
To: Samuel J "Sandy" Kahn
Kent Holdings & Affiliates
File: 2042555300

From: Sandhya Perumalla, and
Daryl Zerfass
Stantec
Date: March 11, 2019

Reference: Preliminary Traffic Assessment of Berriman Ranch Project

The following memorandum summarizes the results of a preliminary traffic assessment conducted for the proposed Berriman Ranch (Project) located in the City of Grass Valley, California. The Project is proposed to consist of 260 residential units made up by one area of 93 single-family lots and 44 apartment/condo units, and another area with 123 single family lots. This study is prepared to determine if the proposed Project would result in significant impacts to nearby roadways or infrastructure based on the City's traffic impact study guidelines.

The study area includes intersections where the proposed Project would generally add 50 or more trips during either the AM or PM peak hour, which is a typical threshold used for identifying a study area. The following five intersections (two signalized and three unsignalized) in the vicinity of the Project site were selected based on the above-mentioned criteria. See attachment for an exhibit showing the Project site and intersection locations.

1. Freeman Lane & McKnight Way (unsignalized)
2. Taylorville Road & McKnight Way (unsignalized)
3. SR 49 Southbound Ramps & McKnight Way
4. SR 49 Northbound Ramps & McKnight Way
5. La Barr Meadows Road/S. Auburn Street & McKnight Way (unsignalized)

The property fronts on Taylorville Road, just south of the Taylorville Road and McKnight Way intersection. Access to and from the Project site is proposed to be via Taylorville Road. Regional access to the Project area will be via SR 49 which is located just east of the Project site with a full interchange at McKnight Way. SR 49 provides a connection to SR 20 approximately one mile north of the Project site.

This traffic study evaluates the proposed Project utilizing the established traffic analysis guidelines of the City of Grass Valley. The scenarios analyzed are as follows:

1. Existing Conditions (2019)
2. Existing plus Project Conditions
3. Opening Year (2021) Cumulative Conditions without-Project
4. Opening Year (2021) Cumulative Conditions with-Project

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PROJECT LEVEL OF SERVICE ANALYSIS

To evaluate potential impacts of traffic generated by the proposed Project on the surrounding circulation system, a level of service (LOS) analysis utilizing a defined performance criterion determines if a project would cause a deficiency at any of the study area intersections during the AM or PM peak hour.

For this analysis, the methodology outlined in the Highway Capacity Manual (HCM) Sixth Edition is used, which produces estimates of average vehicle delay as a function of intersection capacity and the volume of traffic passing through the intersection. From this, a corresponding LOS is defined. Traffic LOS is designated "A" through "F" with LOS "A" representing free flow conditions and LOS "F" representing severe traffic congestion. Certain LOS values are deemed unacceptable by the City. These definitions and procedures are established by individual local jurisdictions, such as the City of Grass Valley. The performance criteria and thresholds used in this analysis are summarized in Table A attached to this memorandum. LOS for arterial roadway intersections is determined based on operating conditions during the AM and PM peak hours and the geometric configuration of the intersection. Synchro software was used to calculate the intersection delay and LOS.

Existing Conditions

Traffic count data were collected for the five study intersection locations during the critical AM and PM peak hours in January 2019. The traffic count worksheets are provided in the attachment.

The results of the intersection LOS analysis under existing conditions are shown in Table 1 below. The study area intersections were analyzed using the HCM delay methodology with the exception of the location with three-way stop control which was modeled using the SimTraffic simulation model due to its unique configuration. Detailed LOS calculation worksheets are provided in the attachment.

The table shows that all the study intersections currently operate at an acceptable LOS D or better during AM and PM peak hour conditions except the intersection of La Barr Meadows Road/S. Auburn Street and McKnight Way operates at an unacceptable LOS E during the AM peak hour.

Table 1 Intersection LOS Summary – Existing Conditions

Int #	Intersection Name	Control Type	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Freeman Lane & McKnight Way	All-Way Stop ¹	9.2	A	15.5	C
2	Taylorville Road & McKnight Way	Two-Way Stop ¹	9.9	A	12.0	B
3	SR 49 Southbound Ramps & McKnight Way	Signal	11.6	B	16.1	B
4	SR 49 Northbound Ramps & McKnight Way	Signal	10.3	B	9.7	A
5	La Barr Meadows Road/ S. Auburn Street & McKnight Way	Three-Way Stop ²	40.5	E	23.5	C

Note:

Delay = average vehicle delay (seconds/vehicle)

¹Delay represents the movement with the highest individual delay

²Represents total delay of all movements based on SimTraffic simulation model

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It should be noted that although the reported delay for the La Barr Meadows Road/S. Auburn Street and McKnight Way intersection represents the average delay of all the movements, the heavy northbound left-turn movement experiences the majority of the delay. See attachment for the SimTraffic performance report.

Project Trip Generation

Table 2 summarizes the anticipated trip generation of the proposed Project. The trip generation estimates were prepared using standardized Institute of Transportation Engineers (ITE) 10th Edition trip generation rates for residential uses. As shown in Table 2, the proposed Project is expected to generate a total of approximately 2,361 daily trips with 180 trips occurring during the AM peak hour and 238 trips occurring during the PM peak hour.

Table 2 Trip Generation Summary

Trip Rates	Amount	Units	AM Peak Hour			PM Peak Hour			ADT
			In	Out	Total	In	Out	Total	
Single-Family Detached Housing (210)		DU	0.19	0.56	0.74	0.62	0.37	0.99	9.44
Multifamily Housing (low-rise) (220)		DU	0.11	0.35	0.46	0.35	0.21	0.56	7.32
Trip Generation									
Single-Family Detached Housing	216	DU	41	121	160	134	80	214	2,039
Multifamily Housing (low-rise)	44	DU	5	15	20	15	9	25	322
Total	260	DU	46	136	180	149	89	238	2,361

Trip Rate Source: Institute of Transportation Engineers (ITE), 10th Edition, 2017, with ITE code in parentheses
ADT - Average Daily Trips
IB - Inbound
OB - Outbound

Project Trip Distribution

The geographic distribution of Project-generated trips was determined based on the location of the Project site in relation to surrounding land uses, the roadway network, and engineering judgement. Overall, approximately 40 percent of the Project trips are oriented towards the north on SR 49 and approximately 20 percent of the Project trips are oriented towards the south on SR 49. Approximately 20 percent of project trips are oriented towards the west of the Project and 20 percent towards east.

Existing Conditions With-Project

Peak hour delay values and LOS that correspond with the existing traffic volumes and the existing-plus-Project traffic forecasts can be found in Table 3, which provides a comparison between the no-Project and the with-Project conditions. The evaluation of study intersections is based on delay-based methodology using Synchro and SimTraffic software.

As shown in the table, each of the study intersections operate at an acceptable LOS D or better during AM and PM peak hour conditions except the intersection of La Barr Meadows Road/S. Auburn Street and McKnight Way operates at an unacceptable LOS E during the AM peak hour. The project results in a significant impact at the intersection based on the performance criteria shown in the attachment Table A. Mitigation that addresses the significant impact is presented in the Mitigation section.

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It should be noted that although the reported delay at the La Barr Meadows Road/S. Auburn Street and McKnight Way intersection represents the average delay of all the movements, the heavy northbound left-turn movement experiences the majority of the delay and is not a movement where the Project is expected to add an appreciable amount of traffic. See attachment for the SimTraffic performance report.

Table 3 Intersection LOS Summary – Existing-Plus-Project Conditions

Intersection Name	Control Type	Existing				Existing-Plus-Project				Increase	
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM
1. Freeman Lane & McKnight Way	All-Way Stop ¹	9.2	A	15.5	C	9.3	A	17.9	C	0.1	2.4
2. Taylorville Road & McKnight Way	Two-Way Stop ¹	9.9	A	12.0	B	11.2	B	13.8	B	1.3	1.8
3. SR 49 Southbound Ramps & McKnight Way	Signal	11.6	B	16.1	B	12.3	B	19.0	B	0.7	2.9
4. SR 49 Northbound Ramps & McKnight Way	Signal	10.3	B	9.7	A	11.4	B	11.0	B	1.1	1.3
5. La Barr Meadows Road/ S. Auburn Street & McKnight Way	Three-Way Stop ²	40.5	E	23.5	C	42.0	E	30.2	D	1.5	6.7

Note:
Bold - denotes significant impact
Delay = average vehicle delay (seconds/vehicle)
¹Delay represents the movement with the highest individual delay
²Represents total delay of all movements based on SimTraffic simulation model

Opening Year (2021) Cumulative Conditions Analysis

Opening Year cumulative condition traffic volumes presented in this analysis are calculated using traffic generated by other nearby planned and approved projects together with a growth rate of two percent per year. A horizon year of 2021 is utilized to evaluate the Opening Year cumulative conditions. The following is a list of projects provided by the City which are included in the Opening Year analysis.

Table 4 Defined Related Projects Included in the Opening Year Cumulative Analysis

No.	Project	Description	Status
1	Whiting Street	67 Single Family Residential Units	Approved
2	Joyce Drive Habitat for Humanity	3.74 Acre Parcel Residential Development (4.01 to 8.0 units per acre)	Pending
3	Arco AM/PM	16 Vehicle Fueling Positions	Pending

The Project's traffic impacts on study intersections for Opening Year without-Project traffic conditions and with-Project traffic conditions are compared in this section. Table 5 summarizes the delay and the peak hour intersection levels of service and provides a comparison between without-Project and the with-Project conditions.

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The table indicates that under the Opening Year cumulative conditions, the study area intersections would operate at an acceptable LOS D or better during the AM and PM peak hour conditions except the intersection of La Barr Meadows Road/S. Auburn Street and McKnight Way operates at an unacceptable LOS E during the AM peak hour and PM peak hour. The project results in a significant impact at the intersection based on the performance criteria shown in the attachment Table A. Mitigation that addresses the significant impact is presented in Mitigation section.

It should be noted that although the reported delay at the La Barr Meadows Road/S. Auburn Street and McKnight Way intersection represents the average delay of all the movements, the heavy northbound left-turn movement experiences the majority of the delay and is not a movement where the Project is expected to add an appreciable amount of traffic. See attachment for the SimTraffic performance report.

Table 5 Intersection LOS Summary – Cumulative Conditions

Intersection Name	Control Type	Opening Year (2021) without Project				Opening Year (2021) with Project				Increase	
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM
1. Freeman Lane & McKnight Way	All-Way Stop ¹	9.5	A	19.1	C	9.7	A	22.9	C	0.2	3.8
2. Taylorville Road & McKnight Way	Two-Way Stop ¹	10.1	B	12.4	B	11.5	B	14.6	B	1.4	2.2
3. SR 49 Southbound Ramps & McKnight Way	Signal	12.0	B	17.6	B	12.7	B	22.0	C	0.7	4.4
4. SR 49 Northbound Ramps & McKnight Way	Signal	10.7	B	10.3	B	12.1	B	11.5	B	1.4	1.2
5. La Barr Meadows Road/S. Auburn Street & McKnight Way	Three-Way Stop ²	43.2	E	30.2	D	45.1	E	47.9	E	1.9	17.7

Note:
Bold - denotes significant impact
Delay = average vehicle delay (seconds/vehicle)
¹Delay represents the movement with the highest individual delay
²Represents total delay of all movements based on SimTraffic simulation model

Mitigation

To mitigate the identified Project impact under existing conditions, the existing three-way stop can be converted to an all-way stop control by adding a stop sign to the eastbound approach. As shown in Table 6, the all-way stop control would improve the intersection to an acceptable LOS. Detailed LOS calculation worksheets are provided in the attachment. The table shows that the intersection would operate at an acceptable LOS C during AM and PM peak hour conditions

Table 6 Intersection LOS Summary - Existing conditions

Intersection Name	Existing				Existing-Plus-Project With All-Way Stop Control				Increase	
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM
La Barr Meadows Road/S. Auburn Street & McKnight Way	40.5	E	23.5	C	17.2	C	19.2	C	-23.3	-4.3

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Per the City's plan, La Barr Meadows Road/S. Auburn Street and McKnight Way intersection is planned for improvement to a roundabout in the future. Therefore, to mitigate the Project impact at the intersection under opening year cumulative conditions, a roundabout analysis was conducted using SIDRA software. As shown in Table 7, a roundabout would fully mitigate the Project's cumulative significant impact. As the identified impact occurs under cumulative conditions and is needed without or with the proposed Project, the Project is responsible for its fair-share of the identified mitigation, which has been calculated to be 19 percent as shown in Table 7.

Table 7 Intersection LOS Summary - Cumulative conditions

Intersection Name	Opening Year (2021) Without Project				Opening Year (2021) With Project With Roundabout				Increase		Project Fair Share %	
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour					
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM		
La Barr Meadows Road/S. Auburn Street & McKnight Way	43.2	E	30.2	D	13.7	B	11.0	B	-29.5	-19.2	19%	

Conclusion

This traffic memo was prepared to evaluate Project impacts associated with the development of the proposed Berriman Ranch Project. Existing conditions and Opening Day cumulative conditions scenario that include related projects in the proximity of the study area for with and without Project were analyzed, and the findings of each scenario are presented.

Based on the results of the LOS analyses and the criteria set forth by the City, the study intersections operate at an acceptable level of service and have less than significant impacts under existing and opening year cumulative conditions at all the study intersections except the intersection of La Barr Meadows Road/S. Auburn Street and McKnight Way which results in a significant impact.

To mitigate the Project impact under existing conditions, converting the three-way stop control to an all-way stop control would improve the intersection to an acceptable LOS and fully mitigate the Project impact. The City has plans to install a roundabout at La Barr Meadows Road/S. Auburn Street and McKnight Way intersection in the future, therefore a roundabout analysis was conducted under opening year cumulative conditions. The roundabout installation would fully mitigate the Project impacts. As the identified impact occurs under cumulative conditions and is needed without or with the proposed Project, the Project is responsible for its fair-share of the identified mitigation.

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Please feel free to contact Sandhya or Daryl if you have any questions or if you would like to discuss the above material.

Sincerely,

Stantec Consulting Services Inc.



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Attachment: Arterial Intersection Performance Criteria
Project Location and Study Intersections Exhibit
Traffic Count Worksheets
Synchro LOS Worksheets
Sidra worksheets

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Table A Arterial Intersection Performance Criteria

<p>Delay Methodology</p> <p>Calculation Methodology</p> <p>Level of service based on “average vehicle delay” calculated as follows:</p> <ul style="list-style-type: none">- Synchro/HCM delay-based intersection methodology for traffic signals- HCM (Sixth Edition)¹ delay-based intersection methodology for stop sign control <p>Performance Standard</p> <p>Level of Service D defined as follows:</p> <ul style="list-style-type: none">- stopped delay to not exceed 55 seconds for signalized intersections- stopped delay to not exceed 35 seconds for stop sign control
<p>Significance Thresholds</p> <p>An intersection is considered to be significantly impacted if the Project would:</p> <ul style="list-style-type: none">• Worsen an intersection from acceptable LOS D or better to unacceptable LOS E or F• Add Project traffic to an intersection currently operating at an unacceptable LOS E or F <p>Note: For intersections under joint jurisdiction of the City and Caltrans, the analysis utilizes the corresponding threshold of the local agency (City) as applicable</p>
<p>Abbreviations:</p> <p>V/C – Volume/Capacity Ratio</p> <p>LOS – Level of Service</p>

¹ SimTraffic Microsimulation model is used to estimate delay for stop control intersections where HCM methodology isn't applicable.

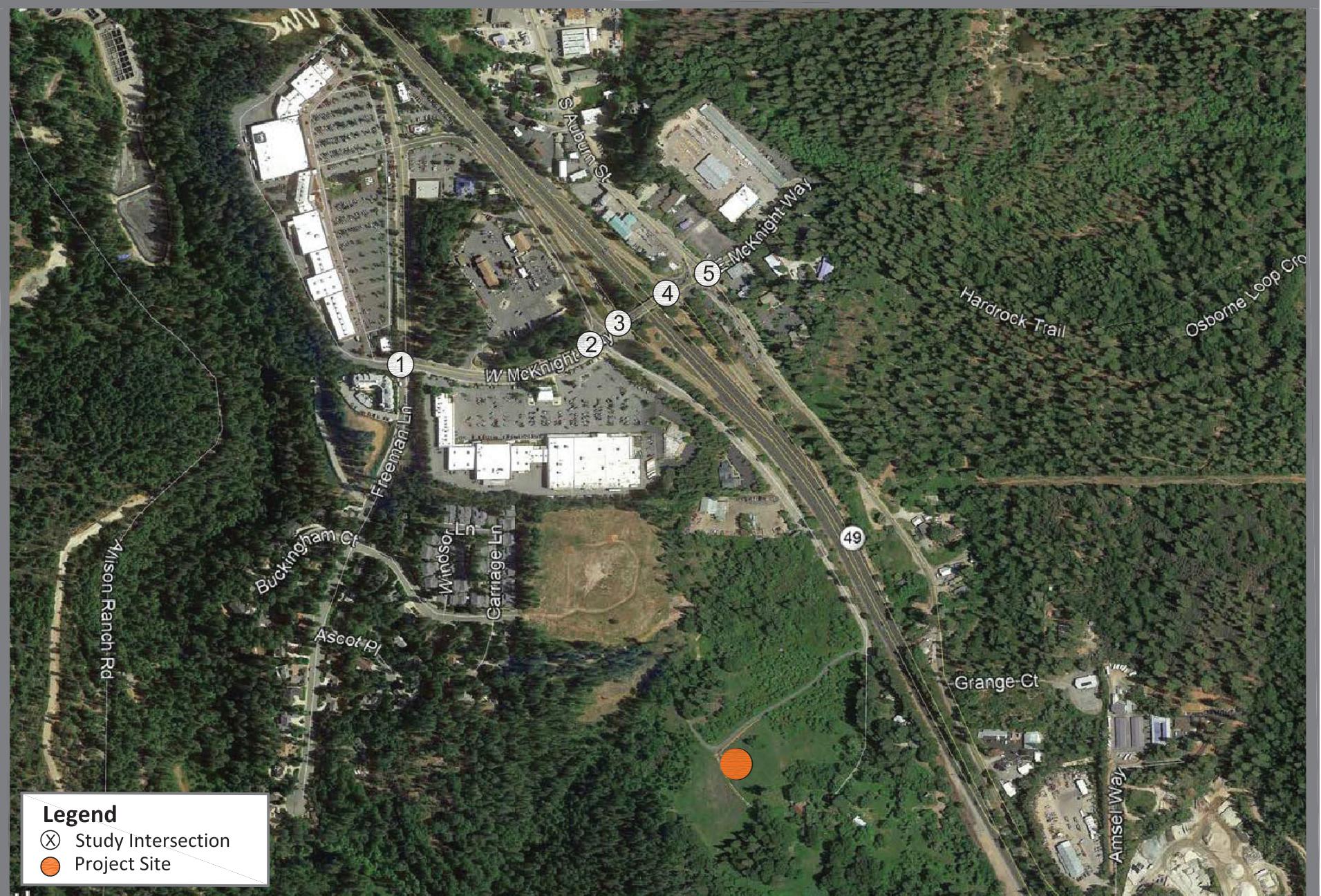


Figure 1
Project Site & Study Intersections

ALL TRAFFIC DATA

(916) 771-8700
orders@atdtraffic.com

File Name : 19-07034-001
 Date : 01/29/2019

Unshifted Count = All Vehicles & UtURNS

START TIME	Freeman Ln Southbound					McKnight Way Westbound					Freeman Ln Northbound					McKnight Way Eastbound					Total	UtURNS Total	
	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL			
7:00	26	0	0	0	26	0	8	9	0	17	0	0	1	0	1	0	2	0	0	2	46	0	
7:15	32	0	0	0	32	2	1	13	0	16	0	0	5	0	5	0	0	0	0	0	53	0	
7:30	36	0	1	0	37	1	4	13	0	18	0	0	3	0	3	1	3	0	0	4	62	0	
7:45	37	0	0	0	37	0	3	19	0	22	0	1	4	0	5	0	7	0	0	7	71	0	
Total	131	0	1	0	132	3	16	54	0	73	0	1	13	0	14	1	12	0	0	13	232	0	
8:00	29	0	0	0	29	0	5	13	0	18	0	0	3	0	3	1	8	0	0	0	9	59	0
8:15	43	1	0	0	44	1	6	24	0	31	0	1	4	0	5	1	6	0	0	0	7	87	0
8:30	46	0	0	0	46	4	14	30	0	48	0	2	5	0	7	0	3	0	3	6	107	3	
8:45	52	1	0	0	53	2	12	25	0	39	0	1	9	0	10	1	9	0	0	0	10	112	0
Total	170	2	0	0	172	7	37	92	0	136	0	4	21	0	25	3	26	0	3	32	365	3	
16:00	100	1	2	0	103	6	18	54	0	78	0	1	2	0	3	0	32	2	0	34	218	0	
16:15	95	4	2	0	101	5	13	59	0	77	1	1	5	0	7	1	23	1	0	25	210	0	
16:30	84	1	2	0	87	9	21	65	0	95	0	1	0	0	1	1	28	0	0	29	212	0	
16:45	90	2	1	0	93	5	20	50	0	75	0	1	3	0	4	2	18	1	0	21	193	0	
Total	369	8	7	0	384	25	72	228	0	325	1	4	10	0	15	4	101	4	0	109	833	0	
17:00	86	2	2	0	90	2	33	68	0	103	0	1	2	0	3	2	21	1	0	24	220	0	
17:15	87	4	0	0	91	4	33	59	0	96	1	1	4	0	6	5	27	2	0	34	227	0	
17:30	69	1	3	0	73	6	17	46	0	69	1	0	3	0	4	0	23	1	0	24	170	0	
17:45	69	0	2	0	71	0	13	47	0	60	0	2	2	0	4	3	18	0	0	21	156	0	
Total	311	7	7	0	325	12	96	220	0	328	2	4	11	0	17	10	89	4	0	103	773	0	
Grand Total	981	17	15	0	1013	47	221	594	0	862	3	13	55	0	71	18	228	8	3	257	2203	3	
Approch %	96.8%	1.7%	1.5%	0.0%		5.5%	25.6%	68.9%	0.0%		4.2%	18.3%	77.5%	0.0%		7.0%	88.7%	3.1%	1.2%				
Total %	44.5%	0.8%	0.7%	0.0%	46.0%	2.1%	10.0%	27.0%	0.0%	39.1%	0.1%	0.6%	2.5%	0.0%	3.2%	0.8%	10.3%	0.4%	0.1%	11.7%	100.0%		

AM PEAK HOUR	Freeman Ln Southbound					McKnight Way Westbound					Freeman Ln Northbound					McKnight Way Eastbound					Total	
	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
Peak Hour Analysis From 08:00 to 09:00																						
Peak Hour For Entire Intersection Begins at 08:00																						
8:00	29	0	0	0	29	0	5	13	0	18	0	0	3	0	3	1	8	0	0	9	59	
8:15	43	1	0	0	44	1	6	24	0	31	0	1	4	0	5	1	6	0	0	7	87	
8:30	46	0	0	0	46	4	14	30	0	48	0	2	5	0	7	0	3	0	3	6	107	
8:45	52	1	0	0	53	2	12	25	0	39	0	1	9	0	10	1	9	0	0	10	112	
Total Volume	170	2	0	0	172	7	37	92	0	136	0	4	21	0	25	3	26	0	3	32	365	
% App Total	98.8%	1.2%	0.0%	0.0%		5.1%	27.2%	67.6%	0.0%		0.0%	16.0%	84.0%	0.0%		9.4%	81.3%	0.0%	9.4%			
PHF	.817	.500	.000	.000	.811	.438	.661	.767	.000	.708	.000	.500	.583	.000	.625	.750	.722	.000	.250	.800	.815	

PM PEAK HOUR	Freeman Ln Southbound					McKnight Way Westbound					Freeman Ln Northbound					McKnight Way Eastbound					Total	
	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
Peak Hour Analysis From 16:30 to 17:30																						
Peak Hour For Entire Intersection Begins at 16:30																						
16:30	84	1	2	0	87	9	21	65	0	95	0	1	0	0	1	1	28	0	0	29	212	
16:45	90	2	1	0	93	5	20	50	0	75	0	1	3	0	4	2	18	1	0	21	193	
17:00	86	2	2	0	90	2	33	68	0	103	0	1	2	0	3	2	21	1	0	24	220	
17:15	87	4	0	0	91	4	33	59	0	96	1	1	4	0	6	5	27	2	0	34	227	
Total Volume	347	9	5	0	361	20	107	242	0	369	1	4	9	0	14	10	94	4	0	108	852	
% App Total	96.1%	2.5%	1.4%	0.0%		5.4%	29.0%	65.6%	0.0%		7.1%	28.6%	64.3%	0.0%		9.3%	87.0%	3.7%	0.0%			
PHF	.964	.563	.625	.000	.970	.556	.811	.890	.000	.896	.250	1.000	.563	.000	.583	.500	.839	.500	.000	.794	.938	

Freeman Ln & McKnight Way**Peak Hour Turning Movement Count**

ID: 19-07034-001

City: Grass Valley

Freeman Ln**SOUTHBOUND**

PEAK HOURS	08:00 AM - 09:00 AM			04:30 PM - 05:30 PM		
NONE	AM	0	2	170	0	99
	NOON	0	0	0	0	0
	PM	5	9	347	0	256

**CONTROL****0**

TEV	365	0	852
AM	0.81	NOON	PM

PHF	0.94
-----	------

Day: Tuesday

Date: 01/29/2019

PEAK HOURS	08:00 AM - 09:00 AM			04:30 PM - 05:30 PM		
NONE	AM	NOON	PM	AM	NOON	PM
	40	0	113	0	0	0
	3	0	0	0	0	0
	3	0	10	0	0	0
	26	0	94	0	0	0
	0	0	4	0	0	0

McKnight Way EASTBOUND

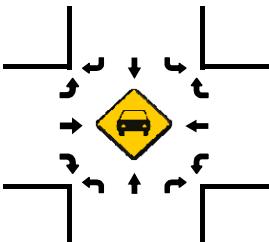
PEAK HOURS	08:00 AM - 09:00 AM			04:30 PM - 05:30 PM		
NONE	PM	0	1	4	9	PM
	NOON	0	0	0	0	NOON
	AM	9	0	0	4	21

NORTHBOUND**Freeman Ln**

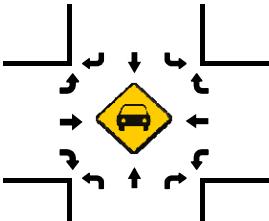
PEAK HOURS	07:00 AM - 09:00 AM			04:00 PM - 06:00 PM		
NONE	PM	NOON	AM	PM	NOON	AM
	242	0	92	0	0	0
	107	0	37	0	0	0
	20	0	7	0	0	0
	0	0	0	0	0	0

McKnight Way WESTBOUND

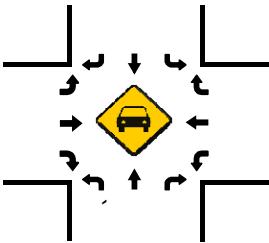
Total Vehicles (AM)



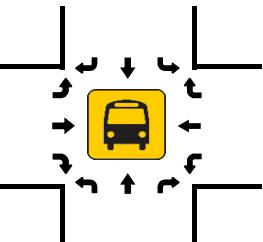
Total Vehicles (NOON)



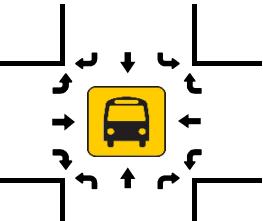
Total Vehicles (PM)



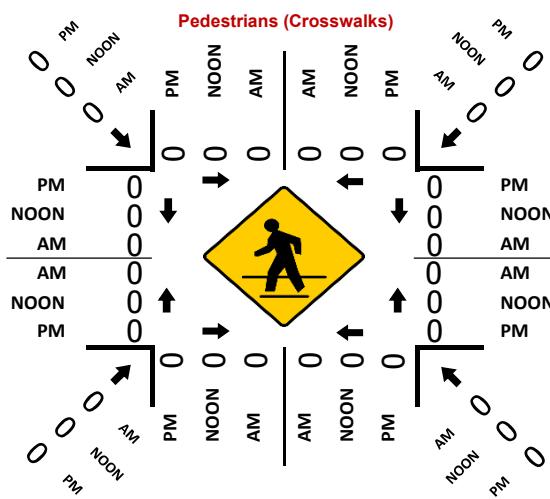
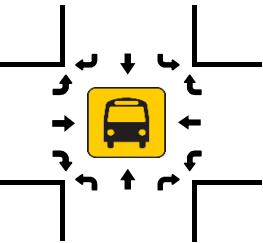
Total Vehicles (AM)



Total Vehicles (NOON)



Total Vehicles (PM)



ALL TRAFFIC DATA

(916) 771-8700
orders@atdtraffic.com

File Name : 19-07034-002
 Date : 01/29/2019

Unshifted Count = All Vehicles & UtURNS

START TIME	Taylorville Rd Southbound					McKnight Way Westbound					Taylorville Rd Northbound					McKnight Way Eastbound					Total	UtURNS Total		
	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL				
7:00	0	0	1	0	1	6	25	27	0	58	0	0	6	0	6	0	30	1	0	31	96	0		
7:15	0	0	0	0	0	4	23	40	0	67	0	0	2	0	2	0	41	0	0	41	110	0		
7:30	0	0	1	0	1	3	33	37	0	73	0	0	3	0	3	0	47	0	0	47	124	0		
7:45	0	0	4	0	4	4	35	40	0	79	0	0	1	0	1	0	62	2	0	64	148	0		
Total	0	0	6	0	6	17	116	144	0	277	0	0	12	0	12	0	180	3	0	183	478	0		
8:00	0	0	1	0	1	6	40	41	0	87	0	0	1	0	1	0	57	0	0	57	146	0		
8:15	0	0	1	0	1	8	56	54	0	118	0	0	1	0	1	0	66	0	0	66	186	0		
8:30	0	0	0	0	0	8	63	57	0	128	0	0	1	0	1	0	67	0	0	67	196	0		
8:45	0	0	2	0	2	8	73	51	0	132	0	0	3	0	3	0	83	2	0	85	222	0		
Total	0	0	4	0	4	30	232	203	0	465	0	0	6	0	6	0	273	2	0	275	750	0		
16:00	0	0	5	0	5	6	114	66	0	186	0	0	10	0	10	0	170	4	0	174	375	0		
16:15	0	0	1	0	1	1	97	76	0	174	0	0	6	0	6	0	177	2	0	179	360	0		
16:30	0	0	0	0	0	7	130	54	0	191	0	0	6	0	6	0	149	2	0	151	348	0		
16:45	0	0	0	0	0	5	105	52	0	162	0	0	4	0	4	0	152	1	0	153	319	0		
Total	0	0	6	0	6	19	446	248	0	713	0	0	26	0	26	0	648	9	0	657	1402	0		
17:00	0	0	1	0	1	4	130	47	0	181	0	0	9	0	9	0	144	0	0	144	335	0		
17:15	0	0	0	0	0	9	117	53	0	179	0	0	7	0	7	0	164	2	0	166	352	0		
17:30	0	0	1	0	1	9	103	35	0	147	0	0	6	0	6	0	133	0	0	133	287	0		
17:45	0	0	0	0	0	4	87	53	0	144	0	0	5	0	5	0	130	1	0	131	280	0		
Total	0	0	2	0	2	26	437	188	0	651	0	0	27	0	27	0	571	3	0	574	1254	0		
Grand Total	0	0	18	0	18	92	1231	783	0	2106	0	0	71	0	71	0	1672	17	0	1689	3884	0		
Apprch %	0.0%	0.0%	100.0%	0.0%	4.4%	58.5%	37.2%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	99.0%	1.0%	0.0%	99.3%	1.4%	0.0%	43.5%	100.0%
Total %	0.0%	0.0%	0.5%	0.0%	2.4%	31.7%	20.2%	0.0%	54.2%	0.0%	0.0%	1.8%	0.0%	1.8%	0.0%	0.0%	43.0%	0.4%	0.0%	43.0%	0.4%	0.0%	43.5%	100.0%

AM PEAK HOUR	Taylorville Rd Southbound					McKnight Way Westbound					Taylorville Rd Northbound					McKnight Way Eastbound					Total			
	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL				
Peak Hour Analysis From 08:00 to 09:00																								
Peak Hour For Entire Intersection Begins at 08:00																								
8:00	0	0	1	0	1	6	40	41	0	87	0	0	1	0	1	0	57	0	0	57	146	0		
8:15	0	0	1	0	1	8	56	54	0	118	0	0	1	0	1	0	66	0	0	66	186	0		
8:30	0	0	0	0	0	8	63	57	0	128	0	0	1	0	1	0	67	0	0	67	196	0		
8:45	0	0	2	0	2	8	73	51	0	132	0	0	3	0	3	0	83	2	0	85	222	0		
Total Volume	0	0	4	0	4	30	232	203	0	465	0	0	6	0	6	0	273	2	0	275	750	0		
% App Total	0.0%	0.0%	100.0%	0.0%	6.5%	49.9%	43.7%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	99.3%	0.7%	0.0%	99.6%	1.4%	0.0%	43.5%	100.0%
PHF	.000	.000	.500	.000	.500	.938	.795	.890	.000	.881	.000	.000	.500	.000	.500	.000	.822	.250	.000	.809	.845			

PM PEAK HOUR	Taylorville Rd Southbound					McKnight Way Westbound					Taylorville Rd Northbound					McKnight Way Eastbound					Total			
	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL				
Peak Hour Analysis From 16:00 to 17:00																								
Peak Hour For Entire Intersection Begins at 16:00																								
16:00	0	0	5	0	5	6	114	66	0	186	0	0	10	0	10	0	170	4	0	174	375	0		
16:15	0	0	1	0	1	1	97	76	0	174	0	0	6	0	6	0	177	2	0	179	360	0		
16:30	0	0	0	0	0	7	130	54	0	191	0	0	6	0	6	0	149	2	0	151	348	0		
16:45	0	0	0	0	0	5	105	52	0	162	0	0	4	0	4	0	152	1	0	153	319	0		
Total Volume	0	0	6	0	6	19	446	248	0	713	0	0	26	0	26	0	648	9	0	657	1402	0		
% App Total	0.0%	0.0%	100.0%	0.0%	2.7%	62.6%	34.8%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	98.6%	1.4%	0.0%	98.6%	1.4%	0.0%	43.5%	100.0%
PHF	.000	.000	.300	.000	.300	.679	.858	.816	.000	.933	.000	.000	.650	.000	.650	.000	.915	.563	.000	.918	.935			

Taylorville Rd & McKnight Way

Peak Hour Turning Movement Count

ID: 19-07034-002
City: Grass Valley

PEAK HOURS

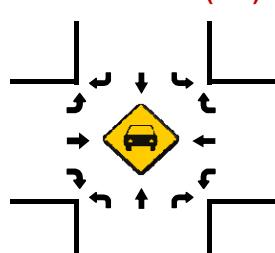
08:00 AM - 09:00 AM

NONE

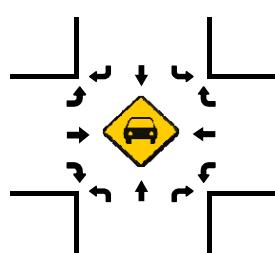
04:00 PM - 05:00 PM



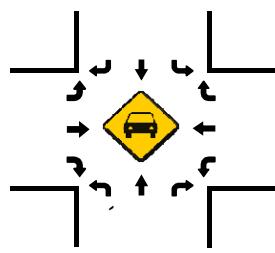
Total Vehicles (AM)



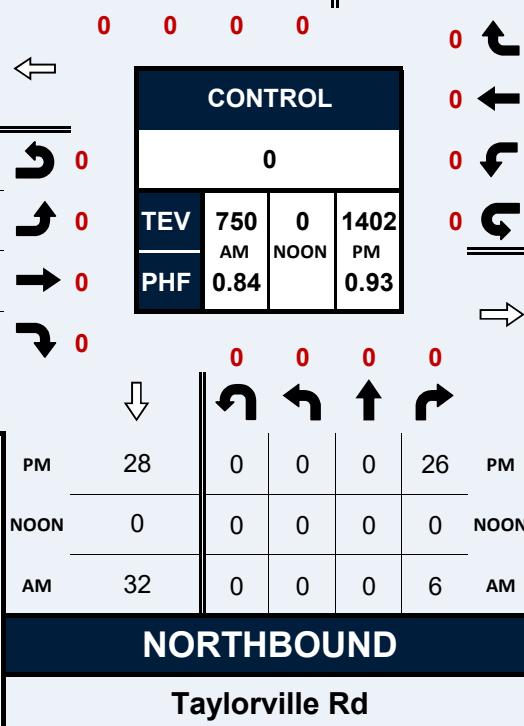
Total Vehicles (NOON)



Total Vehicles (PM)



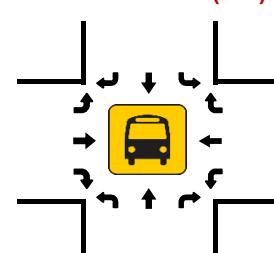
Taylorville Rd					
SOUTHBOUND					
AM	4	0	0	0	203 AM
NOON	0	0	0	0	0 NOON
PM	6	0	0	0	248 PM



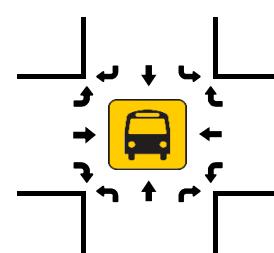
Day: Tuesday
Date: 01/29/2019

PM	NOON	AM	
WESTBOUND			MCKNIGHT WAY
248	0	203	
446	0	232	
19	0	30	
0	0	0	
674	0	279	
PM	NOON	AM	

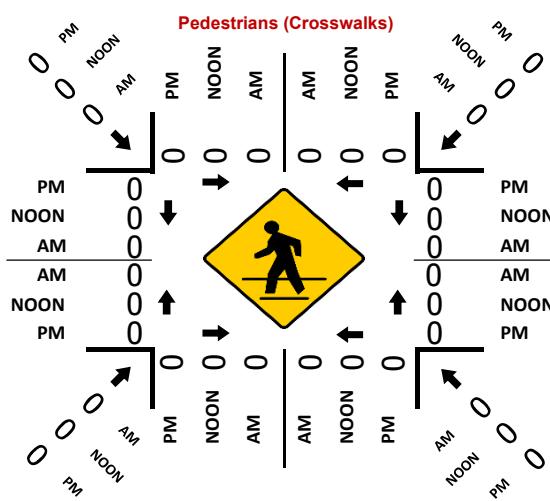
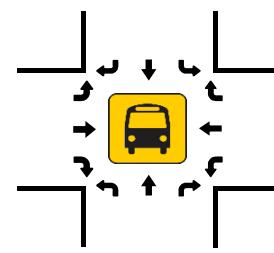
Total Vehicles (AM)



Total Vehicles (NOON)



Total Vehicles (PM)



ALL TRAFFIC DATA

(916) 771-8700
orders@atdtraffic.com

File Name : 19-07034-003
 Date : 01/29/2019

Unshifted Count = All Vehicles & UtURNS

START TIME	SR 49 SB Ramps Southbound					McKnight Way Westbound					SR 49 SB Ramps Northbound					McKnight Way Eastbound					Total	UtURNS Total
	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL		
7:00	14	0	23	0	37	6	35	0	0	41	0	0	0	0	0	0	33	5	0	38	116	0
7:15	25	0	25	0	50	7	42	0	0	49	0	0	0	0	0	0	36	8	0	44	143	0
7:30	34	0	32	0	66	3	41	0	0	44	0	0	0	0	0	0	37	11	0	48	158	0
7:45	33	1	30	0	64	11	48	0	0	59	0	0	0	0	0	0	51	11	0	62	185	0
Total	106	1	110	0	217	27	166	0	0	193	0	0	0	0	0	0	157	35	0	192	602	0
8:00	30	0	35	0	65	6	53	0	0	59	0	0	0	0	0	0	48	11	0	59	183	0
8:15	36	0	58	0	94	6	60	0	0	66	0	0	0	0	0	0	52	14	0	66	226	0
8:30	43	0	63	0	106	13	64	0	0	77	0	0	0	0	0	0	54	15	0	69	252	0
8:45	45	0	62	0	107	12	71	0	0	83	0	0	0	0	0	0	66	19	0	85	275	0
Total	154	0	218	0	372	37	248	0	0	285	0	0	0	0	0	0	220	59	0	279	936	0
16:00	62	0	114	0	176	22	71	0	0	93	0	0	0	0	0	0	132	52	0	184	453	0
16:15	78	0	112	0	190	12	61	0	0	73	0	0	0	0	0	0	136	44	0	180	443	0
16:30	76	0	120	0	196	13	75	0	0	88	0	0	0	0	0	0	108	46	0	154	438	0
16:45	82	0	102	0	184	16	57	0	0	73	0	0	0	0	0	0	119	36	0	155	412	0
Total	298	0	448	0	746	63	264	0	0	327	0	0	0	0	0	0	495	178	0	673	1746	0
17:00	83	0	124	0	207	14	62	0	0	76	0	0	0	0	0	0	114	41	0	155	438	0
17:15	83	0	113	0	196	10	69	0	0	79	0	0	0	0	0	0	116	57	0	173	448	0
17:30	72	0	78	0	150	9	65	0	0	74	0	0	0	0	0	0	103	39	0	142	366	0
17:45	53	1	75	0	129	7	67	0	0	74	0	0	0	0	0	0	101	29	0	130	333	0
Total	291	1	390	0	682	40	263	0	0	303	0	0	0	0	0	0	434	166	0	600	1585	0
Grand Total	849	2	1166	0	2017	167	941	0	0	1108	0	0	0	0	0	0	1306	438	0	1744	4869	0
Apprch %	42.1%	0.1%	57.8%	0.0%		15.1%	84.9%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	74.9%	25.1%	0.0%			
Total %	17.4%	0.0%	23.9%	0.0%	41.4%	3.4%	19.3%	0.0%	0.0%	22.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	26.8%	9.0%	0.0%	35.8%	100.0%	

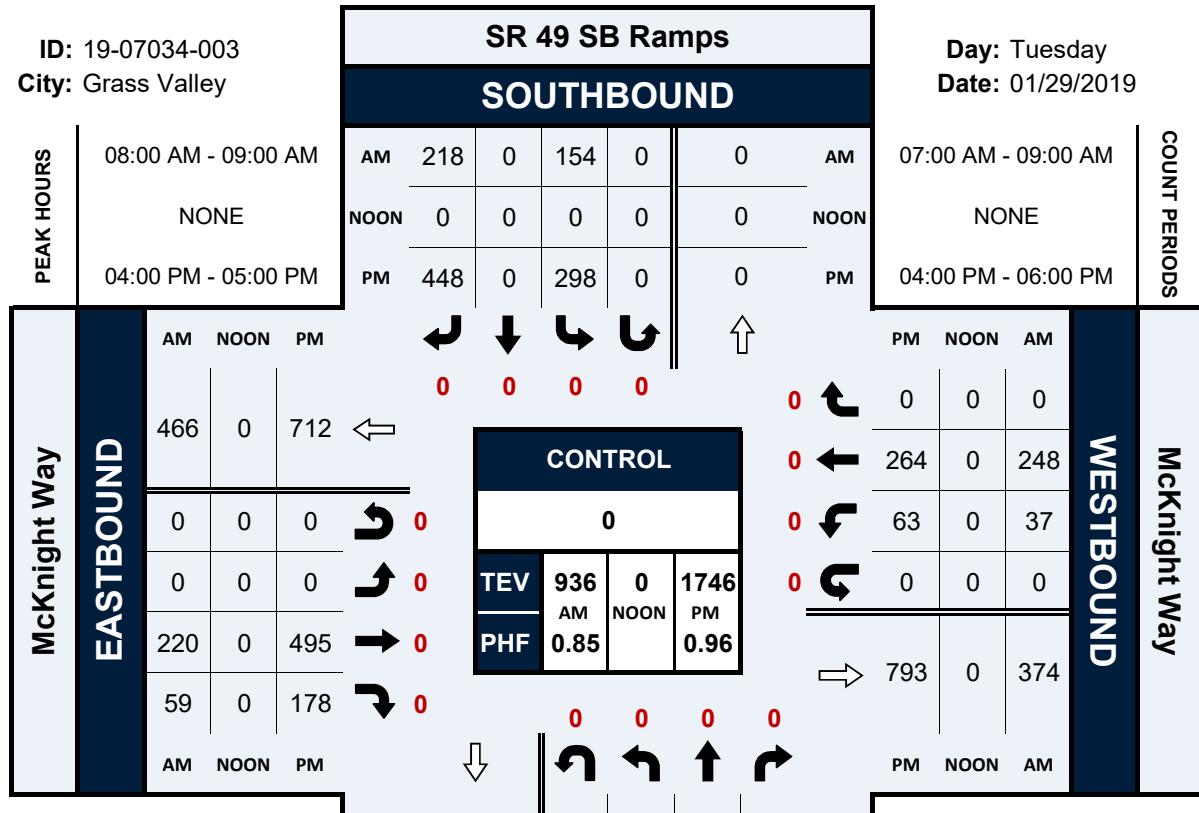
AM PEAK HOUR	SR 49 SB Ramps Southbound					McKnight Way Westbound					SR 49 SB Ramps Northbound					McKnight Way Eastbound					Total	
	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL		
Peak Hour Analysis From 08:00 to 09:00																						
Peak Hour For Entire Intersection Begins at 08:00																						
8:00	30	0	35	0	65	6	53	0	0	59	0	0	0	0	0	0	48	11	0	59	183	
8:15	36	0	58	0	94	6	60	0	0	66	0	0	0	0	0	0	52	14	0	66	226	
8:30	43	0	63	0	106	13	64	0	0	77	0	0	0	0	0	0	54	15	0	69	252	
8:45	45	0	62	0	107	12	71	0	0	83	0	0	0	0	0	0	66	19	0	85	275	
Total Volume	154	0	218	0	372	37	248	0	0	285	0	0	0	0	0	0	220	59	0	279	936	
% App Total	41.4%	0.0%	58.6%	0.0%		13.0%	87.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	78.9%	21.1%	0.0%			
PHF	.856	.000	.865	.000	.869	.712	.873	.000	.000	.858	.000	.000	.000	.000	.000	.000	.833	.776	.000	.821	.851	

PM PEAK HOUR	SR 49 SB Ramps Southbound					McKnight Way Westbound					SR 49 SB Ramps Northbound					McKnight Way Eastbound					Total	
	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL		
Peak Hour Analysis From 16:00 to 17:00																						
Peak Hour For Entire Intersection Begins at 16:00																						
16:00	62	0	114	0	176	22	71	0	0	93	0	0	0	0	0	0	132	52	0	184	453	
16:15	78	0	112	0	190	12	61	0	0	73	0	0	0	0	0	0	136	44	0	180	443	
16:30	76	0	120	0	196	13	75	0	0	88	0	0	0	0	0	0	108	46	0	154	438	
16:45	82	0	102	0	184	16	57	0	0	73	0	0	0	0	0	0	119	36	0	155	412	
Total Volume	298	0	448	0	746	63	264	0	0	327	0	0	0	0	0	0	495	178	0	673	1746	
% App Total	39.9%	0.0%	60.1%	0.0%		19.3%	80.7%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	73.6%	26.4%	0.0%			
PHF	.909	.000	.933	.000	.952	.716	.880	.000	.000	.879	.000	.000	.000	.000	.000	.000	.910	.856	.000	.914	.964	

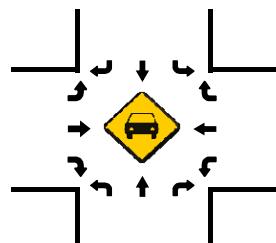
SR 49 SB Ramps & McKnight Way**Peak Hour Turning Movement Count**

ID: 19-07034-003
City: Grass Valley

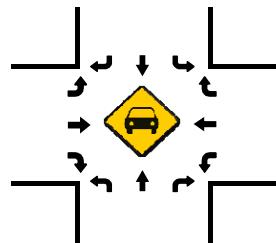
Day: Tuesday
Date: 01/29/2019



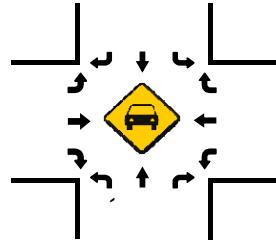
Total Vehicles (AM)



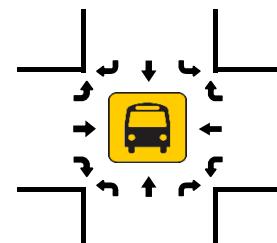
Total Vehicles (NOON)



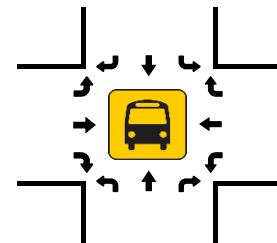
Total Vehicles (PM)



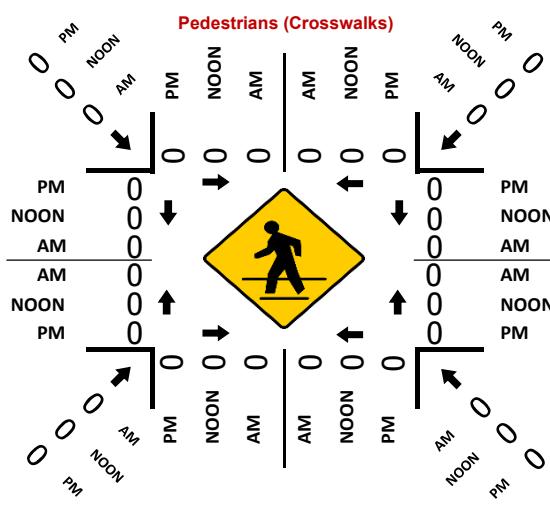
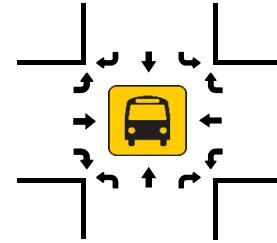
Total Vehicles (AM)



Total Vehicles (NOON)



Total Vehicles (PM)



ALL TRAFFIC DATA

(916) 771-8700
orders@atdtraffic.com

File Name : 19-07034-004
 Date : 01/29/2019

Unshifted Count = All Vehicles & UtURNS

START TIME	SR 49 NB Ramps Southbound					McKnight Way Westbound					SR 49 NB Ramps Northbound					McKnight Way Eastbound					Total	UtURNS Total
	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL		
7:00	0	0	0	0	0	0	25	60	0	85	15	0	10	0	25	21	28	0	0	49	159	0
7:15	0	0	0	0	0	0	29	55	0	84	21	1	19	0	41	25	35	0	0	60	185	0
7:30	0	0	0	0	0	0	29	69	0	98	15	0	17	0	32	24	48	0	0	72	202	0
7:45	0	0	0	0	0	0	43	101	0	144	17	0	14	0	31	22	60	0	0	82	257	0
Total	0	0	0	0	0	0	126	285	0	411	68	1	60	0	129	92	171	0	0	263	803	0
8:00	0	0	0	0	0	0	38	91	0	129	20	1	20	0	41	32	46	0	0	78	248	0
8:15	0	0	0	0	0	0	46	68	0	114	22	0	21	0	43	34	56	0	0	90	247	0
8:30	0	0	0	0	0	0	43	61	0	104	32	1	24	0	57	30	64	0	0	94	255	0
8:45	0	0	0	0	0	0	55	86	0	141	28	0	19	0	47	37	75	0	0	112	300	0
Total	0	0	0	0	0	0	182	306	0	488	102	2	84	0	188	133	241	0	0	374	1050	0
16:00	0	0	0	0	0	0	59	58	0	117	34	0	11	0	45	70	131	0	0	201	363	0
16:15	0	0	0	0	0	0	48	57	0	105	27	1	13	0	41	57	153	0	0	210	356	0
16:30	0	0	0	0	0	0	53	38	0	91	32	0	13	0	45	55	135	0	0	190	326	0
16:45	0	0	0	0	0	0	56	54	0	110	15	1	11	0	27	52	146	0	0	198	335	0
Total	0	0	0	0	0	0	216	207	0	423	108	2	48	0	158	234	565	0	0	799	1380	0
17:00	0	0	0	0	0	0	53	43	0	96	27	0	6	0	33	61	138	0	0	199	328	0
17:15	0	0	0	0	0	0	49	42	0	91	29	0	15	0	44	54	141	0	0	195	330	0
17:30	0	0	0	0	0	0	57	42	0	99	19	0	12	0	31	40	133	0	0	173	303	0
17:45	0	0	0	0	0	0	49	26	0	75	24	1	7	0	32	57	98	0	0	155	262	0
Total	0	0	0	0	0	0	208	153	0	361	99	1	40	0	140	212	510	0	0	722	1223	0
Grand Total	0	0	0	0	0	0	732	951	0	1683	377	6	232	0	615	671	1487	0	0	2158	4456	0
Approch %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	43.5%	56.5%	0.0%	61.3%	1.0%	37.7%	0.0%	31.1%	68.9%	0.0%	0.0%	0.0%	0.0%	48.4%	100.0%	
Total %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	16.4%	21.3%	0.0%	37.8%	8.5%	0.1%	5.2%	0.0%	13.8%	15.1%	33.4%	0.0%	0.0%	.835	.875	

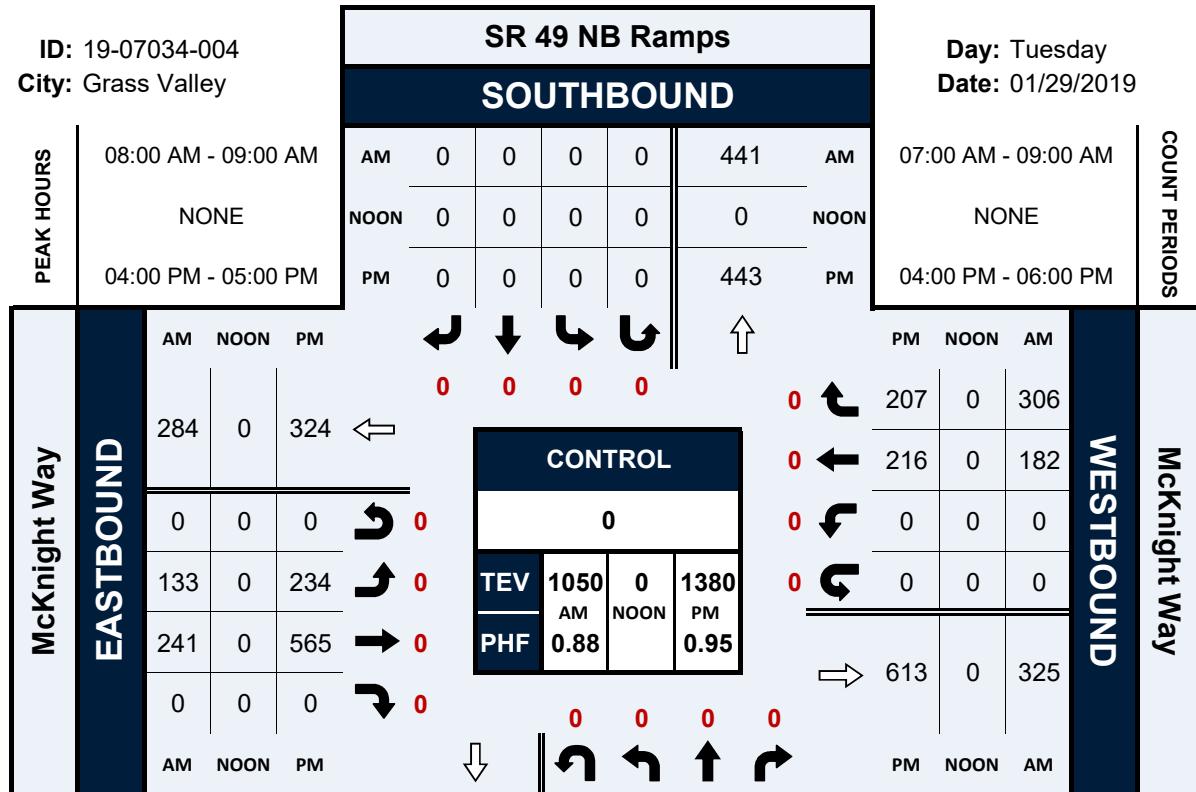
AM PEAK HOUR	SR 49 NB Ramps Southbound					McKnight Way Westbound					SR 49 NB Ramps Northbound					McKnight Way Eastbound					Total	
	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL		
Peak Hour Analysis From 08:00 to 09:00																						
Peak Hour For Entire Intersection Begins at 08:00																						
8:00	0	0	0	0	0	0	38	91	0	129	20	1	20	0	41	32	46	0	0	78	248	
8:15	0	0	0	0	0	0	46	68	0	114	22	0	21	0	43	34	56	0	0	90	247	
8:30	0	0	0	0	0	0	43	61	0	104	32	1	24	0	57	30	64	0	0	94	255	
8:45	0	0	0	0	0	0	55	86	0	141	28	0	19	0	47	37	75	0	0	112	300	
Total Volume	0	0	0	0	0	0	182	306	0	488	102	2	84	0	188	133	241	0	0	374	1050	
% App Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	37.3%	62.7%	0.0%	54.3%	1.1%	44.7%	0.0%	35.6%	64.4%	0.0%	0.0%	0.0%	0.0%	.835	.875	
PHF	.000	.000	.000	.000	.000	.000	.827	.841	.000	.865	.797	.500	.875	.000	.825	.899	.803	.000	.000	.951	.950	

PM PEAK HOUR	SR 49 NB Ramps Southbound					McKnight Way Westbound					SR 49 NB Ramps Northbound					McKnight Way Eastbound					Total	
	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL	LEFT	THRU	RIGHT	UTURNs	APP.TOTAL		
Peak Hour Analysis From 16:00 to 17:00																						
Peak Hour For Entire Intersection Begins at 16:00																						
16:00	0	0	0	0	0	0	59	58	0	117	34	0	11	0	45	70	131	0	0	201	363	
16:15	0	0	0	0	0	0	48	57	0	105	27	1	13	0	41	57	153	0	0	210	356	
16:30	0	0	0	0	0	0	53	38	0	91	32	0	13	0	45	55	135	0	0	190	326	
16:45	0	0	0	0	0	0	56	54	0	110	15	1	11	0	27	52	146	0	0	198	335	
Total Volume	0	0	0	0	0	0	216	207	0	423	108	2	48	0	158	234	565	0	0	799	1380	
% App Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	51.1%	48.9%	0.0%	68.4%	1.3%	30.4%	0.0%	29.3%	70.7%	0.0%	0.0%	0.0%	0.0%	.951	.950	
PHF	.000	.000	.000	.000	.000	.000	.915	.892	.000	.904	.794	.500	.923	.000	.878	.836	.923	.000	.000	.951	.950	

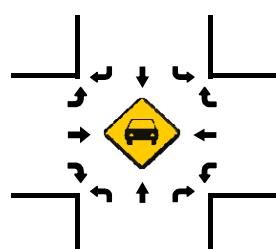
SR 49 NB Ramps & McKnight Way**Peak Hour Turning Movement Count**

ID: 19-07034-004
City: Grass Valley

Day: Tuesday
Date: 01/29/2019



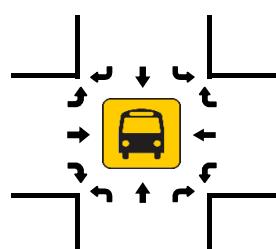
Total Vehicles (AM)



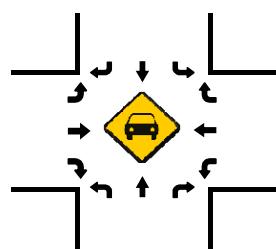
PM	0	0	108	2	48	PM
NOON	0	0	0	0	0	NOON
AM	0	0	102	2	84	AM

NORTHBOUND**SR 49 NB Ramps**

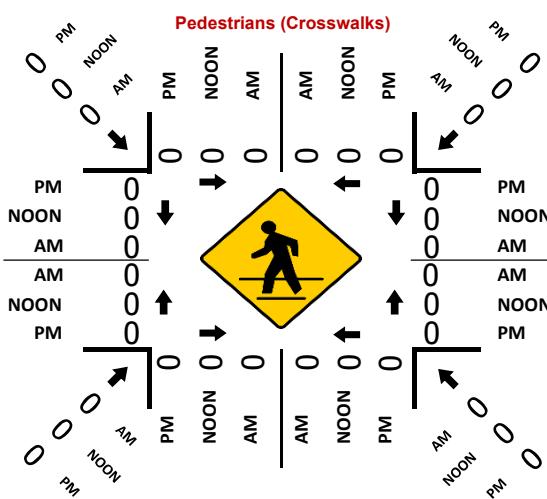
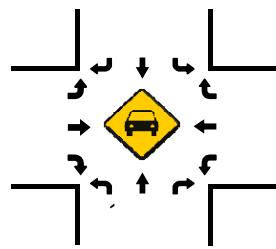
Total Vehicles (AM)



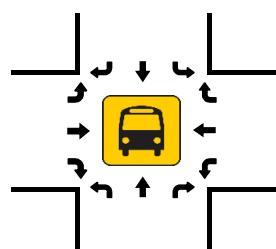
Total Vehicles (NOON)



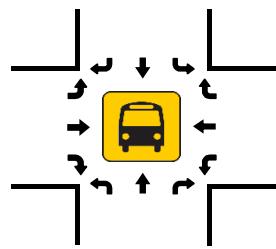
Total Vehicles (PM)



Total Vehicles (NOON)



Total Vehicles (PM)



ALL TRAFFIC DATA

(916) 771-8700
orders@atdtraffic.com

File Name : 19-07034-005
 Date : 01/29/2019

Unshifted Count = All Vehicles & Uturns

START TIME	La Barr Meadows Rd Southbound					McKnight Way Westbound					La Barr Meadows Rd Northbound					McKnight Way Eastbound					Total	Uturns Total
	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
7:00	4	4	15	0	23	4	6	3	0	13	60	16	1	0	77	11	10	16	0	37	150	0
7:15	6	8	14	0	28	3	14	2	0	19	59	17	1	0	77	14	21	22	0	57	181	0
7:30	3	10	13	0	26	6	12	2	0	20	70	30	1	0	101	16	15	29	0	60	207	0
7:45	6	12	20	0	38	2	11	2	0	15	109	44	3	0	156	31	17	29	0	77	286	0
Total	19	34	62	0	115	15	43	9	0	67	298	107	6	0	411	72	63	96	0	231	824	0
8:00	4	9	19	0	32	3	14	4	0	21	98	39	5	0	142	27	13	29	0	69	264	0
8:15	7	14	20	0	41	6	10	4	0	20	83	33	3	0	119	19	20	35	0	74	254	0
8:30	10	21	26	0	57	4	5	6	0	15	75	34	2	0	111	26	23	39	0	88	271	0
8:45	4	19	30	0	53	6	18	5	0	29	98	45	5	0	148	33	15	46	0	94	324	0
Total	25	63	95	0	183	19	47	19	0	85	354	151	15	0	520	105	71	149	0	325	1113	0
16:00	5	29	36	0	70	1	9	3	0	13	69	45	1	0	115	35	23	88	0	146	344	0
16:15	6	30	27	0	63	8	15	9	0	32	68	25	5	0	98	46	18	97	0	161	354	0
16:30	6	17	27	0	50	11	8	10	0	29	56	27	1	0	84	31	21	92	0	144	307	0
16:45	4	15	28	0	47	4	18	4	0	26	63	19	2	0	84	36	24	99	0	159	316	0
Total	21	91	118	0	230	24	50	26	0	100	256	116	9	0	381	148	86	376	0	610	1321	0
17:00	4	30	30	0	64	4	24	3	0	31	46	14	1	0	61	21	23	102	0	146	302	0
17:15	7	21	22	0	50	4	11	4	0	19	54	21	1	0	76	25	23	106	0	154	299	0
17:30	3	18	24	0	45	7	16	2	0	25	54	13	1	0	68	32	17	98	0	147	285	0
17:45	3	20	35	0	58	3	6	4	0	13	37	19	0	0	56	26	11	70	0	107	234	0
Total	17	89	111	0	217	18	57	13	0	88	191	67	3	0	261	104	74	376	0	554	1120	0
Grand Total	82	277	386	0	745	76	197	67	0	340	1099	441	33	0	1573	429	294	997	0	1720	4378	0
Approch %	11.0%	37.2%	51.8%	0.0%		22.4%	57.9%	19.7%	0.0%		69.9%	28.0%	2.1%	0.0%		24.9%	17.1%	58.0%	0.0%			
Total %	1.9%	6.3%	8.8%	0.0%	17.0%	1.7%	4.5%	1.5%	0.0%	7.8%	25.1%	10.1%	0.8%	0.0%	35.9%	9.8%	6.7%	22.8%	0.0%	39.3%	100.0%	

AM PEAK HOUR	La Barr Meadows Rd Southbound					McKnight Way Westbound					La Barr Meadows Rd Northbound					McKnight Way Eastbound					Total	
	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
Peak Hour Analysis From 08:00 to 09:00																						
Peak Hour For Entire Intersection Begins at 08:00																						
8:00	4	9	19	0	32	3	14	4	0	21	98	39	5	0	142	27	13	29	0	69	264	
8:15	7	14	20	0	41	6	10	4	0	20	83	33	3	0	119	19	20	35	0	74	254	
8:30	10	21	26	0	57	4	5	6	0	15	75	34	2	0	111	26	23	39	0	88	271	
8:45	4	19	30	0	53	6	18	5	0	29	98	45	5	0	148	33	15	46	0	94	324	
Total Volume	25	63	95	0	183	19	47	19	0	85	354	151	15	0	520	105	71	149	0	325	1113	
% App Total	13.7%	34.4%	51.9%	0.0%		22.4%	55.3%	22.4%	0.0%		68.1%	29.0%	2.9%	0.0%		32.3%	21.8%	45.8%	0.0%			
PHF	.625	.750	.792	.000	.803	.792	.653	.792	.000	.733	.903	.839	.750	.000	.878	.795	.772	.810	.000	.864	.859	

PM PEAK HOUR	La Barr Meadows Rd Southbound					McKnight Way Westbound					La Barr Meadows Rd Northbound					McKnight Way Eastbound					Total	
	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
Peak Hour Analysis From 16:00 to 17:00																						
Peak Hour For Entire Intersection Begins at 16:00																						
16:00	5	29	36	0	70	1	9	3	0	13	69	45	1	0	115	35	23	88	0	146	344	
16:15	6	30	27	0	63	8	15	9	0	32	68	25	5	0	98	46	18	97	0	161	354	
16:30	6	17	27	0	50	11	8	10	0	29	56	27	1	0	84	31	21	92	0	144	307	
16:45	4	15	28	0	47	4	18	4	0	26	63	19	2	0	84	36	24	99	0	159	316	
Total Volume	21	91	118	0	230	24	50	26	0	100	256	116	9	0	381	148	86	376	0	610	1321	
% App Total	9.1%	39.6%	51.3%	0.0%		24.0%	50.0%	26.0%	0.0%		67.2%	30.4%	2.4%	0.0%		24.3%	14.1%	61.6%	0.0%			
PHF	.875	.758	.819	.000	.821	.545	.694	.650	.000	.781	.928	.644	.450	.000	.828	.804	.896	.949	.000	.947	.933	

La Barr Meadows Rd & McKnight Way

Peak Hour Turning Movement Count

ID: 19-07034-005

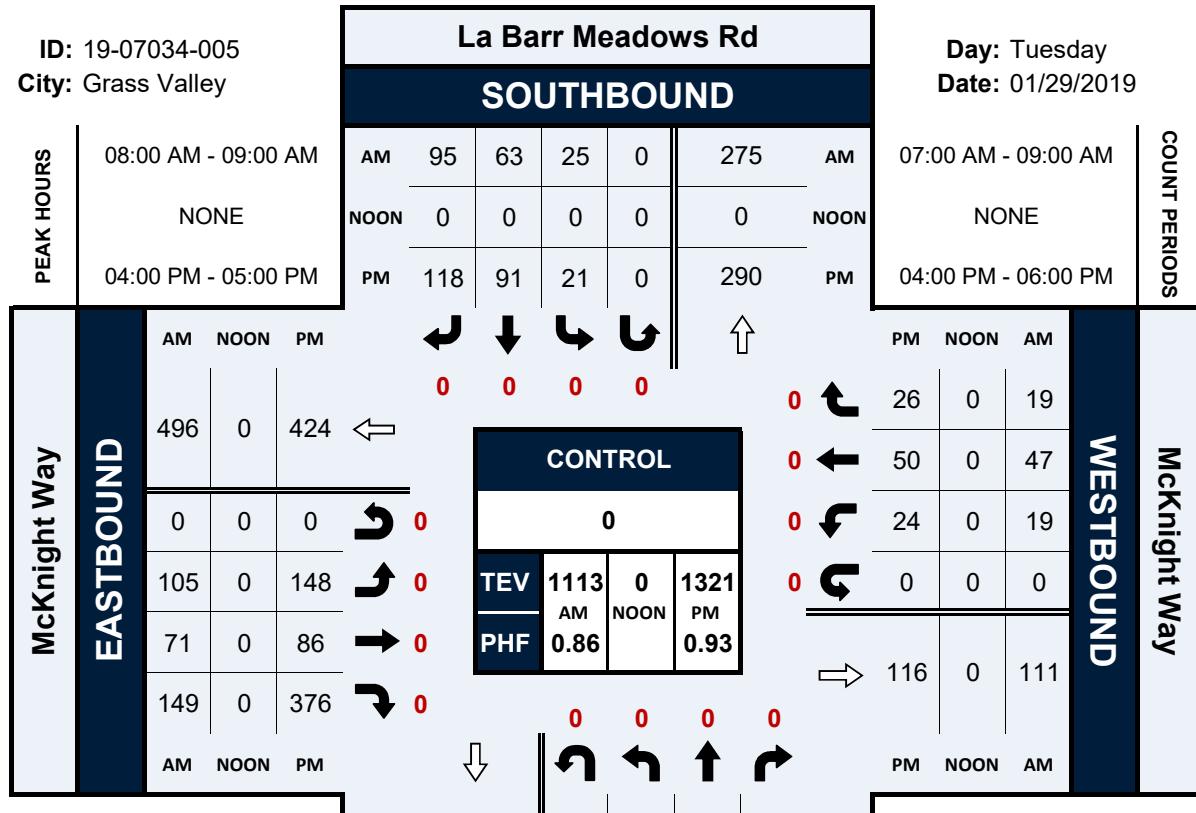
City: Grass Valley

La Barr Meadows Rd

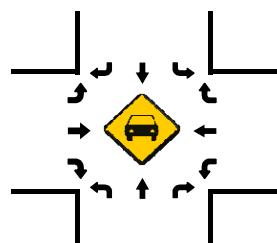
SOUTHBOUND

Day: Tuesday

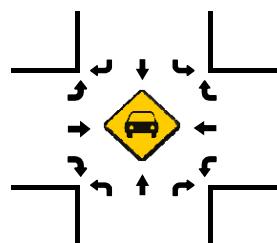
Date: 01/29/2019



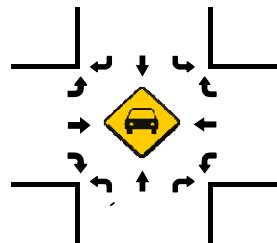
Total Vehicles (AM)



Total Vehicles (NOON)

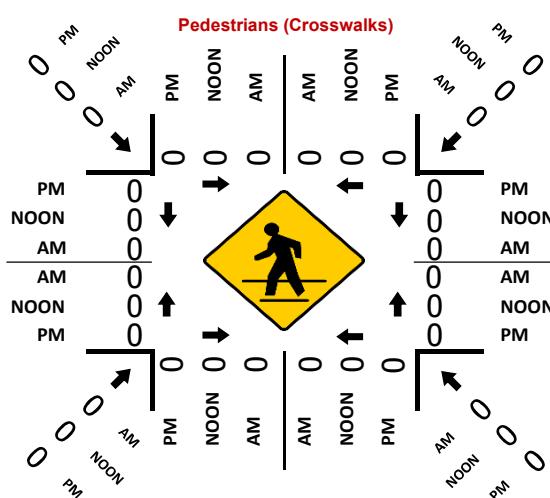


Total Vehicles (PM)

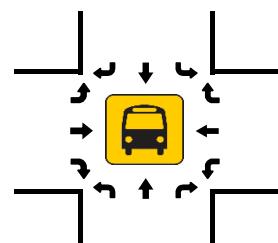


NORTHBOUND

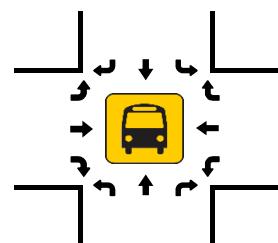
La Barr Meadows Rd



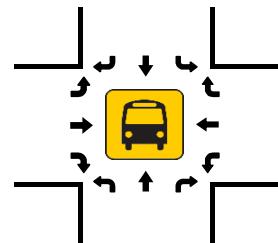
Total Vehicles (AM)



Total Vehicles (NOON)



Total Vehicles (PM)



Intersection

Intersection Delay, s/veh 9.2
Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↑	↑	↑	↑	↑	↑	↔
Traffic Vol, veh/h	6	26	0	7	37	92	0	4	21	170	2	0
Future Vol, veh/h	6	26	0	7	37	92	0	4	21	170	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	28	0	8	40	100	0	4	23	185	2	0
Number of Lanes	0	1	0	0	1	1	1	1	0	1	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	2			1			2			2		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	2			2			1			2		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	2			2			2			1		
HCM Control Delay	8.7			8			7.5			10.4		
HCM LOS	A			A			A			B		

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	19%	16%	0%	100%	0%
Vol Thru, %	100%	16%	81%	84%	0%	0%	100%
Vol Right, %	0%	84%	0%	0%	100%	0%	0%
Sign Control	Stop						
Traffic Vol by Lane	0	25	32	44	92	170	2
LT Vol	0	0	6	7	0	170	0
Through Vol	0	4	26	37	0	0	2
RT Vol	0	21	0	0	92	0	0
Lane Flow Rate	0	27	35	48	100	185	2
Geometry Grp	7	7	6	7	7	7	7
Degree of Util (X)	0	0.035	0.052	0.07	0.124	0.282	0.003
Departure Headway (Hd)	5.166	4.574	5.344	5.249	4.466	5.495	4.993
Convergence, Y/N	Yes						
Cap	0	782	671	684	804	654	717
Service Time	2.899	2.307	3.372	2.969	2.185	3.222	2.72
HCM Lane V/C Ratio	0	0.035	0.052	0.07	0.124	0.283	0.003
HCM Control Delay	7.9	7.5	8.7	8.4	7.8	10.4	7.7
HCM Lane LOS	N	A	A	A	A	B	A
HCM 95th-tile Q	0	0.1	0.2	0.2	0.4	1.2	0

2: Taylorville Rd & W McKnight Way
Existing - AM Peak Hour

Synchro 10 Report
HCM 6th TWSC

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑				↑			↑
Traffic Vol, veh/h	0	273	2	30	232	203	0	0	6	0	0	4
Future Vol, veh/h	0	273	2	30	232	203	0	0	6	0	0	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	103	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	297	2	33	252	221	0	0	7	0	0	4
Major/Minor												
Major1		Major2			Minor1		Minor2					
Conflicting Flow All	-	0	0	299	0	0	-	-	150	-	-	237
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	5.34	-	-	-	-	7.14	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	3.12	-	-	-	-	3.92	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	841	-	-	0	0	739	0	0	764
Stage 1	0	-	-	-	-	-	0	0	-	0	0	-
Stage 2	0	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	841	-	-	-	-	739	-	-	764
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach												
EB			WB			NB		SB				
HCM Control Delay, s	0			0.7			9.9		9.9			
HCM LOS							A		A			
Minor Lane/Major Mvmt												
NBLn1		EBT	EBR	WBL	WBT	WBR	SBLn1					
Capacity (veh/h)	739	-	-	841	-	-	764					
HCM Lane V/C Ratio	0.009	-	-	0.039	-	-	0.006					
HCM Control Delay (s)	9.9	-	-	9.5	0.2	-	9.7					
HCM Lane LOS	A	-	-	A	A	-	A					
HCM 95th %tile Q(veh)	0	-	-	0.1	-	-	0					

3: 49 SB On-Ramp/49 SB Off-Ramp & W McKnight Way Existing - AM Peak Hour

Synchro 10 Report



4: 49 NB Off-Ramp/49 NB On-Ramp & W McKnight Way/E McKnight Way Synchro 10 Report
Existing - AM Peak Hour HCM 6th Signalized Intersection Summary



5: La Barr Meadows Rd/S Auburn St & E McKnight Way Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.2	0.1	198.2	198.4	202.2	0.4	0.4	3.8
Total Del/Veh (s)	0.7	1.2	0.8	11.8	19.8	7.3	111.3	23.2	16.0	8.5	13.2	16.9

5: La Barr Meadows Rd/S Auburn St & E McKnight Way Performance by movement

Movement	All
Denied Del/Veh (s)	92.5
Total Del/Veh (s)	40.5

Intersection

Intersection Delay, s/veh 15.5
Intersection LOS C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	94	4	20	107	242	1	4	9	347	9	5
Future Vol, veh/h	10	94	4	20	107	242	1	4	9	347	9	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	102	4	22	116	263	1	4	10	377	10	5
Number of Lanes	0	1	0	0	1	1	1	1	0	1	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	2			1			2			2		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	2			2			1			2		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	2			2			2			1		
HCM Control Delay	11.3			11.3			9.2			21.4		
HCM LOS	B			B			A			C		

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	9%	16%	0%	100%	0%
Vol Thru, %	0%	31%	87%	84%	0%	0%	64%
Vol Right, %	0%	69%	4%	0%	100%	0%	36%
Sign Control	Stop						
Traffic Vol by Lane	1	13	108	127	242	347	14
LT Vol	1	0	10	20	0	347	0
Through Vol	0	4	94	107	0	0	9
RT Vol	0	9	4	0	242	0	5
Lane Flow Rate	1	14	117	138	263	377	15
Geometry Grp	7	7	6	7	7	7	7
Degree of Util (X)	0.002	0.024	0.211	0.237	0.393	0.68	0.024
Departure Headway (Hd)	7.189	6.183	6.478	6.168	5.382	6.49	5.73
Convergence, Y/N	Yes						
Cap	497	578	553	581	668	558	625
Service Time	4.943	3.936	4.528	3.91	3.123	4.22	3.46
HCM Lane V/C Ratio	0.002	0.024	0.212	0.238	0.394	0.676	0.024
HCM Control Delay	10	9.1	11.3	10.8	11.6	21.9	8.6
HCM Lane LOS	A	A	B	B	B	C	A
HCM 95th-tile Q	0	0.1	0.8	0.9	1.9	5.2	0.1

2: Taylorville Rd & W McKnight Way
Existing - PM Peak Hour

Synchro 10 Report
HCM 6th TWSC

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑				↑			↑
Traffic Vol, veh/h	0	648	9	19	446	248	0	0	26	0	0	6
Future Vol, veh/h	0	648	9	19	446	248	0	0	26	0	0	6
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	103	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	704	10	21	485	270	0	0	28	0	0	7
Major/Minor	Major1	Major2			Minor1			Minor2				
Conflicting Flow All	-	0	0	714	0	0	-	-	357	-	-	378
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	5.34	-	-	-	-	7.14	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	3.12	-	-	-	-	3.92	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	537	-	-	0	0	546	0	0	620
Stage 1	0	-	-	-	-	-	0	0	-	0	0	-
Stage 2	0	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	537	-	-	-	-	546	-	-	620
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB	WB			NB			SB				
HCM Control Delay, s	0	0.6			12			10.9				
HCM LOS					B			B				
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1					
Capacity (veh/h)	546	-	-	537	-	-	620					
HCM Lane V/C Ratio	0.052	-	-	0.038	-	-	0.011					
HCM Control Delay (s)	12	-	-	12	0.4	-	10.9					
HCM Lane LOS	B	-	-	B	A	-	B					
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-	-	0					

3: 49 SB On-Ramp/49 SB Off-Ramp & W McKnight Way Existing - PM Peak Hour

Synchro 10 Report
HCM 6th Signalized Intersection Summary



4: 49 NB Off-Ramp/49 NB On-Ramp & W McKnight Way/E McKnight Way Synchro 10 Report Existing - PM Peak Hour HCM 6th Signalized Intersection Summary

5: La Barr Meadows Rd/S Auburn St & E McKnight Way Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.2	0.2	68.1	66.5	40.6	0.6	1.0	4.1
Total Del/Veh (s)	1.1	1.8	1.4	17.7	24.6	10.8	89.6	18.2	6.7	9.9	13.1	20.7

5: La Barr Meadows Rd/S Auburn St & E McKnight Way Performance by movement

Movement	All
Denied Del/Veh (s)	19.0
Total Del/Veh (s)	23.5

Intersection

Intersection Delay, s/veh 9.3
Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↑	↑	↑	↑	↑	↑	↔
Traffic Vol, veh/h	6	26	0	7	37	119	0	4	21	179	2	0
Future Vol, veh/h	6	26	0	7	37	119	0	4	21	179	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	28	0	8	40	129	0	4	23	195	2	0
Number of Lanes	0	1	0	0	1	1	1	1	0	1	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	2			1			2			2		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	2			2			1			2		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	2			2			2			1		
HCM Control Delay	8.7			8.2			7.6			10.7		
HCM LOS	A			A			A			B		

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	19%	16%	0%	100%	0%
Vol Thru, %	100%	16%	81%	84%	0%	0%	100%
Vol Right, %	0%	84%	0%	0%	100%	0%	0%
Sign Control	Stop						
Traffic Vol by Lane	0	25	32	44	119	179	2
LT Vol	0	0	6	7	0	179	0
Through Vol	0	4	26	37	0	0	2
RT Vol	0	21	0	0	119	0	0
Lane Flow Rate	0	27	35	48	129	195	2
Geometry Grp	7	7	6	7	7	7	7
Degree of Util (X)	0	0.035	0.052	0.07	0.162	0.301	0.003
Departure Headway (Hd)	5.251	4.66	5.412	5.282	4.499	5.562	5.06
Convergence, Y/N	Yes						
Cap	0	767	662	679	798	646	707
Service Time	2.99	2.398	3.446	3.006	2.222	3.293	2.791
HCM Lane V/C Ratio	0	0.035	0.053	0.071	0.162	0.302	0.003
HCM Control Delay	8	7.6	8.7	8.4	8.1	10.7	7.8
HCM Lane LOS	N	A	A	A	A	B	A
HCM 95th-tile Q	0	0.1	0.2	0.2	0.6	1.3	0

Intersection

Int Delay, s/veh 2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	273	11	67	241	203	0	0	142	0	0	4
Future Vol, veh/h	0	273	11	67	241	203	0	0	142	0	0	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									
Storage Length	103	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	297	12	73	262	221	0	0	154	0	0	4

Major/Minor	Major1	Major2		Minor1		Minor2	
Conflicting Flow All	-	0	0	309	0	0	-
Stage 1	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	5.34	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	3.12	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	832	-	0	734
Stage 1	0	-	-	-	-	0	0
Stage 2	0	-	-	-	-	0	0
Platoon blocked, %	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	832	-	-	734
Mov Cap-2 Maneuver	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-

Approach	EB	WB		NB		SB
HCM Control Delay, s	0	1.5		11.2		9.8
HCM LOS				B		A
<hr/>						
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR SBLn1
Capacity (veh/h)	734	-	-	832	-	- 759
HCM Lane V/C Ratio	0.21	-	-	0.088	-	- 0.006
HCM Control Delay (s)	11.2	-	-	9.7	0.4	- 9.8
HCM Lane LOS	B	-	-	A	A	- A
HCM 95th %tile Q(veh)	0.8	-	-	0.3	-	- 0

3: 49 SB On-Ramp/49 SB Off-Ramp & W McKnight Way

Existing plus Project - AM Peak Hour

Synchro 10 Report
HCM 6th Signalized Intersection Summary



4: 49 NB Off-Ramp/49 NB On-Ramp & W McKnight Way/E McKnight Way Synchro 10 Report
Existing plus Project - AM Peak Hour HCM 6th Signalized Intersection Summary

5: La Barr Meadows Rd/S Auburn St & E McKnight Way Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.2	0.2	178.9	180.5	159.2	0.5	0.5	3.7
Total Del/Veh (s)	0.7	1.1	0.7	10.7	20.8	8.6	120.6	26.6	21.7	9.7	11.4	22.6

5: La Barr Meadows Rd/S Auburn St & E McKnight Way Performance by movement

Movement	All
Denied Del/Veh (s)	83.6
Total Del/Veh (s)	42.0

Intersection

Intersection Delay, s/veh 17.9

Intersection LOS C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	94	4	20	107	260	1	4	9	377	9	5
Future Vol, veh/h	10	94	4	20	107	260	1	4	9	377	9	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	102	4	22	116	283	1	4	10	410	10	5
Number of Lanes	0	1	0	0	1	1	1	1	0	1	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	2			1			2			2		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	2			2			1			2		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	2			2			2			1		
HCM Control Delay	11.6			12			9.4			25.7		
HCM LOS	B			B			A			D		

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	9%	16%	0%	100%	0%
Vol Thru, %	0%	31%	87%	84%	0%	0%	64%
Vol Right, %	0%	69%	4%	0%	100%	0%	36%
Sign Control	Stop						
Traffic Vol by Lane	1	13	108	127	260	377	14
LT Vol	1	0	10	20	0	377	0
Through Vol	0	4	94	107	0	0	9
RT Vol	0	9	4	0	260	0	5
Lane Flow Rate	1	14	117	138	283	410	15
Geometry Grp	7	7	6	7	7	7	7
Degree of Util (X)	0.002	0.025	0.217	0.242	0.433	0.747	0.025
Departure Headway (Hd)	7.347	6.339	6.654	6.305	5.518	6.564	5.804
Convergence, Y/N	Yes						
Cap	486	562	538	569	650	553	617
Service Time	5.112	4.104	4.714	4.055	3.268	4.299	3.539
HCM Lane V/C Ratio	0.002	0.025	0.217	0.243	0.435	0.741	0.024
HCM Control Delay	10.1	9.3	11.6	11.1	12.5	26.3	8.7
HCM Lane LOS	B	A	B	B	B	D	A
HCM 95th-tile Q	0	0.1	0.8	0.9	2.2	6.4	0.1

Intersection

Int Delay, s/veh 2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	648	39	138	476	248	0	0	115	0	0	6
Future Vol, veh/h	0	648	39	138	476	248	0	0	115	0	0	6
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									
Storage Length	103	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	704	42	150	517	270	0	0	125	0	0	7

Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	-	0	0	746	0	0	-	-	373	-	-	394
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	5.34	-	-	-	-	7.14	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	3.12	-	-	-	-	3.92	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	518	-	-	0	0	533	0	0	605
Stage 1	0	-	-	-	-	-	0	0	-	0	0	-
Stage 2	0	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	518	-	-	-	-	533	-	-	605
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB		NB		SB	
HCM Control Delay, s	0	3.7		13.8		11	
HCM LOS				B		B	
<hr/>							
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR SBLn1	
Capacity (veh/h)	533	-	-	518	-	-	605
HCM Lane V/C Ratio	0.235	-	-	0.29	-	-	0.011
HCM Control Delay (s)	13.8	-	-	14.8	2.5	-	11
HCM Lane LOS	B	-	-	B	A	-	B
HCM 95th %tile Q(veh)	0.9	-	-	1.2	-	-	0

3: 49 SB On-Ramp/49 SB Off-Ramp & W McKnight Way Existing plus Projct - PM Peak Hour

Synchro 10 Report



4: 49 NB Off-Ramp/49 NB On-Ramp & W McKnight Way/E McKnight Way Synchro 10 Report
Existing plus Projct - PM Peak Hour HCM 6th Signalized Intersection Summary

5: La Barr Meadows Rd/S Auburn St & E McKnight Way Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.2	0.2	91.1	70.8	117.4	1.3	3.5	6.8
Total Del/Veh (s)	0.8	1.7	1.2	19.6	36.6	16.3	110.5	15.6	17.4	12.2	17.3	39.0

5: La Barr Meadows Rd/S Auburn St & E McKnight Way Performance by movement

Movement	All
Denied Del/Veh (s)	25.0
Total Del/Veh (s)	30.2

Intersection

Intersection Delay, s/veh 9.5
Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↑	↑	↑	↑	↑	↑	↔
Traffic Vol, veh/h	10	30	0	10	40	110	0	10	30	190	10	0
Future Vol, veh/h	10	30	0	10	40	110	0	10	30	190	10	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	33	0	11	43	120	0	11	33	207	11	0
Number of Lanes	0	1	0	0	1	1	1	1	0	1	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	2			1			2			2		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	2			2			1			2		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	2			2			2			1		
HCM Control Delay	9			8.3			7.8			10.8		
HCM LOS	A			A			A			B		

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	25%	20%	0%	100%	0%
Vol Thru, %	100%	25%	75%	80%	0%	0%	100%
Vol Right, %	0%	75%	0%	0%	100%	0%	0%
Sign Control	Stop						
Traffic Vol by Lane	0	40	40	50	110	190	10
LT Vol	0	0	10	10	0	190	0
Through Vol	0	10	30	40	0	0	10
RT Vol	0	30	0	0	110	0	0
Lane Flow Rate	0	43	43	54	120	207	11
Geometry Grp	7	7	6	7	7	7	7
Degree of Util (X)	0	0.058	0.067	0.082	0.153	0.321	0.015
Departure Headway (Hd)	5.302	4.774	5.52	5.407	4.602	5.602	5.1
Convergence, Y/N	Yes						
Cap	0	747	648	663	778	640	701
Service Time	3.05	2.521	3.562	3.138	2.333	3.342	2.84
HCM Lane V/C Ratio	0	0.058	0.066	0.081	0.154	0.323	0.016
HCM Control Delay	8.1	7.8	9	8.6	8.2	11	7.9
HCM Lane LOS	N	A	A	A	A	B	A
HCM 95th-tile Q	0	0.2	0.2	0.3	0.5	1.4	0

Intersection															
Int Delay, s/veh	0.8														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations		↑↑↑			↑↑				↑			↑			
Traffic Vol, veh/h	0	300	10	40	250	220	0	0	10	0	0	10			
Future Vol, veh/h	0	300	10	40	250	220	0	0	10	0	0	10			
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	103	-	-	-	-	-	-	-	0	-	-	0			
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-			
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-			
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92			
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2			
Mvmt Flow	0	326	11	43	272	239	0	0	11	0	0	11			
Major/Minor	Major1	Major2			Minor1			Minor2							
Conflicting Flow All	-	0	0	337	0	0	-	-	169	-	-	256			
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-			
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-			
Critical Hdwy	-	-	-	5.34	-	-	-	-	7.14	-	-	6.94			
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-			
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-			
Follow-up Hdwy	-	-	-	3.12	-	-	-	-	3.92	-	-	3.32			
Pot Cap-1 Maneuver	0	-	-	807	-	-	0	0	719	0	0	743			
Stage 1	0	-	-	-	-	-	0	0	-	0	0	-			
Stage 2	0	-	-	-	-	-	0	0	-	0	0	-			
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-			
Mov Cap-1 Maneuver	-	-	-	807	-	-	-	-	719	-	-	743			
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-			
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-			
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-			
Approach	EB			WB			NB			SB					
HCM Control Delay, s	0			0.9			10.1			9.9					
HCM LOS							B			A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1								
Capacity (veh/h)	719	-	-	807	-	-	743								
HCM Lane V/C Ratio	0.015	-	-	0.054	-	-	0.015								
HCM Control Delay (s)	10.1	-	-	9.7	0.3	-	9.9								
HCM Lane LOS	B	-	-	A	A	-	A								
HCM 95th %tile Q(veh)	0	-	-	0.2	-	-	0								

3: 49 SB On-Ramp/49 SB Off-Ramp & W McKnight Way Interim Year No Project - AM Peak Hour

Synchro 10 Report
HCM 6th Signalized Intersection Summary



4: 49 NB Off-Ramp/49 NB On-Ramp & W McKnight Way/E McKnight Way Synchro 10 Report
Interim Year No Project - AM Peak Hour HCM 6th Signalized Intersection Summary



5: La Barr Meadows Rd/S Auburn St & E McKnight Way Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.2	0.1	349.0	352.9	352.9	0.7	0.6	3.8
Total Del/Veh (s)	0.8	1.3	0.7	28.2	37.1	20.1	131.9	26.0	18.8	11.3	14.3	20.7

5: La Barr Meadows Rd/S Auburn St & E McKnight Way Performance by movement

Movement	All
Denied Del/Veh (s)	158.9
Total Del/Veh (s)	43.2

Intersection

Intersection Delay, s/veh 19.1

Intersection LOS C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↑	↑	↑	↑	↑	↑	↔
Traffic Vol, veh/h	20	100	10	30	120	270	10	10	10	380	10	10
Future Vol, veh/h	20	100	10	30	120	270	10	10	10	380	10	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	109	11	33	130	293	11	11	11	413	11	11
Number of Lanes	0	1	0	0	1	1	1	1	0	1	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB				EB			SB			NB	
Opposing Lanes	2				1			2			2	
Conflicting Approach Left	SB				NB			EB			WB	
Conflicting Lanes Left	2				2			1			2	
Conflicting Approach Right	NB				SB			WB			EB	
Conflicting Lanes Right	2				2			2			1	
HCM Control Delay	12.4				12.8			10.1			28.5	
HCM LOS	B				B			B			D	

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	15%	20%	0%	100%	0%
Vol Thru, %	0%	50%	77%	80%	0%	0%	50%
Vol Right, %	0%	50%	8%	0%	100%	0%	50%
Sign Control	Stop						
Traffic Vol by Lane	10	20	130	150	270	380	20
LT Vol	10	0	20	30	0	380	0
Through Vol	0	10	100	120	0	0	10
RT Vol	0	10	10	0	270	0	10
Lane Flow Rate	11	22	141	163	293	413	22
Geometry Grp	7	7	6	7	7	7	7
Degree of Util (X)	0.023	0.041	0.268	0.295	0.464	0.778	0.036
Departure Headway (Hd)	7.613	6.74	6.838	6.504	5.694	6.784	5.922
Convergence, Y/N	Yes						
Cap	468	528	523	551	628	533	603
Service Time	5.401	4.528	4.916	4.27	3.459	4.535	3.672
HCM Lane V/C Ratio	0.024	0.042	0.27	0.296	0.467	0.775	0.036
HCM Control Delay	10.6	9.8	12.4	12	13.3	29.5	8.9
HCM Lane LOS	B	A	B	B	B	D	A
HCM 95th-tile Q	0.1	0.1	1.1	1.2	2.5	7.1	0.1

Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑				↑			↑
Traffic Vol, veh/h	0	690	10	20	480	260	0	0	40	0	0	10
Future Vol, veh/h	0	690	10	20	480	260	0	0	40	0	0	10
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	103	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	750	11	22	522	283	0	0	43	0	0	11
Major/Minor	Major1	Major2			Minor1			Minor2				
Conflicting Flow All	-	0	0	761	0	0	-	-	381	-	-	403
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	5.34	-	-	-	-	7.14	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	3.12	-	-	-	-	3.92	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	510	-	-	0	0	527	0	0	597
Stage 1	0	-	-	-	-	-	0	0	-	0	0	-
Stage 2	0	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	510	-	-	-	-	527	-	-	597
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.6			12.4			11.1		
HCM LOS							B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1					
Capacity (veh/h)	527	-	-	510	-	-	597					
HCM Lane V/C Ratio	0.083	-	-	0.043	-	-	0.018					
HCM Control Delay (s)	12.4	-	-	12.4	0.5	-	11.1					
HCM Lane LOS	B	-	-	B	A	-	B					
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-	-	0.1					

3: 49 SB On-Ramp/49 SB Off-Ramp & W McKnight Way Interim Year No Project - PM Peak Hour

Synchro 10 Report
HCM 6th Signalized Intersection Summary



4: 49 NB Off-Ramp/49 NB On-Ramp & W McKnight Way/E McKnight Way Synchro 10 Report
Interim Year No Project - PM Peak Hour HCM 6th Signalized Intersection Summary



5: La Barr Meadows Rd/S Auburn St & E McKnight Way Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	1.5	2.5	1.3	141.7	113.3	62.2	0.8	0.7	3.8
Total Del/Veh (s)	1.1	1.9	1.3	35.8	43.8	34.0	120.5	19.3	15.5	14.9	16.4	27.9

5: La Barr Meadows Rd/S Auburn St & E McKnight Way Performance by movement

Movement	All
Denied Del/Veh (s)	37.2
Total Del/Veh (s)	30.2

Intersection

Intersection Delay, s/veh 9.7
Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖ ↗			↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	
Traffic Vol, veh/h	10	30	0	10	40	137	0	10	30	199	10	0
Future Vol, veh/h	10	30	0	10	40	137	0	10	30	199	10	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	33	0	11	43	149	0	11	33	216	11	0
Number of Lanes	0	1	0	0	1	1	1	1	0	1	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	2			1			2			2		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	2			2			1			2		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	2			2			2			1		
HCM Control Delay	9.1			8.6			7.9			11.1		
HCM LOS	A			A			A			B		

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	25%	20%	0%	100%	0%
Vol Thru, %	100%	25%	75%	80%	0%	0%	100%
Vol Right, %	0%	75%	0%	0%	100%	0%	0%
Sign Control	Stop						
Traffic Vol by Lane	0	40	40	50	137	199	10
LT Vol	0	0	10	10	0	199	0
Through Vol	0	10	30	40	0	0	10
RT Vol	0	30	0	0	137	0	0
Lane Flow Rate	0	43	43	54	149	216	11
Geometry Grp	7	7	6	7	7	7	7
Degree of Util (X)	0	0.059	0.068	0.082	0.192	0.341	0.016
Departure Headway (Hd)	5.392	4.862	5.592	5.444	4.64	5.672	5.169
Convergence, Y/N	Yes						
Cap	0	733	639	658	773	634	691
Service Time	3.148	2.618	3.642	3.18	2.375	3.417	2.914
HCM Lane V/C Ratio	0	0.059	0.067	0.082	0.193	0.341	0.016
HCM Control Delay	8.1	7.9	9.1	8.7	8.5	11.3	8
HCM Lane LOS	N	A	A	A	A	B	A
HCM 95th-tile Q	0	0.2	0.2	0.3	0.7	1.5	0

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑				↑			↑
Traffic Vol, veh/h	0	300	19	77	259	220	0	0	146	0	0	10
Future Vol, veh/h	0	300	19	77	259	220	0	0	146	0	0	10
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	103	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	326	21	84	282	239	0	0	159	0	0	11
Major/Minor	Major1	Major2			Minor1		Minor2					
Conflicting Flow All	-	0	0	347	0	0	-	-	174	-	-	261
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	5.34	-	-	-	-	7.14	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	3.12	-	-	-	-	3.92	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	799	-	-	0	0	714	0	0	738
Stage 1	0	-	-	-	-	-	0	0	-	0	0	-
Stage 2	0	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	799	-	-	-	-	714	-	-	738
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB		WB			NB		SB				
HCM Control Delay, s	0		1.6			11.5		10				
HCM LOS						B		B				
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1					
Capacity (veh/h)	714	-	-	799	-	-	738					
HCM Lane V/C Ratio	0.222	-	-	0.105	-	-	0.015					
HCM Control Delay (s)	11.5	-	-	10	0.5	-	10					
HCM Lane LOS	B	-	-	B	A	-	B					
HCM 95th %tile Q(veh)	0.8	-	-	0.4	-	-	0					

3: 49 SB On-Ramp/49 SB Off-Ramp & W McKnight Way Interim Year With Project - AM Peak Hour

Synchro 10 Report
HCM 6th Signalized Intersection Summary



4: 49 NB Off-Ramp/49 NB On-Ramp & W McKnight Way/E McKnight Way Synchro 10 Report
Interim Year With Project - AM Peak Hour HCM 6th Signalized Intersection Summary

5: La Barr Meadows Rd/S Auburn St & E McKnight Way Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.2	0.1	448.9	450.2	415.9	1.5	1.8	5.0
Total Del/Veh (s)	0.7	1.3	0.8	27.7	35.4	21.6	144.6	28.7	26.8	12.9	17.9	38.7

5: La Barr Meadows Rd/S Auburn St & E McKnight Way Performance by movement

Movement	All
Denied Del/Veh (s)	198.3
Total Del/Veh (s)	45.1

Intersection

Intersection Delay, s/veh 22.9

Intersection LOS C

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↑	↑	↑	↑	↑	↑	↔
Traffic Vol, veh/h	20	100	10	30	120	288	10	10	10	410	10	10
Future Vol, veh/h	20	100	10	30	120	288	10	10	10	410	10	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	109	11	33	130	313	11	11	11	446	11	11
Number of Lanes	0	1	0	0	1	1	1	1	0	1	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB				EB			SB			NB	
Opposing Lanes	2				1			2			2	
Conflicting Approach Left	SB				NB			EB			WB	
Conflicting Lanes Left	2				2			1			2	
Conflicting Approach Right	NB				SB			WB			EB	
Conflicting Lanes Right	2				2			2			1	
HCM Control Delay	12.8				13.8			10.3			36.1	
HCM LOS	B				B			B			E	

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	15%	20%	0%	100%	0%
Vol Thru, %	0%	50%	77%	80%	0%	0%	50%
Vol Right, %	0%	50%	8%	0%	100%	0%	50%
Sign Control	Stop						
Traffic Vol by Lane	10	20	130	150	288	410	20
LT Vol	10	0	20	30	0	410	0
Through Vol	0	10	100	120	0	0	10
RT Vol	0	10	10	0	288	0	10
Lane Flow Rate	11	22	141	163	313	446	22
Geometry Grp	7	7	6	7	7	7	7
Degree of Util (X)	0.024	0.042	0.276	0.301	0.508	0.85	0.036
Departure Headway (Hd)	7.89	7.015	7.023	6.648	5.837	6.863	6
Convergence, Y/N	Yes						
Cap	456	513	507	538	614	526	595
Service Time	5.59	4.715	5.119	4.429	3.618	4.622	3.758
HCM Lane V/C Ratio	0.024	0.043	0.278	0.303	0.51	0.848	0.037
HCM Control Delay	10.8	10	12.8	12.3	14.6	37.4	9
HCM Lane LOS	B	A	B	B	B	E	A
HCM 95th-tile Q	0.1	0.1	1.1	1.3	2.9	8.9	0.1

Intersection

Int Delay, s/veh 3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	690	40	139	510	260	0	0	129	0	0	10
Future Vol, veh/h	0	690	40	139	510	260	0	0	129	0	0	10
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									
Storage Length	103	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	750	43	151	554	283	0	0	140	0	0	11

Major/Minor	Major1	Major2		Minor1		Minor2	
Conflicting Flow All	-	0	0	793	0	0	-
Stage 1	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	5.34	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	3.12	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	492	-	0	515
Stage 1	0	-	-	-	-	0	0
Stage 2	0	-	-	-	-	0	0
Platoon blocked, %	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	492	-	-	515
Mov Cap-2 Maneuver	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-

Approach	EB	WB		NB		SB
HCM Control Delay, s	0	4.1		14.6		11.3
HCM LOS				B		B
<hr/>						
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR SBLn1
Capacity (veh/h)	515	-	-	492	-	- 583
HCM Lane V/C Ratio	0.272	-	-	0.307	-	- 0.019
HCM Control Delay (s)	14.6	-	-	15.5	3.1	- 11.3
HCM Lane LOS	B	-	-	C	A	- B
HCM 95th %tile Q(veh)	1.1	-	-	1.3	-	- 0.1

3: 49 SB On-Ramp/49 SB Off-Ramp & W McKnight Way Interim Year With Project - PM Peak Hour

Synchro 10 Report



4: 49 NB Off-Ramp/49 NB On-Ramp & W McKnight Way/E McKnight Way Synchro 10 Report
Interim Year With Project - PM Peak Hour HCM 6th Signalized Intersection Summary

5: La Barr Meadows Rd/S Auburn St & E McKnight Way Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.6	1.3	1.5	425.1	424.4	368.6	24.0	26.2	24.1
Total Del/Veh (s)	1.0	1.8	1.4	59.9	69.5	55.3	232.9	36.0	41.5	28.8	26.0	64.4

5: La Barr Meadows Rd/S Auburn St & E McKnight Way Performance by movement

Movement	All
Denied Del/Veh (s)	120.6
Total Del/Veh (s)	47.9

Intersection

Intersection Delay, s/veh 17.2

Intersection LOS C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	132	71	149	19	47	19	354	151	15	25	63	104
Future Vol, veh/h	132	71	149	19	47	19	354	151	15	25	63	104
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	143	77	162	21	51	21	385	164	16	27	68	113
Number of Lanes	0	1	1	0	1	0	1	1	0	0	1	1
Approach												
Opposing Approach	WB			WB			NB			SB		
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	14			12.3			22.4			11.2		
HCM LOS	B			B			C			B		

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	65%	0%	22%	28%	0%
Vol Thru, %	0%	91%	35%	0%	55%	72%	0%
Vol Right, %	0%	9%	0%	100%	22%	0%	100%
Sign Control	Stop						
Traffic Vol by Lane	354	166	203	149	85	88	104
LT Vol	354	0	132	0	19	25	0
Through Vol	0	151	71	0	47	63	0
RT Vol	0	15	0	149	19	0	104
Lane Flow Rate	385	180	221	162	92	96	113
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.741	0.319	0.446	0.28	0.193	0.193	0.202
Departure Headway (Hd)	6.929	6.356	7.37	6.227	7.519	7.277	6.419
Convergence, Y/N	Yes						
Cap	519	561	492	572	480	495	563
Service Time	4.718	4.144	5.07	4.026	5.529	4.983	4.119
HCM Lane V/C Ratio	0.742	0.321	0.449	0.283	0.192	0.194	0.201
HCM Control Delay	27.2	12.1	15.9	11.5	12.3	11.7	10.7
HCM Lane LOS	D	B	C	B	B	B	B
HCM 95th-tile Q	6.2	1.4	2.3	1.1	0.7	0.7	0.7

Intersection

Intersection Delay, s/veh 19.2

Intersection LOS C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	166	86	376	24	50	26	256	116	9	21	91	148
Future Vol, veh/h	166	86	376	24	50	26	256	116	9	21	91	148
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	180	93	409	26	54	28	278	126	10	23	99	161
Number of Lanes	0	1	1	0	1	0	1	1	0	0	1	1
Approach												
Opposing Approach	WB			WB			NB			SB		
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	22.3			13.7			19.6			13.3		
HCM LOS	C			B			C			B		

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	66%	0%	24%	19%	0%
Vol Thru, %	0%	93%	34%	0%	50%	81%	0%
Vol Right, %	0%	7%	0%	100%	26%	0%	100%
Sign Control	Stop						
Traffic Vol by Lane	256	125	252	376	100	112	148
LT Vol	256	0	166	0	24	21	0
Through Vol	0	116	86	0	50	91	0
RT Vol	0	9	0	376	26	0	148
Lane Flow Rate	278	136	274	409	109	122	161
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.617	0.28	0.566	0.725	0.243	0.267	0.316
Departure Headway (Hd)	7.986	7.42	7.434	6.384	8.032	7.892	7.073
Convergence, Y/N	Yes						
Cap	454	484	485	568	447	455	508
Service Time	5.731	5.165	5.173	4.123	6.087	5.64	4.821
HCM Lane V/C Ratio	0.612	0.281	0.565	0.72	0.244	0.268	0.317
HCM Control Delay	22.8	13	19.5	24.2	13.7	13.5	13.1
HCM Lane LOS	C	B	C	C	B	B	B
HCM 95th-tile Q	4.1	1.1	3.5	6	0.9	1.1	1.3

DELAY (AVERAGE)

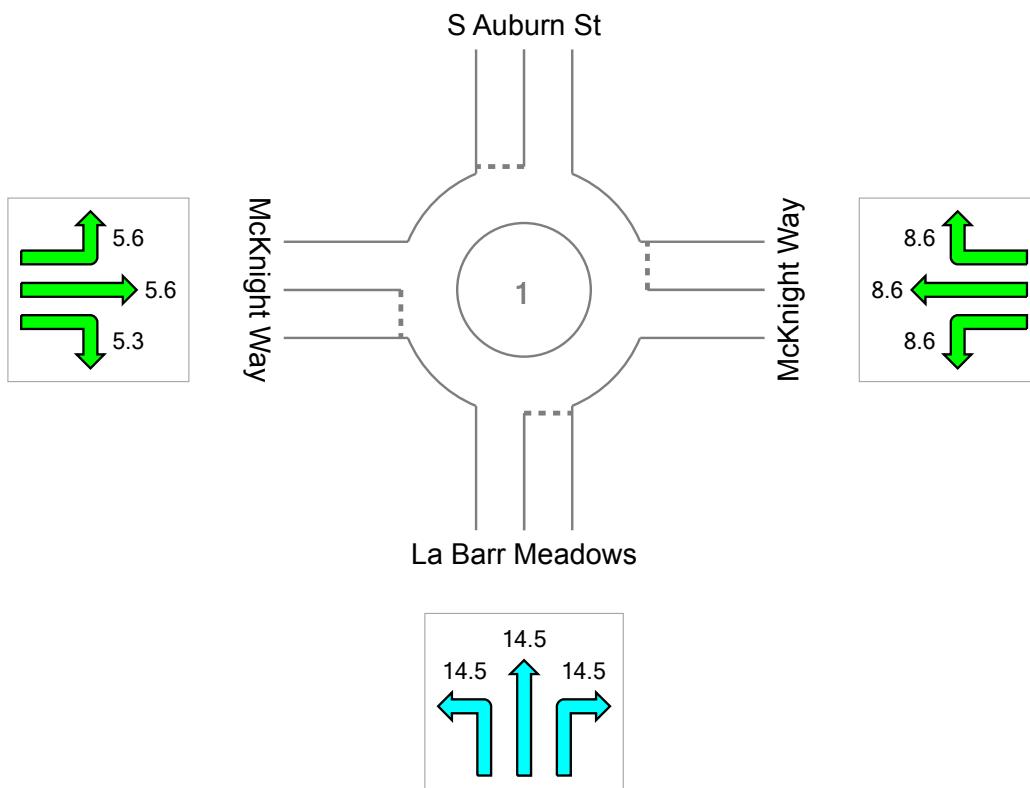
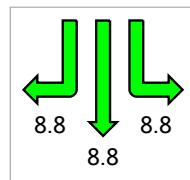
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: S Auburn St/LaBarrMeadows & McKnight Way - Existing - AM

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Delay (Average)	14.5	8.6	8.8	5.4	10.5
LOS	B	A	A	A	B



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F	Continuous

Level of Service Method: Delay & v/c (HCM 2010)

LOS F will result if $v/c > 1$ irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

DELAY (AVERAGE)

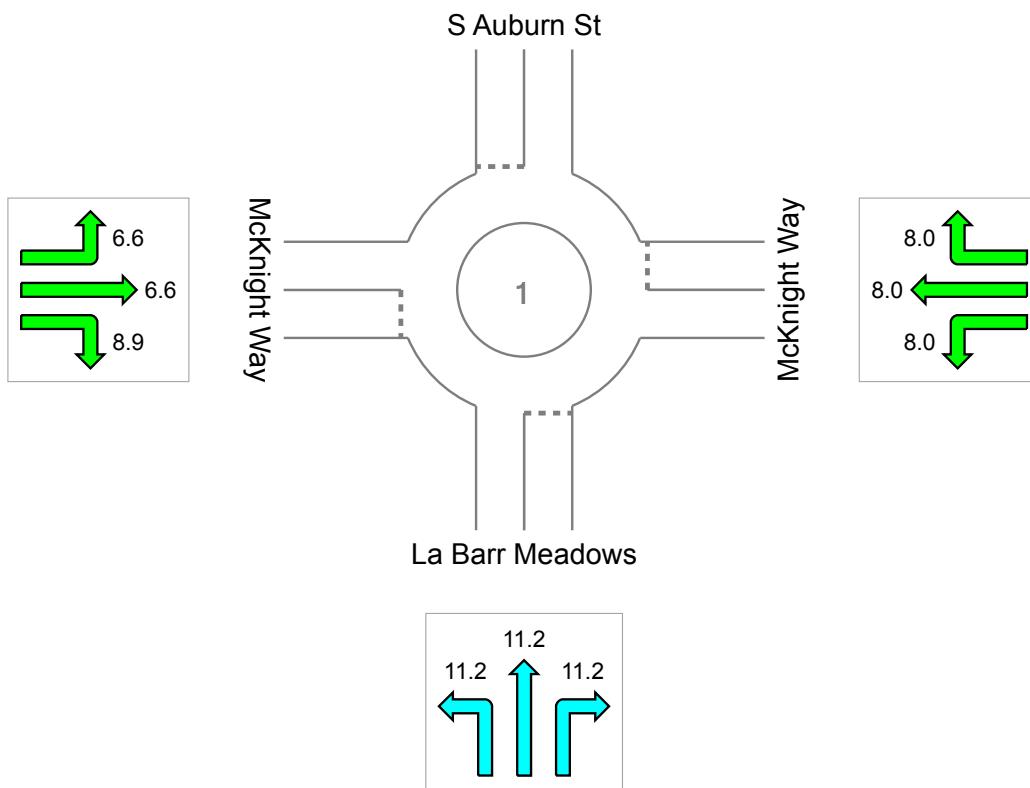
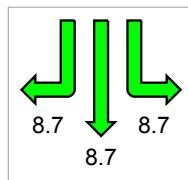
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: S Auburn St/LaBarrMeadows & McKnight Way - Existing - PM

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Delay (Average)	11.2	8.0	8.7	8.0	9.0
LOS	B	A	A	A	A



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F	Continuous

Level of Service Method: Delay & v/c (HCM 2010)

LOS F will result if $v/c > 1$ irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

DELAY (AVERAGE)

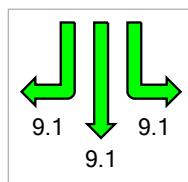
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: S Auburn St/LaBarrMeadows & McKnight Way - Ex+prj - AM

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Delay (Average)	15.5	8.9	9.1	5.6	10.9
LOS	C	A	A	A	B

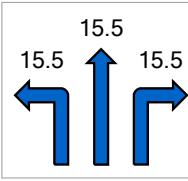
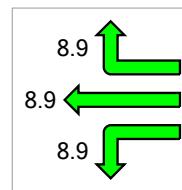
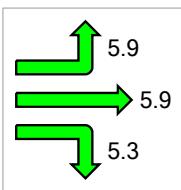


S Auburn St

McKnight Way

McKnight Way

La Barr Meadows



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F	Continuous

Level of Service Method: Delay & v/c (HCM 2010)

LOS F will result if $v/c > 1$ irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

DELAY (AVERAGE)

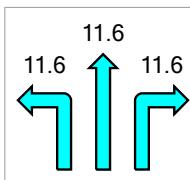
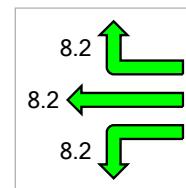
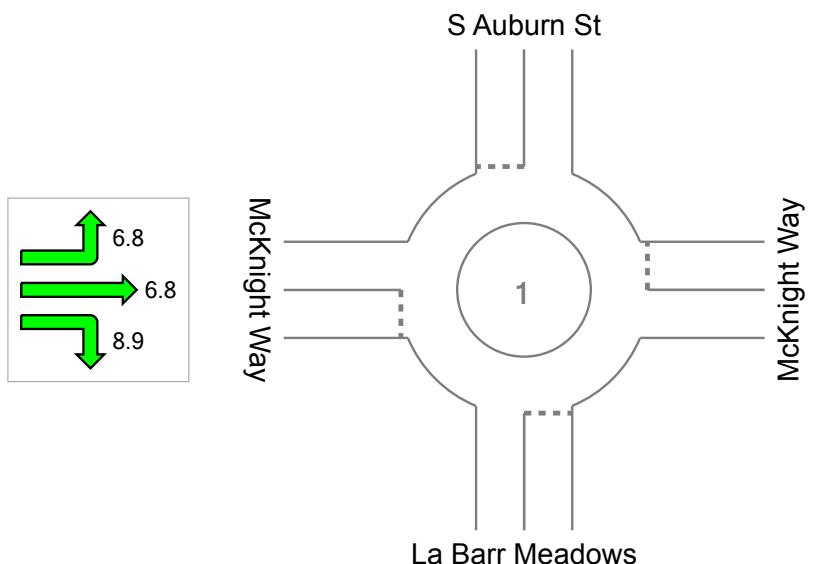
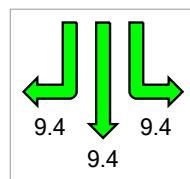
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: S Auburn St/LaBarrMeadows & McKnight Way - Ex+prj - PM

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Delay (Average)	11.6	8.2	9.4	8.1	9.3
LOS	B	A	A	A	A



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F	Continuous

Level of Service Method: Delay & v/c (HCM 2010)

LOS F will result if $v/c > 1$ irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

DELAY (AVERAGE)

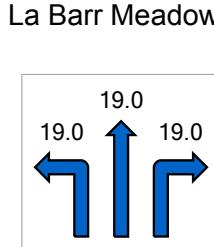
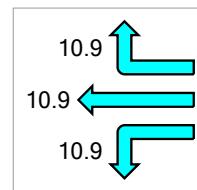
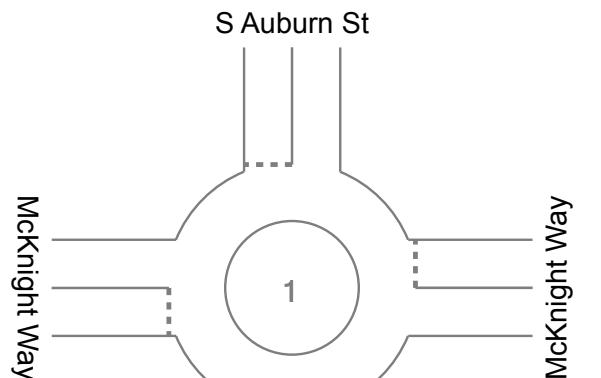
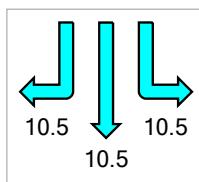
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: S Auburn St/LaBarrMeadows & McKnight Way - Interim Year without Project- AM

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Delay (Average)	19.0	10.9	10.5	6.0	12.9
LOS	C	B	B	A	B



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F	Continuous

Level of Service Method: Delay & v/c (HCM 2010)

LOS F will result if $v/c > 1$ irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

DELAY (AVERAGE)

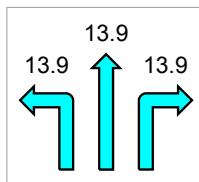
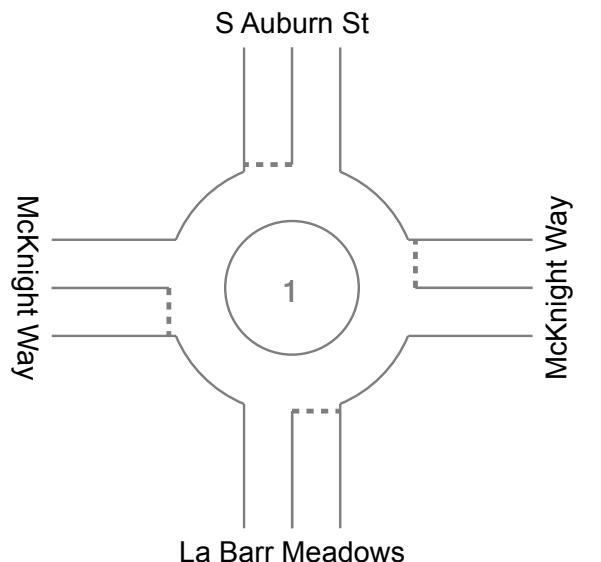
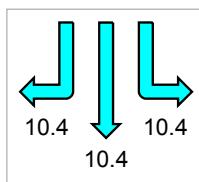
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: S Auburn St/LaBarrMeadows & McKnight Way - Interim Year without Project- PM

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Delay (Average)	13.9	10.2	10.4	8.9	10.6
LOS	B	B	B	A	B



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F	Continuous

Level of Service Method: Delay & v/c (HCM 2010)

LOS F will result if $v/c > 1$ irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

DELAY (AVERAGE)

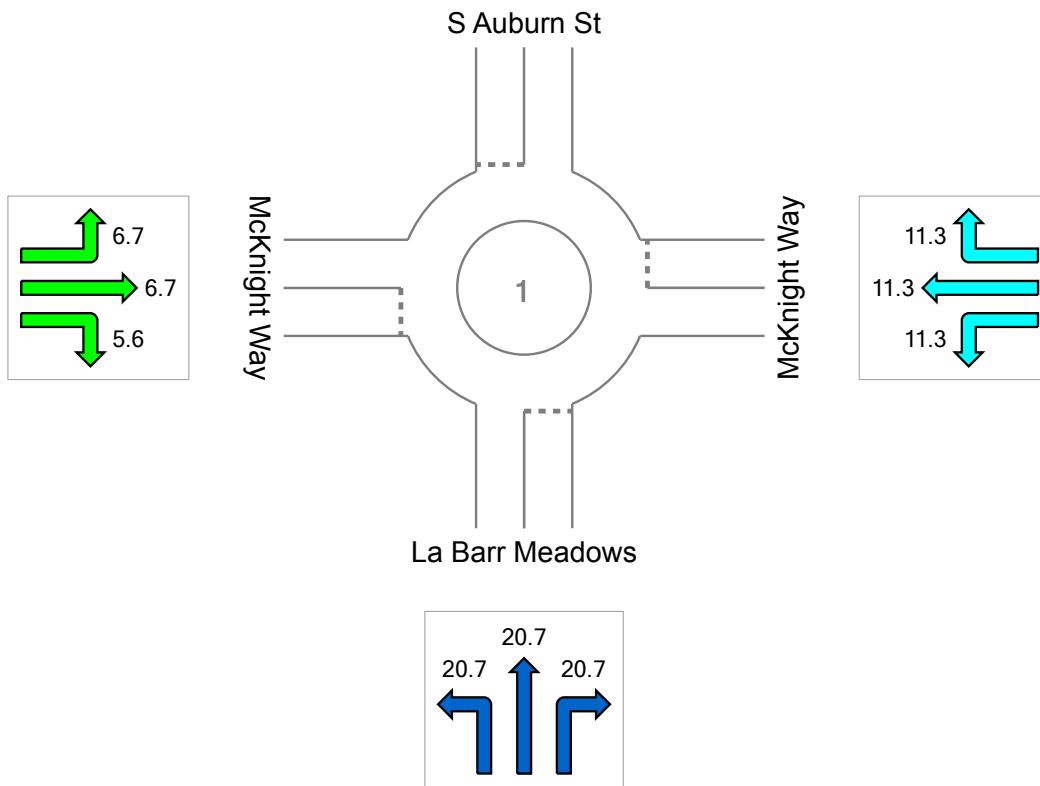
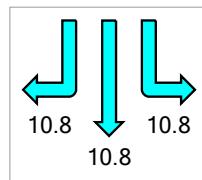
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: S Auburn St/LaBarrMeadows & McKnight Way - Interim Year with Project- AM

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Delay (Average)	20.7	11.3	10.8	6.3	13.7
LOS	C	B	B	A	B



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F	Continuous

Level of Service Method: Delay & v/c (HCM 2010)

LOS F will result if $v/c > 1$ irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

DELAY (AVERAGE)

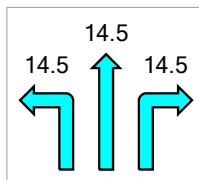
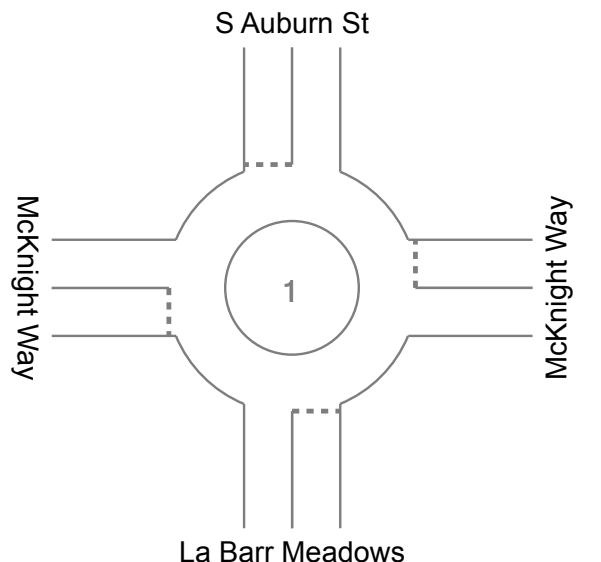
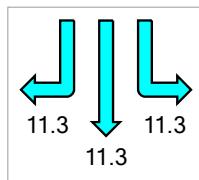
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: S Auburn St/LaBarrMeadows & McKnight Way - Interim Year with Project- PM

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Delay (Average)	14.5	10.5	11.3	9.0	11.0
LOS	B	B	B	A	B



Colour code based on Level of Service



Level of Service Method: Delay & v/c (HCM 2010)

LOS F will result if $v/c > 1$ irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.