	202	707	924	163	157	543	380
Shared Lane Traffic (%)												
Lane Group Flow (vph)	412	314	471	147	449	202	707	924	163	157	543	380
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (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
Detector 1 Queue (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
Detector 1 Delay (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
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8

Lanes, Volumes, Timings  
8: US 24 & Curtis/Stapleton

2040 Background  
PM (TWSC)

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	11.0	26.8	26.8	10.0	25.8	25.8	19.2	31.2	31.2	12.0	24.0	24.0
Total Split (%)	13.8%	33.5%	33.5%	12.5%	32.3%	32.3%	24.0%	39.0%	39.0%	15.0%	30.0%	30.0%
Maximum Green (s)	6.5	22.3	22.3	5.5	21.3	21.3	14.7	26.7	26.7	7.5	19.5	19.5
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	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	28.8	22.3	22.3	26.8	21.3	21.3	36.4	24.6	24.6	25.0	17.7	17.7
Actuated g/C Ratio	0.37	0.29	0.29	0.34	0.27	0.27	0.47	0.32	0.32	0.32	0.23	0.23
v/c Ratio	0.60	0.31	0.63	0.36	0.46	0.35	0.83	0.83	0.27	0.60	0.67	0.70
Control Delay	20.6	23.3	8.3	18.8	25.9	5.5	24.1	31.8	4.7	23.6	32.1	18.3
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	20.6	23.3	8.3	18.8	25.9	5.5	24.1	31.8	4.7	23.6	32.1	18.3
LOS	C	C	A	B	C	A	C	C	A	C	C	B
Approach Delay		16.5			19.4			26.3			26.0	
Approach LOS		B			B			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 77.8

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 22.7









Intersection LOS: C

Intersection Capacity Utilization 67.9%

ICU Level of Service C

























Analysis Period (min) 15

Splits and Phases: 8: US 24 & Curtis/Stapleton

			
Ø1	Ø2	Ø3	Ø4
11 s	25.8 s	12 s	31.2 s
			
Ø5	Ø6	Ø7	Ø8
10 s	26.8 s	19.2 s	24 s













Lanes, Volumes, Timings  
8: US 24 & Curtis/Stapleton

2040 Background + Site  
AM (TWSC)

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	175	300	600	75	375	50	300	400	50	125	800	350
Future Volume (vph)	175	300	600	75	375	50	300	400	50	125	800	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	190		325	215		215	890		1000	790		790
Storage Lanes	2		2	1		1	2		1	1		1
Taper Length (ft)	240			200			190			190		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.435			0.525			0.148			0.387		
Satd. Flow (perm)	1572	3539	1583	978	3539	1583	535	3539	1583	721	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			329			116			116			305
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4560			2900			6479			6170	
Travel Time (s)		69.1			43.9			80.3			76.5	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	206	353	706	88	441	59	326	435	54	136	870	380
Shared Lane Traffic (%)												
Lane Group Flow (vph)	206	353	706	88	441	59	326	435	54	136	870	380
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (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
Detector 1 Queue (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
Detector 1 Delay (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
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8

Lanes, Volumes, Timings  
8: US 24 & Curtis/Stapleton

2040 Background + Site  
AM (TWSC)

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	9.6	44.4	44.4	9.6	44.4	44.4	13.0	31.6	31.6	13.4	32.0	32.0
Total Split (%)	9.7%	44.8%	44.8%	9.7%	44.8%	44.8%	13.1%	31.9%	31.9%	13.5%	32.3%	32.3%
Maximum Green (s)	5.1	39.9	39.9	5.1	39.9	39.9	8.5	27.1	27.1	8.9	27.5	27.5
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	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	45.9	41.9	41.9	45.0	39.9	39.9	35.5	27.0	27.0	35.5	27.0	27.0
Actuated g/C Ratio	0.47	0.43	0.43	0.46	0.41	0.41	0.36	0.27	0.27	0.36	0.27	0.27
v/c Ratio	0.25	0.23	0.82	0.18	0.31	0.08	0.74	0.45	0.10	0.39	0.90	0.58
Control Delay	14.0	19.4	23.0	14.1	20.8	0.3	30.8	31.5	0.4	22.4	47.8	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	14.0	19.4	23.0	14.1	20.8	0.3	30.8	31.5	0.4	22.4	47.8	10.8
LOS	B	B	C	B	C	A	C	C	A	C	D	B
Approach Delay		20.5			17.7			29.1			35.2	
Approach LOS		C			B			C			D	

Intersection Summary

Area Type: Other

Cycle Length: 99

Actuated Cycle Length: 98.5

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 26.9









Intersection LOS: C

Intersection Capacity Utilization 74.7%

ICU Level of Service D































Analysis Period (min) 15

Splits and Phases: 8: US 24 & Curtis/Stapleton

			
Ø1	Ø2	Ø3	Ø4
9.6 s	44.4 s	13.4 s	31.6 s
			
Ø5	Ø6	Ø7	Ø8
9.6 s	44.4 s	13 s	32 s













Lanes, Volumes, Timings  
8: US 24 & Curtis/Stapleton

2040 Background + Site  
PM (TWSC)

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	 	 			 		 	 			 	
Traffic Volume (vph)	350	300	400	125	400	175	650	850	150	150	500	350
Future Volume (vph)	350	300	400	125	400	175	650	850	150	150	500	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	190		325	215		215	890		1000	790		790
Storage Lanes	2		2	1		1	2		1	1		1
Taper Length (ft)	240			200			190			190		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.311			0.540			0.219			0.183		
Satd. Flow (perm)	1124	3539	1583	1006	3539	1583	791	3539	1583	341	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			443			215			165			215
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		4560			2900			6479			6170	
Travel Time (s)		69.1			43.9			80.3			76.5	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	412	353	471	147	471	206	707	924	163	163	543	380
Shared Lane Traffic (%)												
Lane Group Flow (vph)	412	353	471	147	471	206	707	924	163	163	543	380
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (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
Detector 1 Queue (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
Detector 1 Delay (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
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8

Lanes, Volumes, Timings  
8: US 24 & Curtis/Stapleton

2040 Background + Site  
PM (TWSC)

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	15.0	34.8	34.8	10.2	30.0	30.0	24.0	39.0	39.0	15.0	30.0	30.0
Total Split (%)	15.2%	35.2%	35.2%	10.3%	30.3%	30.3%	24.2%	39.4%	39.4%	15.2%	30.3%	30.3%
Maximum Green (s)	10.5	30.3	30.3	5.7	25.5	25.5	19.5	34.5	34.5	10.5	25.5	25.5
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	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	40.4	30.4	30.4	31.7	26.0	26.0	44.0	29.9	29.9	31.5	21.9	21.9
Actuated g/C Ratio	0.43	0.32	0.32	0.34	0.28	0.28	0.47	0.32	0.32	0.34	0.23	0.23
v/c Ratio	0.56	0.31	0.58	0.38	0.48	0.35	0.82	0.82	0.26	0.63	0.66	0.71
Control Delay	21.3	25.7	6.8	22.7	31.3	5.5	25.9	36.1	4.8	28.6	36.6	21.9
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	21.3	25.7	6.8	22.7	31.3	5.5	25.9	36.1	4.8	28.6	36.6	21.9
LOS	C	C	A	C	C	A	C	D	A	C	D	C
Approach Delay		17.0			23.4			29.2			30.3	
Approach LOS		B			C			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 99

Actuated Cycle Length: 93.7

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 25.4









Intersection LOS: C

Intersection Capacity Utilization 68.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: US 24 & Curtis/Stapleton

			
Ø1	Ø2	Ø3	Ø4
15 s	30 s	15 s	39 s
			
Ø5	Ø6	Ø7	Ø8
10.2 s	34.8 s	24 s	30 s

## **Synchro LOS Reports**



















**US 24/Judge Orr Road**



# Lanes, Volumes, Timings

## 3: US 24 & Judge Orr

Existing  
AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	5	66	128	123	7	3	18	199	49	1	512	8
Future Volume (vph)	5	66	128	123	7	3	18	199	49	1	512	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	850		0	700		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			280			300		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.913			0.997			0.970			0.998	
Flt Protected		0.999			0.956		0.950			0.950		
Satd. Flow (prot)	0	1699	0	0	1775	0	1770	1807	0	1770	1859	0
Flt Permitted		0.992			0.494		0.298			0.567		
Satd. Flow (perm)	0	1687	0	0	917	0	555	1807	0	1056	1859	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		125			2			19			1	
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		3440			7269			6189			6479	
Travel Time (s)		52.1			110.1			76.7			80.3	
Peak Hour Factor	0.86	0.86	0.86	0.83	0.83	0.83	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	6	77	149	148	8	4	21	234	58	1	602	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	232	0	0	160	0	21	292	0	1	611	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		













Existing AM  
Lanes, Volumes, Timings

Synchro 10 Report  
JAB

# Lanes, Volumes, Timings

## 3: US 24 & Judge Orr

Existing  
AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.6		9.5	22.6		9.6	33.3		9.6	33.3	
Total Split (%)	12.7%	30.1%		12.7%	30.1%		12.8%	44.4%		12.8%	44.4%	
Maximum Green (s)	5.0	18.1		5.0	18.1		5.1	28.8		5.1	28.8	
Yellow Time (s)	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	
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		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)		12.8			12.8		30.9	30.1		30.9	30.1	
Actuated g/C Ratio		0.24			0.24		0.58	0.56		0.58	0.56	
v/c Ratio		0.47			0.73		0.05	0.29		0.00	0.58	
Control Delay		11.8			39.5		6.1	8.4		6.0	12.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		11.8			39.5		6.1	8.4		6.0	12.9	
LOS		B			D		A	A		A	B	
Approach Delay		11.8			39.5			8.3			12.9	
Approach LOS		B			D			A			B	

### Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 53.5

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 14.8









Intersection LOS: B

Intersection Capacity Utilization 57.7%

ICU Level of Service B

Analysis Period (min) 15



















Splits and Phases: 3: US 24 & Judge Orr

			
Ø1	Ø2	Ø3	Ø4
9.6 s	33.3 s	9.5 s	22.6 s
			
Ø5	Ø6	Ø7	Ø8
9.6 s	33.3 s	9.5 s	22.6 s

# Lanes, Volumes, Timings

## 3: US 24 & Judge Orr

Existing  
PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	35	27	48	82	48	8	103	583	129	6	370	15
Future Volume (vph)	35	27	48	82	48	8	103	583	129	6	370	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	850		0	700		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			280			300		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.941			0.992			0.973			0.994	
Flt Protected		0.984			0.971		0.950			0.950		
Satd. Flow (prot)	0	1725	0	0	1794	0	1770	1812	0	1770	1852	0
Flt Permitted		0.868			0.733		0.409			0.267		
Satd. Flow (perm)	0	1521	0	0	1354	0	762	1812	0	497	1852	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49			4			17			3	
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		3440			7269			6189			6479	
Travel Time (s)		52.1			110.1			76.7			80.3	
Peak Hour Factor	0.79	0.79	0.79	0.84	0.84	0.84	0.94	0.94	0.94	0.92	0.92	0.92
Adj. Flow (vph)	44	34	61	98	57	10	110	620	137	7	402	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	139	0	0	165	0	110	757	0	7	418	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		













Existing PM  
Lanes, Volumes, Timings

Synchro 10 Report  
JAB

# Lanes, Volumes, Timings

## 3: US 24 & Judge Orr

Existing  
PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.6		9.5	22.6		10.6	38.3		9.6	37.3	
Total Split (%)	11.9%	28.3%		11.9%	28.3%		13.3%	47.9%		12.0%	46.6%	
Maximum Green (s)	5.0	18.1		5.0	18.1		6.1	33.8		5.1	32.8	
Yellow Time (s)	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	
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		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)		12.6			12.6		43.0	41.8		39.3	35.3	
Actuated g/C Ratio		0.19			0.19		0.66	0.64		0.60	0.54	
v/c Ratio		0.42			0.62		0.18	0.65		0.02	0.42	
Control Delay		19.1			34.3		5.5	13.3		5.0	12.2	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		19.1			34.3		5.5	13.3		5.0	12.2	
LOS		B			C		A	B		A	B	
Approach Delay		19.1			34.3			12.3			12.1	
Approach LOS		B			C			B			B	

### Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 65.2

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 15.1









Intersection LOS: B

Intersection Capacity Utilization 67.5%

ICU Level of Service C



















Analysis Period (min) 15

Splits and Phases: 3: US 24 & Judge Orr

 Ø1	 Ø2	 Ø3	 Ø4
9.6 s	38.3 s	9.5 s	22.6 s
 Ø5	 Ø6	 Ø7	 Ø8
10.6 s	37.3 s	9.5 s	22.6 s

Lanes, Volumes, Timings  
3: US 24 & Judge Orr

Existing + Site  
AM (Signal)













												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	5	67	128	127	9	3	18	199	51	1	512	8
Future Volume (vph)	5	67	128	127	9	3	18	199	51	1	512	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	850		0	700		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			280			300		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.914			0.997			0.969			0.998	
Flt Protected		0.999			0.956		0.950			0.950		
Satd. Flow (prot)	0	1701	0	0	1775	0	1770	1805	0	1770	1859	0
Flt Permitted		0.991			0.500		0.295			0.564		
Satd. Flow (perm)	0	1687	0	0	929	0	550	1805	0	1051	1859	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		123			2			20			1	
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		3440			7269			6189			6479	
Travel Time (s)		52.1			110.1			76.7			80.3	
Peak Hour Factor	0.86	0.86	0.86	0.83	0.83	0.83	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	6	78	149	153	11	4	21	234	60	1	602	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	233	0	0	168	0	21	294	0	1	611	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		

Existing + Site AM (Signal)  
Lanes, Volumes, Timings

Synchro 10 Report  
JAB

Lanes, Volumes, Timings  
3: US 24 & Judge Orr

Existing + Site  
AM (Signal)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.6		9.5	22.6		9.6	33.3		9.6	33.3	
Total Split (%)	12.7%	30.1%		12.7%	30.1%		12.8%	44.4%		12.8%	44.4%	
Maximum Green (s)	5.0	18.1		5.0	18.1		5.1	28.8		5.1	28.8	
Yellow Time (s)	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	
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		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)		13.0			13.0		30.8	30.0		30.8	30.0	
Actuated g/C Ratio		0.24			0.24		0.57	0.56		0.57	0.56	
v/c Ratio		0.46			0.74		0.05	0.29		0.00	0.59	
Control Delay		11.9			40.1		6.2	8.6		6.0	13.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		11.9			40.1		6.2	8.6		6.0	13.1	
LOS		B			D		A	A		A	B	
Approach Delay		11.9			40.1			8.4			13.1	
Approach LOS		B			D			A			B	

Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 53.7

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 15.2









Intersection LOS: B

Intersection Capacity Utilization 58.0%

ICU Level of Service B



















Analysis Period (min) 15

Splits and Phases: 3: US 24 & Judge Orr

 Ø1	 Ø2	 Ø3	 Ø4
9.6 s	33.3 s	9.5 s	22.6 s
 Ø5	 Ø6	 Ø7	 Ø8
9.6 s	33.3 s	9.5 s	22.6 s

Lanes, Volumes, Timings  
3: US 24 & Judge Orr

Existing + Site  
PM (Signal)













												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	35	29	48	85	49	8	103	583	134	6	370	15
Future Volume (vph)	35	29	48	85	49	8	103	583	134	6	370	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	850		0	700		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			280			300		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.942			0.992			0.972			0.994	
Flt Protected		0.985			0.971		0.950			0.950		
Satd. Flow (prot)	0	1728	0	0	1794	0	1770	1811	0	1770	1852	0
Flt Permitted		0.870			0.727		0.409			0.261		
Satd. Flow (perm)	0	1527	0	0	1343	0	762	1811	0	486	1852	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48			4			18			3	
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		3440			7269			6189			6479	
Travel Time (s)		52.1			110.1			76.7			80.3	
Peak Hour Factor	0.79	0.79	0.79	0.84	0.84	0.84	0.94	0.94	0.94	0.92	0.92	0.92
Adj. Flow (vph)	44	37	61	101	58	10	110	620	143	7	402	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	142	0	0	169	0	110	763	0	7	418	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		

Existing + Site PM (Signal)  
Lanes, Volumes, Timings

Synchro 10 Report  
JAB

Lanes, Volumes, Timings  
3: US 24 & Judge Orr

Existing + Site  
PM (Signal)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.6		9.5	22.6		10.6	38.3		9.6	37.3	
Total Split (%)	11.9%	28.3%		11.9%	28.3%		13.3%	47.9%		12.0%	46.6%	
Maximum Green (s)	5.0	18.1		5.0	18.1		6.1	33.8		5.1	32.8	
Yellow Time (s)	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	
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		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)		12.7			12.7		42.8	41.7		39.1	35.1	
Actuated g/C Ratio		0.19			0.19		0.66	0.64		0.60	0.54	
v/c Ratio		0.42			0.64		0.19	0.66		0.02	0.42	
Control Delay		19.4			34.9		5.5	13.5		5.2	12.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		19.4			34.9		5.5	13.5		5.2	12.3	
LOS		B			C		A	B		A	B	
Approach Delay		19.4			34.9			12.5			12.2	
Approach LOS		B			C			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 65.2

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 15.4









Intersection LOS: B

Intersection Capacity Utilization 68.4%

ICU Level of Service C

Analysis Period (min) 15

























Splits and Phases: 3: US 24 & Judge Orr

 Ø1	 Ø2	 Ø3	 Ø4
9.6 s	38.3 s	9.5 s	22.6 s
 Ø5	 Ø6	 Ø7	 Ø8
10.6 s	37.3 s	9.5 s	22.6 s















Lanes, Volumes, Timings  
3: US 24 & Judge Orr Rd

2040 Background  
AM (Signal)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	106	300	253	82	34	203	675	187	107	1210	94
Future Volume (vph)	43	106	300	253	82	34	203	675	187	107	1210	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	205		155	275		155	850		800	700		600
Storage Lanes	1		1	2		1	2		1	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.698			0.950			0.950			0.365		
Satd. Flow (perm)	1300	3539	1583	3433	3539	1583	3433	3539	1583	680	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			316			245			195			200
Link Speed (mph)		45			45			65			65	
Link Distance (ft)		1090			1791			2619			3386	
Travel Time (s)		16.5			27.1			27.5			35.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.98	0.96	0.95	0.98	0.95
Adj. Flow (vph)	45	112	316	266	86	36	211	689	195	113	1235	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	112	316	266	86	36	211	689	195	113	1235	99
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (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
Detector 1 Queue (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
Detector 1 Delay (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
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free			Free			2	6		6

Lanes, Volumes, Timings  
3: US 24 & Judge Orr Rd

2040 Background  
AM (Signal)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	21.0	15.0		35.0	29.0		25.0	60.0	60.0	10.0	45.0	45.0
Total Split (%)	17.5%	12.5%		29.2%	24.2%		20.8%	50.0%	50.0%	8.3%	37.5%	37.5%
Maximum Green (s)	16.0	10.0		30.0	24.0		20.0	55.0	55.0	5.0	40.0	40.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	None	None
Act Effct Green (s)	17.0	9.2	120.0	14.6	18.1	120.0	12.7	67.9	67.9	71.8	63.5	63.5
Actuated g/C Ratio	0.14	0.08	1.00	0.12	0.15	1.00	0.11	0.57	0.57	0.60	0.53	0.53
v/c Ratio	0.21	0.41	0.20	0.64	0.16	0.02	0.58	0.34	0.20	0.23	0.66	0.11
Control Delay	36.6	57.1	0.3	57.0	45.4	0.0	57.4	15.5	2.7	9.3	23.9	0.2
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	36.6	57.1	0.3	57.0	45.4	0.0	57.4	15.5	2.7	9.3	23.9	0.2
LOS	D	E	A	E	D	A	E	B	A	A	C	A
Approach Delay		17.2			49.1			21.3			21.1	
Approach LOS		B			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 23.8

Intersection LOS: C

Intersection Capacity Utilization 65.6%

ICU Level of Service C

























Analysis Period (min) 15

Splits and Phases: 3: US 24 & Judge Orr Rd















Lanes, Volumes, Timings  
3: US 24 & Judge Orr Rd

2040 Background  
PM (Signal)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	220	130	317	427	135	165	403	1350	405	145	800	152
Future Volume (vph)	220	130	317	427	135	165	403	1350	405	145	800	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	205		155	275		155	850		800	700		600
Storage Lanes	1		1	2		1	2		1	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.662			0.950			0.950			0.080		
Satd. Flow (perm)	1233	3539	1583	3433	3539	1583	3433	3539	1583	149	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			334			245			422			200
Link Speed (mph)		45			45			65			65	
Link Distance (ft)		1090			1791			2619			3386	
Travel Time (s)		16.5			27.1			27.5			35.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.98	0.96	0.95	0.98	0.95
Adj. Flow (vph)	232	137	334	449	142	174	420	1378	422	153	816	160
Shared Lane Traffic (%)												
Lane Group Flow (vph)	232	137	334	449	142	174	420	1378	422	153	816	160
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (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
Detector 1 Queue (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
Detector 1 Delay (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
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free			Free			2	6		6

Lanes, Volumes, Timings  
3: US 24 & Judge Orr Rd

2040 Background  
PM (Signal)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	21.0	15.0		35.0	29.0		25.0	60.0	60.0	10.0	45.0	45.0
Total Split (%)	17.5%	12.5%		29.2%	24.2%		20.8%	50.0%	50.0%	8.3%	37.5%	37.5%
Maximum Green (s)	16.0	10.0		30.0	24.0		20.0	55.0	55.0	5.0	40.0	40.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	None	None
Act Effct Green (s)	25.3	10.0	120.0	21.0	15.7	120.0	19.1	56.2	56.2	62.8	49.9	49.9
Actuated g/C Ratio	0.21	0.08	1.00	0.18	0.13	1.00	0.16	0.47	0.47	0.52	0.42	0.42
v/c Ratio	0.71	0.47	0.21	0.75	0.31	0.11	0.77	0.83	0.44	0.61	0.55	0.21
Control Delay	46.5	57.3	0.3	55.0	47.7	0.1	58.2	33.5	3.3	37.7	30.0	2.3
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	46.5	57.3	0.3	55.0	47.7	0.1	58.2	33.5	3.3	37.7	30.0	2.3
LOS	D	E	A	D	D	A	E	C	A	D	C	A
Approach Delay		26.6			41.2			32.4			27.1	
Approach LOS		C			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 31.7

Intersection LOS: C

Intersection Capacity Utilization 78.4%

ICU Level of Service D

























Analysis Period (min) 15

Splits and Phases: 3: US 24 & Judge Orr Rd















Lanes, Volumes, Timings  
3: US 24 & Judge Orr Rd

2040 Background + Site  
AM (Signal)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	108	300	276	89	34	203	675	195	107	1210	94
Future Volume (vph)	43	108	300	276	89	34	203	675	195	107	1210	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	205		155	275		155	850		800	700		600
Storage Lanes	1		1	2		1	2		1	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.693			0.950			0.950			0.362		
Satd. Flow (perm)	1291	3539	1583	3433	3539	1583	3433	3539	1583	674	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			316			245			203			200
Link Speed (mph)		45			45			65			65	
Link Distance (ft)		1090			1791			2619			3386	
Travel Time (s)		16.5			27.1			27.5			35.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.98	0.96	0.95	0.98	0.95
Adj. Flow (vph)	45	114	316	291	94	36	211	689	203	113	1235	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	114	316	291	94	36	211	689	203	113	1235	99
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (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
Detector 1 Queue (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
Detector 1 Delay (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
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free			Free			2	6		6

Lanes, Volumes, Timings  
3: US 24 & Judge Orr Rd

2040 Background + Site  
AM (Signal)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	21.0	15.0		35.0	29.0		25.0	60.0	60.0	10.0	45.0	45.0
Total Split (%)	17.5%	12.5%		29.2%	24.2%		20.8%	50.0%	50.0%	8.3%	37.5%	37.5%
Maximum Green (s)	16.0	10.0		30.0	24.0		20.0	55.0	55.0	5.0	40.0	40.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	None	None
Act Effct Green (s)	17.0	9.2	120.0	15.5	19.0	120.0	12.7	66.9	66.9	71.0	62.6	62.6
Actuated g/C Ratio	0.14	0.08	1.00	0.13	0.16	1.00	0.11	0.56	0.56	0.59	0.52	0.52
v/c Ratio	0.21	0.42	0.20	0.66	0.17	0.02	0.58	0.35	0.21	0.24	0.67	0.11
Control Delay	35.9	57.2	0.3	56.7	44.6	0.0	57.4	16.2	2.8	9.7	24.7	0.2
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	35.9	57.2	0.3	56.7	44.6	0.0	57.4	16.2	2.8	9.7	24.7	0.2
LOS	D	E	A	E	D	A	E	B	A	A	C	A
Approach Delay		17.3			49.2			21.6			21.9	
Approach LOS		B			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 24.5

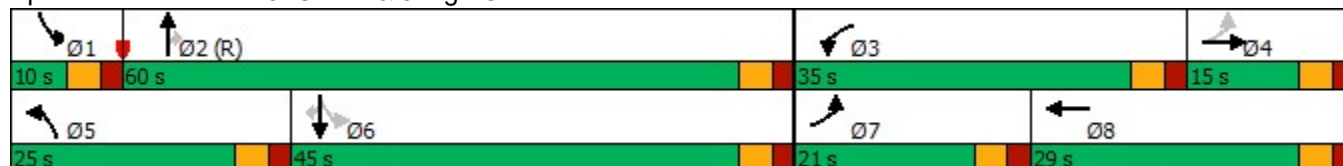
Intersection LOS: C

Intersection Capacity Utilization 66.3%

ICU Level of Service C

























Analysis Period (min) 15

Splits and Phases: 3: US 24 & Judge Orr Rd



Lanes, Volumes, Timings  
3: US 24 & Judge Orr Rd













2040 Background + Site  
PM (Signal)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	220	139	317	441	140	165	403	1350	431	145	800	152
Future Volume (vph)	220	139	317	441	140	165	403	1350	431	145	800	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	205		155	275		155	850		800	700		600
Storage Lanes	1		1	2		1	2		1	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.659			0.950			0.950			0.081		
Satd. Flow (perm)	1228	3539	1583	3433	3539	1583	3433	3539	1583	151	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			334			245			449			200
Link Speed (mph)		45			45			65			65	
Link Distance (ft)		1090			1791			2619			3386	
Travel Time (s)		16.5			27.1			27.5			35.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.98	0.96	0.95	0.98	0.95
Adj. Flow (vph)	232	146	334	464	147	174	420	1378	449	153	816	160
Shared Lane Traffic (%)												
Lane Group Flow (vph)	232	146	334	464	147	174	420	1378	449	153	816	160
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (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
Detector 1 Queue (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
Detector 1 Delay (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
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Free	Prot	NA	Free	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free			Free			2	6		6



Lanes, Volumes, Timings  
3: US 24 & Judge Orr Rd

2040 Background + Site  
PM (Signal)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	21.0	15.0		35.0	29.0		25.0	60.0	60.0	10.0	45.0	45.0
Total Split (%)	17.5%	12.5%		29.2%	24.2%		20.8%	50.0%	50.0%	8.3%	37.5%	37.5%
Maximum Green (s)	16.0	10.0		30.0	24.0		20.0	55.0	55.0	5.0	40.0	40.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	None	None
Act Effct Green (s)	25.5	10.3	120.0	21.5	16.5	120.0	18.9	55.9	55.9	61.7	49.4	49.4
Actuated g/C Ratio	0.21	0.09	1.00	0.18	0.14	1.00	0.16	0.47	0.47	0.51	0.41	0.41
v/c Ratio	0.70	0.48	0.21	0.76	0.30	0.11	0.78	0.84	0.46	0.63	0.56	0.21
Control Delay	45.5	57.3	0.3	54.8	47.0	0.1	59.0	33.9	3.4	39.2	30.4	2.3
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	45.5	57.3	0.3	54.8	47.0	0.1	59.0	33.9	3.4	39.2	30.4	2.3
LOS	D	E	A	D	D	A	E	C	A	D	C	A
Approach Delay		26.7			41.2			32.5			27.6	
Approach LOS		C			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 31.9

Intersection LOS: C

Intersection Capacity Utilization 78.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 3: US 24 & Judge Orr Rd





## MEMORANDUM

DATE: October 23, 2019

TO: Nina Ruiz, PCD-Project Manager

FROM: Jeff Rice / Steve Kuehster, PCD-Engineering  
719-520-7877 / 719-520-6813

SUBJECT: SP-19-006 – Saddlehorn Ranch/824  
**Second Submittal**

### **w/ LSC Responses to TIS Comments**

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#### **Engineering Division**

Planning and Community Development (PCD)-Engineering reviews plans and reports to ensure general conformance with El Paso County standards and criteria. The project engineer is responsible for compliance with all applicable criteria, including other governmental regulations. Notwithstanding anything depicted in the plans in words or graphic representation, all design and construction related to roads, storm drainage and erosion control shall conform to the standards and requirements of the most recent version of the relevant adopted El Paso County standards, including the Land Development Code (LDC), the Engineering Criteria Manual (ECM), the Drainage Criteria Manual (DCM), and the Drainage Criteria Manual Volume 2 (DCM2). Any deviations from regulations and standards must be requested, and approved by the ECM Administrator, in writing. Any modifications necessary to meet overlooked criteria after-the-fact will be entirely the developer's responsibility to rectify.

The comments include unresolved previous comments and new comments resulting from the re-submittal in **bold**. All previous comments that have been resolved have been noted or deleted. A written response to all comments and redlines is required for review of the re-submittal. Please arrange a meeting between the developer's team and County staff to review and discuss these comments and prepared revisions/responses prior to the next submittal. **Additional comments may be generated on items added or revised after the original comments.**

**Note: The ECM was updated July 2, 2019 requiring updated plan requirements, checklists and forms in order for the County to maintain compliance with its MS4 permit. These comments reflect the updates.**

**Due to the volume and complexity of these comments and the additional information and details required in the plans and reports, Staff will provide more detailed comments on the next submittal. A 21-day review period will be necessary with the next review to complete the review of revised documents and any deviation requests.**

#### General / Letter of Intent

1. Provide copies or electronic links to the easements identified in title insurance Schedule B exceptions 11, 17, and 24. If these easements cannot be delineated, provide a note on the preliminary plan stating that. **Partially resolved; show and label the 90-foot easement in exception 23..**

2. See Letter of Intent redlines. **See updated redlines.**
3. Mention all waivers and deviations in the Letter of Intent. **See LOI redlines.**

#### Preliminary Plan

1. Label the Judge Orr Road and Curtis Road MTCP classifications, proposed rights-of-way and ROW preservation. Provide cross-sections (see TIS comment #1 below). **Partially resolved; label the MTCP classifications and provide proposed cross-sections on the preliminary plan. (See TIS comment #1.)**
2. Show and label existing and proposed drainage facilities and all necessary drainage and maintenance access easements. **Unresolved.**
3. Ensure that all checklist items are provided. **Unresolved.**
4. Provide a note stating that approved Base Flood Elevations (BFEs) are required to be obtained for any plats in or within 300 feet of the northeast corner. **Partially resolved; see redline.**
5. See preliminary plan redlines for additional comments. **Partially resolved; some redlines still need to be addressed.**

#### Transportation / Traffic Impact Study (TIS) / Noise Study

1. Provide deviation requests for the proposed Curtis Road and Judge Orr Road cross-sections to set the required widths going forward on this project (see e-mail dated April 3, 2019) The deviation requests need to address where there is not a defined cross-section in the ECM. This is needed to document acceptance of the cross-sections and track potential ECM revisions. **Unresolved.**  
**LSC Response: Please refer to the deviation request submitted by JR Engineering, and the updated TIS which references and incorporates the deviation request.**
2. **Resolved, the submitted CDs do not have knuckles proposed.**
3. As noted in the TIS dated January 2019, Curtis Road is “unimproved” between Judge Orr Road and Falcon Highway (except where the County constructed it south of Judge Orr Road as part of the Stapleton Drive project). Address what improvements are needed adjacent to the project south to Falcon Highway to bring the road up to 2-lane arterial standards for use of the proposed subdivision. **Unresolved.**  
**LSC Response: Please refer to the deviation request submitted by JR Engineering, and the updated TIS which references and incorporates the deviation request.**
4. **See TIS redlines. Note: for ease and speed of review it is recommended that appendix pages be kept in the same order as the previous submittal.**  
**LSC Response: Please refer to the LSC Responses to the TIS Redlines (attached).**

#### MDDP / Preliminary Drainage Report / Drainage Plans

**Note: ECM updates have affected this plan as noted at the beginning of these comments. The update that affects the MDDP is section: I.7.1.B; please review this section and provide the necessary information. A “study specific to the watershed...” showing that expected soil and vegetation conditions are suitable for infiltration of the WQCV for lots that do not completely drain to the proposed SWQCV ponds may be required if a building lot coverage restriction is not desired.**

1. **Resolved.**

2. As noted in the DCM Update, Table 6-1, SWMM is most commonly used with urbanized watersheds; ensure that the model has been properly calibrated for use in this rural development. **Resolved based on response letter.**
3. Show approximate locations of conceptual channel improvements on the developed drainage plan. **Unresolved; this is required information in a PDR.**
4. The report needs to address access to the natural and improved channel sections for long-term maintenance. Provide discussion of the maintenance entity, access, and other maintenance aspects/considerations of the preliminary design. Show conceptual access roads for ponds and channels on the developed drainage plan. **Partially resolved; further details will need to be provided with each Final Drainage Report.**
5. Provide proposed roadway cross-sections on the developed condition plans. **Partially resolved; provide the Judge Orr and Curtis Road typical cross-sections as well.**
6. The floodplain locations appear to not conform to the contours in many locations. Verify and revise as appropriate. **Unresolved; channel improvements intended to maintain the current FEMA floodplain locations need to be shown.**
  - a. If the modeled floodplain differs from the FEMA floodplain show both on the plans. (Since the lots are 2.5 acres and larger in size it is acceptable to have floodplain easements within the lots where appropriate.) **Unresolved.**
  - b. Evaluate how the undersized culverts under Judge Orr Road and Curtis Road affect the proposed development during overtopping. Show overtopping/diversion areas on the plans. **Unresolved.**
7. **Resolved.**
8. Consider adjusting pond overflow spillways to a potentially less damaging location if the ponds do overtop. Please discuss with staff. **Partially resolved; this can be addressed with filing-specific FDRs.**
9. Provide correspondence with the State Engineer on notice to construct impoundments, when available (final checklist item). **Unresolved.**
10. See MDDP/PDR redlines for further revisions and clarification of these comments. **Partially resolved; see updated/remaining redlines.**

#### Grading and Erosion Control Plan / Predevelopment Site Grading / SWMP

**Note: The following comments are provided based on the Pre-development Site Grading ("Early Grading") request. Grading may otherwise be performed under the Filing 1 plat approval if desired.**

1. The owner needs to sign the ESQCP, Pre-development Site Grading form, PDR, and GEC Plan.
  - a. **Provide the new PBMP Applicability Form, which can be found at:**  
<https://planningdevelopment.elpasoco.com/wp-content/uploads/Engineering/EngineeringDocuments/PBMP-Applicability-Form.docx>.
  - b. **An updated ESQCP form is required as part of ECM updates; provide with the next submittal. The form can be found at**  
<https://planningdevelopment.elpasoco.com/wp-content/uploads/Engineering/EngineeringDocuments/Erosion-and-Stormwater-Quality-Control-Permitrev.2019.docx>
2. The no-rise certification needs to be signed by the engineer. **Unresolved.**
3. The areas proposed to be graded under the early grading approval need to be clarified. If it is only the Filing 1 area and borrow/stockpile areas being graded, state so in the Letter of Intent. **Partially resolved; the FAE Section 1 items will need to be separated into a separate FAE. Verify that the GEC**

4. Ensure that all GEC Plan and SWMP checklist items (attached) are provided. GEC and SWMP checklists will be reviewed with the next submittal. **As noted at the beginning of these comments, updated checklists are required to be provided by the design engineer. Provide the checklists with the next submittal. Instructions are provided below the list of attachments. Checklists can be found at:**  
[https://planningdevelopment.elpasoco.com/wp-content/uploads/Engineering/EngineeringDocuments/Copy-of-GEC-SWMP\\_Checklists.xlsx](https://planningdevelopment.elpasoco.com/wp-content/uploads/Engineering/EngineeringDocuments/Copy-of-GEC-SWMP_Checklists.xlsx).
5. Note: Engineering Staff has no comments on the Soil, Geology, Geologic Hazard and Wastewater Study, except that additional study will be required for road and drainage construction in accordance with ECM Appendix C, for the final plat.
6. Note: If you have not already, please familiarize yourself with the new CDPHE Stormwater Discharge Requirements at  
<https://www.colorado.gov/pacific/cdphe/cor400000-stormwater-discharge>. All Stormwater Management Plans (SWMPs) for projects under review, already approved, and under construction need to be updated to meet the State requirements. If a project is already approved we do not need the SWMP resubmitted to EPC PCD but all SWMPs in the field need to be updated as part of the regular revision process. Please reference the CDPHE checklist and requirements – County checklists and criteria are in the process of being updated, which should be complete around the end of July.

#### Attachments/Electronic Redlines

1. LOI redlines
2. MDDP/Preliminary Drainage Report redlines
3. Preliminary Plan redlines
4. TIS redlines
5. GEC redlines
6. SWMP redlines
7. Engineering Final Submittal Checklist (for Early Grading)

#### **Checklist Instructions:**

Complete and upload the attached SWMP and GEC Checklist (from the recent update to the ECM).

GEC and SWMP Checklist instructions:

1. The applicant shall insert into each box either of the following:
  - a. check mark or Y - this item has been addressed
  - b. N/A - This item does not apply to this project.
2. All checkboxes must be filled in. If necessary provide comments at the end of the checklist.
3. The review engineer will verify each item by inserting one of the following:
  - a. check mark or Y - This item has been adequately addressed or agree that it does not apply
  - b. N - This item has not been adequately addressed.
4. A copy of the checklist will be returned to the applicant.
5. The checklist will be required to be updated and returned with the resubmittal.

SWMP Checklist caveat:

For "N/A". A statement or note is required specifying exactly why a checklist item is not applicable.

Engineering Final Submittal Checklist for Electronic Submittals	
Check Box	Item: Report/Form
<input type="checkbox"/>	Drainage Report (signed)
<input type="checkbox"/>	PBMP Applicability Form
<input type="checkbox"/>	Traffic Impact Study (signed)
<input type="checkbox"/>	Grading & Erosion Control Plan <b>and checklist</b> (signed)
<input type="checkbox"/>	<del>Street Construction Plans (signed)</del>
<input checked="" type="checkbox"/>	Deviation Request (signed)
<input type="checkbox"/>	MS4 Post Construction Form and SDI worksheet DPW POC: John Chavez
<input type="checkbox"/>	Proof of embankment/pond submittal to State Engineer
<input type="checkbox"/>	ESQCP (signed) DPW POC: John Chavez
<input type="checkbox"/>	* Financial Assurance Estimate, SIA (signed)
<input type="checkbox"/>	* Pond/BMP Maint. Agreement and Easement (signed)
<input type="checkbox"/>	* Operation & Maintenance Manual
<input type="checkbox"/>	AutoCAD base drawing (submitted to DPW)
<input checked="" type="checkbox"/>	Pre-Development Site Grading Acknowledgement and Right of Access Form (signed)
<input type="checkbox"/>	Other: Offsite Easements, Other Permits (FEMA LOMR, USACE, <a href="#">Floodplain...</a> ), Conditions of Approval, Street light license agreement, etc.
Pre-Construction Checklist:	
<input type="checkbox"/>	Driveway/Access Permit (Temporary access permits to be obtained from EPC DPW)
<input type="checkbox"/>	Work Within the ROW Permit (DPW or CDOT)
<input type="checkbox"/>	* Stormwater Management Plan (SWMP) <b>and checklist</b> Submit to PCD-Inspections 2 weeks prior to precon.
<input type="checkbox"/>	* Colorado Discharge Permit (COR: _____ )
<input type="checkbox"/>	* County Construction Activity Permit
<input type="checkbox"/>	* CDPHE APEN – (if over 25 ac. or 6 mos.)
<input type="checkbox"/>	* Financial Surety (Letter of Credit/Bond/Collateral/Check)
<input type="checkbox"/>	Construction Permit Fee: <i>Early Grading or Standalone Grading</i> <span style="float: right;">\$ <b>1,637.00</b></span> (Verify fees with Inspections Supervisor at time of scheduling)
<input type="checkbox"/>	Other: _____

\* - required items to obtain an ESQCP

Permit Fee and Collateral must be separate checks

Post Construction Submittal Checklist: (ECM 5.10.6)	
<input type="checkbox"/>	As-Built Drawings
<input type="checkbox"/>	Pond Certification Letter
<input type="checkbox"/>	Acceptance Letter for wet utilities

- ☐ = Need final / signed version

- ☒ = complete, in file

- ☐ = PCD Staff to provide

- ☐ = Undetermined at this time

- ☐ = Need later



**LSC TRANSPORTATION CONSULTANTS,  
INC.**

**545 East Pikes Peak Avenue, Suite 210  
Colorado Springs, CO 80903  
(719) 633-2868**

**FAX (719) 633-5430**

**E-mail: [lsc@lsctrans.com](mailto:lsc@lsctrans.com)**

**Website: <http://www.lsctrans.com>**

**Engineering Review**

***10/24/2019 11:41:40 AM***

*dsdrice*

*JeffRice@elpasoco.com*

**(719) 520-7877**

**EPC Planning & Community  
Development Department**

July 11, 2019

Mr. Bill Guman  
William Guman & Associates, Ltd.  
731 North Weber Street, Suite 10  
Colorado Springs, CO 80903

**See comment letter.**

RE: Saddlehorn Ranch  
El Paso County, Colorado  
Traffic Impact Analysis  
LSC 184751

Dear Mr. Guman:

LSC Transportation Consultants, Inc. has prepared this traffic impact analysis for the 824-acre Saddlehorn Ranch residential development site located southeast of the intersection of Curtis Road and Judge Orr Road in El Paso County, Colorado. The site is planned to be developed with 2.5-acre single-family residential lots. Figure 1 shows the site location. Access is proposed to Curtis Road and Judge Orr Road. This report has been prepared to accompany the Preliminary Plan and Final Plat submittals to the County.

**REPORT CONTENTS**

The report contains the following:


- The proposed land use and access for the site.
- The existing and planned roadways in the study area including the, classifications, anticipated number of lanes, posted speed limits, lane geometries, traffic controls, etc.
- The existing traffic volumes and projected future 2040 background traffic volumes at the study area intersections.
- Estimates of the average weekday and peak-hour vehicle-trips to be generated by the development and the directional distribution on the area roadways.
- Assignment of the site's projected traffic volumes to the study area roadways and intersections for the short- and long-term horizon and the resulting total traffic volumes for the short and long term.
- The resulting traffic impacts, which have been quantified by determining the future levels of service at the study area intersections. The report also identifies the roadway link impacts (level of service) by evaluating the projected long-term background and total traffic volumes relative to the *Engineering Criteria Manual* (ECM) design ADTs by roadway classification.
- Recommended improvements.

# Summary of Comments on EDARP comments -- 2019-10-29.pdf


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Page: 2

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 Number: 1      Author: dsdrice      Subject: EPC ENG Review      Date: 10/24/2019 11:41:49 AM

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 Number: 2      Author: dsdrice      Subject: Text Box      Date: 10/24/2019 11:41:53 AM

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[See comment letter.](#)

51 or 52?

1

2

223?

## SITE LAND USE AND ACCESS

The 824-acre Saddlehorn Ranch site is located south of Judge Orr Road, east of Curtis Road, and is planned to be developed with 2.5-acre single-family residential lots. Phase 1 would include 50 lots located in the southwest portion of the site, as shown in the site plan phasing in Figure 2. At buildout, the development would contain 222 single-family homes.

Five full-movement access points are planned: three on Judge Orr Road and two on Curtis Road. Access points on Judge Orr Road would be 1,318, 2,750, and 5,215 feet east of the intersection of Curtis Road/Judge Orr Road. Access points on Curtis Road would be 2,750 and 5,286 feet south of the Judge Orr Road/Curtis Road intersection, with the south access point 5,480 feet north of Falcon Highway. The site plan provides for a future local road connection to the parcel to the south of the site.

## EXISTING ROADWAY AND TRAFFIC CONDITIONS

### Area Roadways

The roadways in the study area are shown on Figure 1 and are described below.

- **US Highway (US) 24** is located about one mile north of the site (via Curtis Road) and about 1.5 miles west of the site (via Judge Orr Road). US Highway 24 is also accessible from the southwest corner of the site via Falcon Highway. The travel distance to/from the intersection of US Highway 24/Falcon Highway via Falcon Highway is about four miles.

This two-lane State Highway extends east/west across Colorado connecting the Buena Vista, Colorado Springs, and Limon areas. US 24 is planned to be widened to four lanes through the Falcon area and is classified as an Expressway by the Colorado Department of Transportation (CDOT) and the *El Paso County Major Transportation Corridors Plan (MTCP)*. The posted speed limit on US 24 in the vicinity of Judge Orr Road is 55 miles per hour (mph). A parallel frontage road is planned in the future on the east side of US 24 that would extend from Judge Orr Road to Curtis Road.

- **Judge Orr Road** is a two-lane roadway that extends east from Eastonville Road across most of El Paso County. It is shown on the *El Paso County 2040 Major Transportation Corridors Plan* and the *Preserved Corridor Network Plan* as a four-lane Minor Arterial adjacent to the site (and west of Curtis Road). Posted speed limits adjacent to the site range from 45 to 55 mph. West of Curtis Road, the speed limit is 45 mph, while it generally increases to 55 mph east of Curtis Road. The intersection of US 24/Judge Orr is currently signalized. Due to the oblique angle of this intersection, the eastbound and westbound approaches are split-phased. The US 24 Access Control Plan/PEL Study shows future plans for realignment of Judge Orr at US Highway 24 to improve the intersection and provide an intersection angle closer to 90 degrees.
- **Curtis Road** is a two-lane roadway that extends south from the intersection of US Highway 24/Stapleton Drive intersection to Drennan Road. It is shown as a two-lane, rural Principal Arterial on the 2040 El Paso County 2040 Major Transportation Corridors Plan and a four-lane Principal Arterial




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 Number: 1      Author: dsdrice      Subject: Callout      Date: 10/24/2019 12:06:15 PM

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51 or 52?


 Author: jchodsdon    Subject: Sticky Note      Date: 3/11/2020 3:41:44 PM  
Updated in the revised TIS Report

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 Number: 2      Author: dsdrice      Subject: Callout      Date: 10/24/2019 11:46:39 AM

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223?

 Author: jchodsdon    Subject: Sticky Note      Date: 3/11/2020 3:41:53 PM  
Updated in the revised TIS Report

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on the Preserved Corridor Network Plan. Adjacent to the site, the posted speed limit is 45 mph. Both intersections of Curtis Road/Judge Orr Road and Curtis Road/Falcon Highway are two-way, stop-sign controlled. The section north of Judge Orr was recently constructed to current ECM standards with paved shoulders, etc. Generally, the section between Judge Orr and Falcon Highway is an “unimproved,” two-lane paved road.

### Existing Traffic Conditions

Address what improvements are needed to Curtis Road to bring the road up to adequate standards for use of the proposed subdivision, EPC PCD is requiring an "interim" 2 lane section meeting a minimum standard.

Figure 3 shows the morning and afternoon peak-hour traffic volumes at the study area intersections based on counts conducted by LSC. The traffic count reports are attached. Figure 3 also shows the Colorado Department of Transportation Average Annual Daily Traffic Volumes (AADT) on US 24 and estimates of the average weekday traffic volumes based on factored peak-hour count data.

### Existing Levels of Service

Level of service (LOS) is a quantitative measure of the level of congestion or delay at an intersection. Level of service is indicated on a scale from “A” to “F.” LOS A represents control delay of less than 10 seconds for unsignalized and signalized intersections. LOS F represents control delay of more than 50 seconds for unsignalized intersections and more than 80 seconds for signalized intersections. Table 1 shows the level of service delay ranges.

**Table 1: Intersection Level of Service Ranges**

Level of Service	Signalized Intersections	Unsignalized Intersections
	Average Control Delay (seconds per vehicle)	Average Control Delay (seconds per vehicle) <sup>1</sup>
A	≤ 10.0	≤ 10.0
B	10.1 – 20.0	10.1 – 15.0
C	20.1 – 35.0	15.1 – 25.0
D	35.1 – 55.0	25.1 – 35.0
E	55.1 – 80.0	35.1 – 50.0
F	≥ 80.1	≥ 50.1
<sup>1</sup> For unsignalized intersections, if V/C is > 1.00, then LOS is LOS F regardless of the projected average control delay per vehicle		

Study area intersections have been analyzed to determine the existing levels of service. Table 3 through Table 8 show the level of service analysis results at the study intersections.

### 2040 BACKGROUND TRAFFIC


Background traffic is the traffic estimated to be on the study area roadways and intersections without the proposed development’s trip generation or site-generated traffic volumes. Background traffic includes increases in through traffic and anticipated future traffic to be generated by other nearby

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 Number: 1      Author: Steve Kuehster      Subject: text box      Date: 10/28/2019 3:06:24 PM

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Address what improvements are needed to Curtis Road to bring the road up to adequate standards for use of the proposed subdivision, EPC PCD is requiring an "interim" 2 lane section meeting a minimum standard.

 Author: jchodsdon      Subject: Sticky Note      Date: 3/11/2020 3:43:21 PM

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Addressed with the deviation request by JR Engineering. Also, the updated TIS references and incorporates the deviation request.

development projects, but assumes zero traffic generated by the site. Figure 4 shows the projected 2040 background traffic volumes.

The 2040 background traffic volumes are generally based on the projections presented in the MTCP, but adjustments have been made to account for reduced trip generation from the former Santa Fe Springs development area. US Highway volumes are estimates by LSC based on the Colorado Department of Transportation *US 24 Planning and Environmental Linkages Study Final Corridor Conditions Report* dated December 2016.

## TRIP GENERATION

Estimates of the vehicle-trips to be generated by the proposed development have been developed using the nationally published trip generation rates found in *Trip Generation, 10th Edition, 2017* by the Institute of Transportation Engineers (ITE). Table 2 shows the trip generation estimate.

**Table 2: Estimated Site Vehicle-Trip Generation**

Analysis Period	Weekday		
	In	Out	Total
<b>Phase 1</b>			
A.M. Peak Hour	10	31	42
P.M. Peak Hour	34	20	54
Daily 24-hour	285	285	570
<b>Phases 2 + 3</b>			
A.M. Peak Hour	31	94	126
P.M. Peak Hour	107	63	169
Daily 24-hour	847	847	1694
<b>Buildout</b>			
A.M. Peak Hour	42	125	167
P.M. Peak Hour	141	83	223
Daily 24-hour	1132	1132	2264


Verify based on  
number of lots

1

### Phase 1


Following buildout of Phase 1, the site is projected to generate about 570 new vehicle-trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 10 vehicles would enter and 31 vehicles would exit the site. During the afternoon peak hour, which generally occurs for one hour between 4:15 and 6:15 p.m., about 34 vehicles would enter and 20 vehicles would exit the site.

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 Number: 1      Author: dsdrice      Subject: Text Box      Date: 10/24/2019 12:08:44 PM

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[Verify based on number of lots](#)







 Author: jchodsdon      Subject: Sticky Note      Date: 3/11/2020 3:45:27 PM  
Table has been updated in the March 2020 TIS.

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### Judge Orr Road/Site Access Intersections

All individual turning movements at the three site access point intersections on Judge Orr Road are projected to operate at LOS B or better during both the short- and long-term morning and evening peak hours, as shown in Table 8.

**Table 8: LOS Analysis Results – Judge Orr Road/Site Access Intersections**


Scenario	N Access (Left)			N Access (Middle)			N Access (Right)		
	Traffic Control	NB	WB	Traffic Control	NB	WB	Traffic Control	NB	WB
									
A.M. Peak Hour									
2018 Existing + Site	TWSC	-	-	TWSC	-	-	TWSC	-	-
2040 Background + Site		B	A		B	A		B	A
P.M. Peak Hour									
2018 Existing + Site	TWSC	-	-	TWSC	-	-	TWSC	-	-
2040 Background + Site		B	A		B	A		B	A
TWSC = two-way stop sign control									

### FUTURE ROADWAY IMPROVEMENTS

- Table 10 presents the roadway improvement recommendations including auxiliary turn lane needs, traffic control, anticipated right-of-way dedication, and corridor preservation.
- Auxiliary turn lanes at the site access points will need to be phased with the development. Table 10 also includes potential additional turn lane needs at offsite intersections within the study area.
- The short term/Phase 1 only site generated traffic volumes show a southbound left turn volume over 10 vehicles per hour. This is the threshold for a left turn lane on a Principal Arterial. However, once the access to the north is added with a future phase, the left turn volume would not exceed the threshold. The short term, Phase 1 left turn volume would not exceed 25 left turning vehicles per hour, which is the threshold on Major Collectors/Minor Arterials. The short-term ADT and the current roadway cross section are more consistent with a Rural Major Collector/Minor Arterial. A left turn lane is recommended for the access to the north with a future phase.
- US Highway 24/Stapleton is planned to be signalized. This project will likely need to escrow funds for this future signal on a pro-rata basis.
- Curtis Road, Judge Orr Road, and Stapleton Road north of Curtis Road are shown to need roadway upgrades on the 2040 MTCP based on anticipated growth in the general area and the Stapleton extension to Briargate Parkway.


what about proposed? A  
deviation needs to be  
approved. ①

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 Number: 1      Author: dsdrice      Subject: Callout      Date: 10/24/2019 12:14:07 PM

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what about proposed? A deviation needs to be approved.

 Author: jchodsdon      Subject: Sticky Note      Date: 3/11/2020 3:45:43 PM

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Addressed with the deviation request by JR Engineering. Also, the updated TIS references and incorporates the deviation request.

- The intersections of Curtis/Judge Orr and Curtis/Falcon Highway may need to be upgraded to roundabout or traffic signal control by 2040 based on anticipated growth in the general area and the Stapleton extension to Briargate Parkway.

## CONCLUSIONS AND RECOMMENDATIONS

### Trip Generation

Following buildout of Phase 1, the site is projected to generate about <sup>1</sup>570 new vehicle-trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about <sup>2</sup>10 vehicles would enter and <sup>3</sup>31 vehicles would exit the site. During the afternoon peak hour, which generally occurs for one hour between 4:15 and 6:15 p.m., about <sup>4</sup>54 vehicles would enter and <sup>5</sup>20 vehicles would exit the site.

At **buildout** the site is projected to generate about <sup>6</sup>2,264 new vehicle-trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak hour, about 42 vehicles would enter and 125 vehicles would exit the site. During the afternoon peak hour about 141 vehicles would enter and 83 vehicles would exit the site.

### Projected Levels of Service

- Level of service analysis results indicate that roundabout or traffic signal control may be needed at the intersections of Curtis Road/Judge Orr and Falcon Highway/Curtis Road during the long term in order for the intersections to operate at an acceptable level of service (LOS D or better).
- Site access points on Judge Orr Road and Curtis Road operate at acceptable levels of service as two-way stop-sign-control intersections through the 20-year horizon.
- Please refer to the “Projected Levels of Service” section above for detailed LOS analysis results for the intersections of US 24/Stapleton Road, US 24/Judge Orr Road.

## RECOMMENDED IMPROVEMENTS

The following highlight the anticipated study area roadway and intersection improvements due to a combination of existing deficiencies, future background traffic, and projected site traffic. A list of improvements in the study area and assessment of responsibility is presented in Table 10. Also, please refer to the “Future Roadway Improvements” section above. Turn lane dimensions, including deceleration and stacking distances, transition tapers and redirect tapers, will need to conform to ECM standards.




 Number: 1 570	Author: dsdrice	Date: 10/24/2019 12:14:46 PM
 Number: 2 10	Author: dsdrice	Date: 10/24/2019 12:14:52 PM
 Number: 3 31	Author: dsdrice	Date: 10/24/2019 12:14:55 PM
 Number: 4 34	Author: dsdrice	Date: 10/24/2019 12:15:00 PM
 Number: 5 20	Author: dsdrice	Date: 10/24/2019 12:15:05 PM
 Number: 6 2,264	Author: dsdrice	Date: 10/24/2019 12:15:16 PM


Table 9: Detailed Trip Generation Estimate

ITE				Trip Generation Rates <sup>(1)</sup>					Driveway Trips Generated					
Code	Description	Value	Units	Average Weekday	A.M.		P.M.		Average Weekday	A.M.		P.M.		
					In	Out	In	Out		In	Out	In	Out	
Phase 1														
210	Single-Family Detached Housing	112	DU	10.96	0.20	0.60	0.66	0.39	570	10	31	34	20	
Phases 2 + 3														
210	Single-Family Detached Housing	170	DU	9.97	0.18	0.55	0.63	0.37	1694	31	94	107	63	
	Buildout Total	282	DU						Buildout Total	2264	42	125	141	83

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 Number: 1	Author: dsdrice	Date: 10/24/2019 12:35:27 PM
52		

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 Number: 2	Author: dsdrice	Date: 10/24/2019 12:35:23 PM
222		

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Table 10: Roadway Improvements for Saddlehorn Ranch

Offsite Intersections			
Item #	Improvement	Timing	Responsibility
US Highway 24/Judge Orr Intersection			
1.1	Realignment of Judge Orr Road at US Highway 24 per CDOT Hwy 24 PEL Study	Future (the PEL study identified this as high priority project with a time frame of less than 5 years)	CDOT
1.2	Southwest-bound right-turn deceleration lane on US 24 approaching Judge Orr Road	As required by other development(s) or with realignment of US 24/ Judge Orr	CDOT or by others
1.3	Construct southwest-bound right-turn acceleration lane on US 24 at Judge Orr Road	As required by other development(s) or with realignment of US 24/ Judge Orr	CDOT or by others
1.4	Eastbound left-turn lane on Judge Orr Road approaching US 24	With realignment of US 24/ Judge Orr	CDOT
1.5	Westbound dual left-turn lanes on Judge Orr Road approaching US 24	With realignment of US 24/ Judge Orr	CDOT
1.6	Northeast-bound right-turn deceleration lane on US 24 approaching Judge Orr Road	With realignment of US 24/ Judge Orr	CDOT
1.7	Eastbound right-turn deceleration lane on Judge Orr Road approaching US 24	As required by other development(s) or with realignment of US 24/ Judge Orr	CDOT or by others
US Highway 24/Stapleton Intersection			
2.1	Signalize the intersection	Once warrants are met	CDOT is collecting Escrow from area developments impacting this intersection with each subdivision filing
Curtis Road/Falcon Highway			
3.1	Lengthen eastbound left-turn lane to ECM Standards on Falcon Highway approaching Curtis Road	Currently warranted by ECM	Escrow for pro-rata share of improvement or construction at the time of Phase 2 development (Fee program credit per Fee program provisions)
3.2	<b>Long Term:</b> In the case of a future signalized intersection - Construct southbound right-turn deceleration lane on Curtis Road approaching Falcon Highway	Upon Signalization	Escrow for pro-rata share of improvement or construction if warranted at the time of development (Fee program credit per Fee program provisions)
3.2	<b>Long Term:</b> Reconstruct Intersection as a modern roundabout (or signalize the intersection)	Once LOS of AWSC drops below acceptable levels (roundabout); or once signal warrants are met (for conversion to a signal or roundabout)	El Paso County -- This intersection will be fee-program eligible for a signal/roundabout and applicant will pay Fee program traffic impact fees.
Adjacent County Arterial Roadway ROW Requirements			
4.1	Judge Orr ROW Dedication - 4 Lane Minor Arterial, Rural 130' to 150' estimated ROW Dedication' (Note: 4-lane Rural <b>Principal</b> is 180')	Shown in 2040 MTCP	Applicant
4.2	Judge Orr - 4 Lane Minor Arterial - Beyond above dedication, no additional ROW Preservation needed	Shown in 2060 Corridor Pres Plan	Applicant
4.3	Curtis Road - 2 Lane Rural Principal Arterial 130' to 150' estimated ROW Dedication' (Note: 4-lane Rural <b>Principal</b> is 180')	Shown in 2040 MTCP	Applicant
4.4	Curtis Road - 4 Lane Rural Principal Arterial 180' ROW Preservation	Shown in 2060 Corridor Pres Plan	Applicant
Roadway Segment Improvements			
5.1	Falcon Highway - Upgrade to Two-Lane Rural Minor Arterial	Shown in 2040 MTCP	MTCP Project No. U5; Details TBD; applicant will pay Fee program traffic impact fees.
5.2	Judge Orr Road - Widen to <b>Four Lane</b> Rural Minor Arterial	Shown in 2040 MTCP	MTCP Project No. C15; Details TBD; - applicant will pay Fee program traffic impact fees.
5.3	Curtis Road - Upgrade to Two-Lane Rural Principal Arterial	Shown in 2040 MTCP	<b>1</b> MTCP Project No. U1; Details TBD applicant will pay Fee program traffic impact fees.
Internal Subdivision Roadways			
6.1	Construct internal streets to County Rural Local Standards	As development occurs and as needed for access	Applicant
Adjacent Intersection and Access Intersections			
Item #	Improvement	Timing	Responsibility
Judge Orr/Curtis Road Intersection			
7.1	Westbound Right Turn Deceleration Lane	Once peak hour westbound right turn volume exceeds 50 vehicles per hour.	Escrow for improvement or construction if warranted at the time of development (Fee program credit per Fee program provisions)
7.2	Eastbound Right Turn Deceleration Lane	Currently warranted by ECM	Escrow for improvement or construction at the time of Phase 2 development (Fee program credit per Fee program provisions)
7.3	Potentially sign for All Way Stop-Sign Control	Once Warrants for AWSC are met	El Paso County
7.4	<b>Long Term:</b> Reconstruct Intersection as a modern roundabout (or signalize the intersection)	Once LOS of AWSC drops below acceptable levels (roundabout); or once signal warrants are met (for conversion to a signal or roundabout)	El Paso County; This intersection will be fee-program eligible for a signal/roundabout and applicant will pay Fee program traffic impact fees.
7.5	<b>Long Term:</b> In the case of a future signalized intersection- lengthening of northbound and southbound left turn deceleration lanes.	As needed based on future speed limit and turning volume/stacking length criteria.	Escrow for improvement or construction if warranted at the time of development (Fee program credit per Fee program provisions)
Judge Orr/Site Access Points			
8.1	No Auxiliary Turn Lanes Required	-	-
Curtis Road/North Site Access			
9.1	Construct southbound left-turn deceleration lane on Curtis Rd approaching the site access	With Phase 2/3 site development	Applicant
9.2	Construct northbound right-turn deceleration lane on Curtis Rd approaching the site access	With Phase 2/3 site development	Applicant
Curtis Road/South Site Access			
10.1	Construct northbound right-turn deceleration lane on Curtis Road approaching the site access	With site development	Applicant

Source: LSC Transportation Consultants, Inc.


Which access? Is this not required with Phase 1 at Carrizo Springs Trail?

2

Applicant per rezone condition of approval, potentially subject to fee program credit.


3

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 Number: 1      Author: dsdrice      Date: 10/24/2019 1:06:08 PM  
MTCP Project No. U1; Details TBD applicant will pay Fee

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program traffic impact fees.


 Author: jchodsdon    Subject: Sticky Note      Date: 3/11/2020 3:46:10 PM  
Updated per the comment.

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 Number: 2      Author: dsdrice      Subject: Callout      Date: 10/24/2019 1:12:24 PM

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Which access? Is this not required with Phase 1 at Carrizo Springs Trail?


 Author: jchodsdon    Subject: Sticky Note      Date: 3/11/2020 3:46:53 PM  
This has been addressed with the updated TIS.

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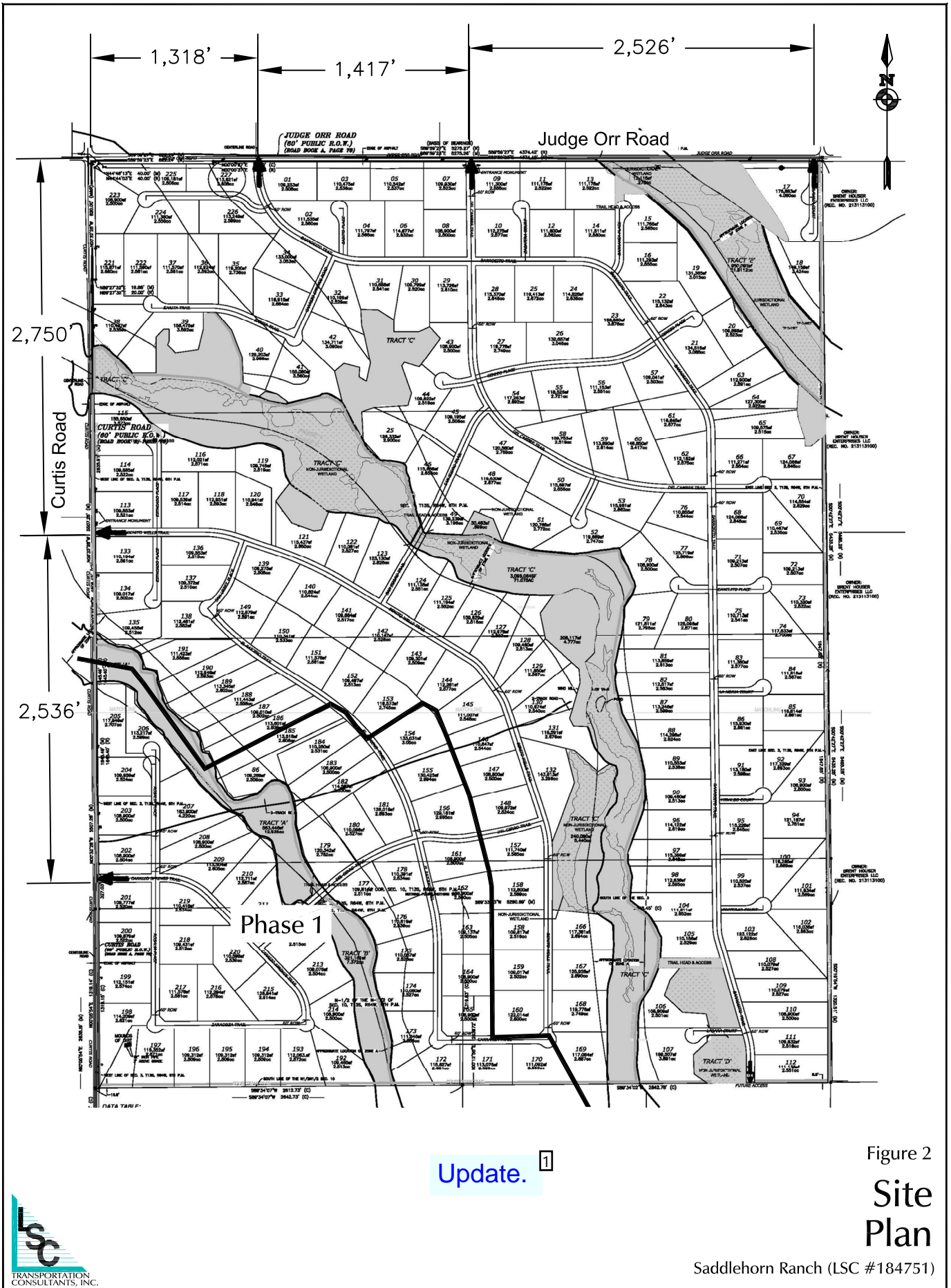
 Number: 3      Author: dsdrice      Subject: Callout      Date: 10/24/2019 1:12:20 PM

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Applicant per rezone condition of approval, potentially subject to fee program credit.

 Author: jchodsdon    Subject: Sticky Note      Date: 3/11/2020 3:47:16 PM  
Updated per the comment

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 Number: 1      Author: dsdrice      Subject: Text Box      Date: 10/24/2019 1:13:38 PM

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[Update.](#)

 Author: jchodsdon      Subject: Sticky Note      Date: 3/11/2020 3:47:45 PM  
Updated with the latest site plan

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