

APPENDIX L

Sierra Gateway Apartments Transportation Impact Analysis Report

Prepared for:

Rocklin Sierra Apartments II, LLC

Prepared by:



**SIERRA GATEWAY APARTMENTS
TRANSPORTATION IMPACT ANALYSIS REPORT**

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APPENDIX

Traffix LOS Worksheets

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Introduction

This report has been prepared to present the results of a traffic impact analysis performed by Omni-Means for the proposed Sierra Gateway Apartments (Project) in the City of Rocklin (City). The site is located on a vacant 9.83 acre parcel immediately southeast of the intersection of Rocklin Road and Sierra College Boulevard. The Project site is bounded by Rocklin Road to the north, Sierra College Boulevard to the west, existing residential development to the east, and single-family residences to the south.

Based on a review of the submitted site plan, the Project proposes to develop 195 apartment dwelling units. Primary access to the proposed Project would be provided from Rocklin Road via the existing Rocklin Manor Drive. The adjacent residential development immediately east of the proposed Project currently has access to Rocklin Road from a driveway off of Rocklin Manor Drive. Secondary, exit only and emergency access will be provided to Sierra College Boulevard via Water Lily Lane along the southern edge of the Project site. **Figure 1** shows the project location and vicinity map.

This report includes a description of the existing transportation setting, including current AM and PM peak hour traffic operations at study intersections. Study intersections were selected in consultation with City of Rocklin staff. This report also includes analysis and discussion of the following items:

- Approved projects within the City of Rocklin, along with quantification of trip generation and distribution associated with those projects and their combined impacts on existing AM and PM peak hour intersection operations.
- Quantification of the trip generation and trip distribution associated with the proposed project and the resulting impacts on existing AM and PM peak hour intersection operations.
- The projected Cumulative (Year 2030) peak hour operations with and without the development of the proposed project.
- Potential improvements that are needed to mitigate project impacts and eliminate level of service deficiencies.

The following transportation impact analysis scenarios are included in this report:

1. *Existing Conditions*
2. *Existing Plus Project Conditions*
3. *Existing Plus Project with Outbound Access from Water Lily Lane Conditions*
4. *Short Term No Project (Existing + Approved Projects Scenario) Conditions*
5. *Short Term Plus Project (Existing + Approved Project Scenario + proposed Project) Conditions*
6. *Short Term Plus Project with Outbound Access from Water Lily Lane Conditions*
7. *Year 2030 No Project Conditions*
8. *Year 2030 Plus Project Conditions*
9. *Year 2030 Plus Project Conditions with Outbound Access from Water Lily Lane*

Existing conditions describes the existing transportation facilities serving the project site, and the traffic operations that currently exist for those facilities.

Existing Plus Project conditions analyze traffic impacts associated with the proposed Project are investigated in comparison to the *Existing* conditions scenario. This scenario assumes primary access to the proposed Project will be from Rocklin Road via Rocklin Manor Drive only, with emergency-only access to Sierra College Boulevard via Water Lily Lane.

Existing Plus Project with Outbound Access from Water Lily Lane conditions are similar to *Existing Plus Project* conditions, but assume that outbound access from the proposed Project will also be available to Sierra College Boulevard via Water Lily Lane. As with *Existing Plus Project* conditions, this scenario analyzes traffic impacts associated with the proposed Project in comparison to the *Existing* conditions scenario.

Short Term conditions refer to future scenarios in which approved and/or pending development projects in the Project vicinity are assumed to be completed. The *Short Term No Project* scenario analyzes traffic operations following completion of approved projects only, with the exclusion of the proposed Project.

The *Short Term Plus Project* scenario analyzes traffic operations following completion of approved projects with the addition of traffic generated by the proposed Project and investigates proposed Project impacts in comparison to the *Short Term No Project* scenario, assuming primary Project access is provided to Rocklin Road only via Rocklin Manor Drive.

The *Short Term Plus Project with Outbound Access from Water Lily Lane* scenario allows outbound access from the Project to Sierra College Boulevard via Water Lily Lane and investigates proposed Project impacts in comparison to the *Short Term No Project* scenario.

Year 2030 (Cumulative) conditions refer to future scenarios which assume full buildout of all remaining City of Rocklin vacant lands, consistent with the City's General Plan Land Use Element. Additionally, *Year 2030* conditions assume construction of transportation infrastructure improvements consistent with the City's General Plan Circulation Element, specifically programmed improvements included in the City's Capital Improvement Program. The *Year 2030 No Project* scenario analyzes traffic operations assuming buildout of the City's General Plan with the exclusion of the proposed Project.

The *Year 2030 Plus Project* scenario analyzes traffic operations assuming buildout of the City's General Plan in addition to the proposed Project and investigates proposed Project impacts in comparison to the *Year 2030 No Project* scenario, assuming primary project access is provided to Rocklin Road only via Rocklin Manor Drive.

The *Year 2030 Plus Project with Outbound Access from Water Lily Lane* scenario allows outbound access from the Project to Sierra College Boulevard via Water Lily Lane and investigates proposed Project impacts in comparison to the *Year 2030 No Project* scenario.

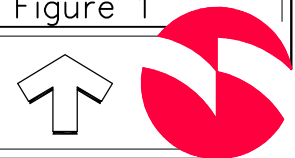
The methodologies used to develop traffic volumes for the above traffic scenarios are described in greater detail in the subsequent relevant sections of this report. Following analysis of each analysis scenario, a description of identified deficiencies is included and a determination of project impacts is made. Improvements to mitigate deficiencies and project impacts are included in the Mitigations section of this report.



Sierra Gateway Apartments Traffic Impact Study

Figure 1

Study Area Map



Project Setting

The City of Rocklin is located in Placer County, California, covering approximately 19.5 square miles. The American Census Survey reports that in 2014, the population in Rocklin was estimated at 59,000.

Transportation System

Interstate 80 (I-80) is a high capacity major interstate freeway facility that traverses the study area generally in the southwest-northeast direction connecting major urban centers within and beyond the state of California. I-80 serves as a major home-to-work commuter route in the Davis-Sacramento-Auburn area, and is the major connector for Bay Area-Lake Tahoe-Reno recreation traffic. I-80 enters the City limits at the State Route 65 interchange and continues northeast where it exits the Rocklin City limits at the Brace Road overpass. I-80 through the Rocklin area is a six-lane freeway with two interchanges providing access to and from the Rocklin area.

Rocklin Road is an east-west roadway that is classified within the City of Rocklin General Plan Circulation Element as a principal arterial between Pacific Street and Sierra College Boulevard, carrying large volumes of through traffic. From Pacific Street to Sierra College Boulevard, Rocklin Road is a four lane roadway with a two-way left turn lane. East of Sierra College Boulevard it traverses as a two-lane roadway entering the Town limits of Loomis. Rocklin Road has one of the two interchanges with I-80 within the City of Rocklin.

Sierra College Boulevard is predominantly a north-south four- to six-lane roadway that is classified within the City of Rocklin General Plan Circulation Element as principal arterial, carrying large volumes of through traffic in the eastern portion of the planning area. It connects the City of Rocklin to the City of Roseville in the south and the Town of Loomis in the north. Sierra College Boulevard begins in the south at the Placer County/Sacramento County line as the northward extension of Hazel Avenue, continuing north through (or along the border of) different sections of unincorporated Placer County and the incorporated cities of Roseville and Rocklin, and the Town of Loomis, ending eventually at State Route 193 near the City of Lincoln. Sierra College Boulevard is the second of two interchanges with I-80 within the City of Rocklin.

Rocklin Manor Drive is a two-lane semi-circular private driveway that provides primary access to Rocklin Road from the multi-family residential development immediately east of the proposed Project Site. Rocklin Manor Drive forms a stub south of its western intersection with Rocklin Road, where future access to the proposed Project is anticipated.

Water Lily Lane is a two-lane east-west local street that provides primary access to Sierra College Boulevard from about 47 single family homes immediately south of the proposed Project site. Water Lily Lane is not a through street.

Study Intersections

The following list of critical study intersections were identified in coordination with City of Rocklin staff for analysis during weekday AM and PM peak hour conditions:

1. Sierra College Boulevard / Rocklin Road
2. Sierra College Boulevard / Water Lily Lane - Cobblecreek Circle

3. Rocklin Road / Rocklin Manor Drive (west entrance)
4. Rocklin Road / I-80 WB Ramps
5. Rocklin Road / I-80 EB Ramps
6. Sierra College Boulevard / I-80 EB Ramps
7. Sierra College Boulevard / I-80 WB Ramps

Study Mainline and Ramp Segments

The following list of critical study freeway mainline segments and merge/diverge segments were identified in coordination with City of Rocklin and Caltrans staff for analysis during AM and PM peak hour conditions:

1. I-80 EB South of Rocklin Road
2. I-80 EB Off Ramp at Rocklin Road
3. I-80 EB On Ramp at Rocklin Road
4. I-80 WB Off Ramp at Rocklin Road
5. I-80 WB On Ramp at Rocklin Road
6. I-80 WB South of Rocklin Road
7. I-80 EB South of Sierra College Boulevard
8. I-80 EB Off Ramp at Sierra College Boulevard
9. I-80 EB Loop On Ramp at Sierra College Boulevard
10. I-80 EB On Ramp at Sierra College Boulevard
11. I-80 EB North of Sierra College Boulevard
12. I-80 WB North of Sierra College Boulevard
13. I-80 WB Off Ramp at Sierra College Boulevard
14. I-80 WB On Loop Ramp at Sierra College Boulevard
15. I-80 WB On Ramp at Sierra College Boulevard
16. I-80 WB South of Sierra College Boulevard

Ramp traffic volumes were obtained from the existing intersection counts at the intersections of Rocklin Road & I-80 WB Ramps, Rocklin Road & I-80 EB Ramps, Sierra College Boulevard & I-80 EB Ramps, and Sierra College Boulevard & I-80 WB Ramps. Mainline traffic volumes were obtained from the 2014 published Caltrans data for I-80 mainline segment.

Existing Traffic Volumes

Existing traffic counts were collected by Omni-Means on multiple days at the above study intersections, during both AM and PM peak hours. Existing AM and PM peak hour turning movement counts at the Sierra College Boulevard / Rocklin Road intersection were collected in October 2015 during a typical weekday while local schools were in session. Existing AM and PM peak hour turning movement counts at the Rocklin Road and Sierra College Boulevard interchanges were collected in May 2016 during a typical weekday while local schools were in session.

AM peak hour is defined as the one-hour of peak traffic flow (which is the highest total volume count over four consecutive 15-minute count periods) counted between 7:00 AM and 9:00 AM on a typical weekday. The PM peak hour is defined as the one-hour of peak traffic flow counted between 4:00 PM and 6:00 PM on a typical weekday.

Existing AM and PM peak hour traffic volumes at the study intersections identified above are attached in the Appendix.

Alternative Transportation Modes

Transit Services

City of Rocklin is served by Placer County Transit Agency (PCTA) for the regional and interregional transportation.

Lincoln Sierra College Route: It is a bus service that serves from Lincoln on 3rd & F street to Sierra College in Rocklin, six days a week. The bus stop near the project is in Sierra College on Rocklin Road. The bus schedule can be found on the Placer County Transit website.

Auburn to Light Rail Route: It is a bus service that serves from Auburn Station/Nevada Street to Light Rail Watt/I-80, six days a week. The bus stop near the project is in Sierra College on Rocklin Road. The bus schedule can be found on the Placer County Transit website.

Taylor Road Shuttle Route: It is a bus service that serves from Auburn Station/Nevada Street to Sierra College in Rocklin, six days a week. The bus stop near the project is in Sierra College on Rocklin Road. The bus schedule can be found on the Placer County Transit website.

Pedestrian Facilities

Rocklin Road currently has sidewalks along the southern portion of the roadway from Sierra College Boulevard east to the Rocklin City Limits and sidewalks along both portions of the roadway west of Sierra College Boulevard. Sierra College currently has sidewalks along the western portion of the roadway from Rocklin Road south to the Rocklin City Limits and sidewalks intermittently on the eastern portion of the roadway from the project site south to the Rocklin City Limits. Water Lily Lane, south of the proposed project site, has sidewalks along both portions of the roadway until the terminus.

Bicycle Facilities

The *Placer County Transportation Planning Agency* is the lead agency to coordinate planning efforts of local jurisdictions in providing a safe and efficient regional system of bicycle routes for commuter, school, and recreational use. Within the City of Rocklin, the study identifies existing bike facilities with classifications from the California Streets and Highways Code as follows:

(a) Bike paths or shared use paths, also referred to as "Class I bikeways," which provide a completely separated right-of-way designated for the exclusive use of bicycles and pedestrians with cross-flows by motorists minimized.

(b) Bike lanes, also referred to as "Class II bikeways," which provide a restricted right-of-way designated for the exclusive or semi-exclusive use of bicycles with through travel by motor vehicles or pedestrians prohibited, but with vehicle parking and cross-flows by pedestrians and motorists permitted.

(c) Bike routes, also referred to as "Class III bikeways," which provide a right-of-way on street or off-street, designated by signs or permanent markings and shared with pedestrians and motorists.

(d) Cycle tracks or separated bikeways, also referred to as "Class IV bikeways," which promote active transportation and provide a right-of-way designated exclusively for bicycle travel adjacent to a roadway and which are separated from vehicular traffic. Types of separation include, but are not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

In the vicinity of the project, a Class II bike lane currently exists along Sierra College Boulevard and Rocklin Road.

Level of Service Methodologies and Guidelines

General LOS Methodologies

Intersection and ramp LOS have been calculated for all control types using the methods documented in the Transportation Research Board publication *Highway Capacity Manual 2010*. LOS determinations are presented on a letter grade scale from "A" to "F", whereby LOS "A" represents "free-flow" conditions and LOS "F" represents over capacity conditions.

Mainline and Ramp LOS Methodologies

Mainline and ramp LOS is calculated using HCS 2010 software by McTrans. LOS has been calculated on a density basis in passenger cars per mile per lane (pc/mi/ln). Table 1 presents the LOS threshold for mainline and ramp segments in the study area.

**TABLE 1
LEVEL OF SERVICE (LOS) CRITERIA FOR MAINLINE SEGMENTS**

BASIC FREEWAY SEGMENTS		RAMP MERGE AND DIVERGE AREAS	
LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
A	0 - 11	A	<=10
B	> 11 - 18	B	> 10 - 20
C	> 18 - 26	C	> 20 - 28
D	> 26 - 35	D	> 28 - 35
E	>35 - 45	E	> 35
F	> 45	F	Demand exceeds capacity

Intersection LOS Methodologies

Intersection LOS has been calculated for all City of Rocklin signalized study intersections using Circular 212 Planning methodology. LOS at signalized ramp terminals at Rocklin Road and Sierra College Boulevard have been calculated using methods documented in the Transportation Research Board (TRB) Publication *Highway Capacity Manual (HCM), Fifth Edition, 2010*. LOS at all unsignalized intersections has been determined using HCM 2010 methodology. For two-way stop-controlled (TWSC) intersections, the "worst-case" movement delays and LOS is reported, computed based on HCM 2010.

Table 2 presents the LOS definitions for different types of intersection controls.

**TABLE 2
LOS CRITERIA FOR INTERSECTIONS**

Level of Service	Type of Flow	Delay	Maneuverability	Stopped Delay/Vehicle (sec)	
				Signalized/ Roundabouts	Unsignalized/ All-Way Stop
A	Stable Flow	Very slight delay. Progression is very favorable, with most vehicles arriving during the green phase not stopping at all.	Turning movements are easily made, and nearly all drivers find freedom of operation.	≤ 10.0	≤ 10.0
B	Stable Flow	Good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	>10 and ≤ 20.0	>10 and ≤ 15.0
C	Stable Flow	Higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.	Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted	>20 and ≤ 35.0	>15 and ≤ 25.0
D	Approaching Unstable Flow	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	Maneuverability is severely limited during short periods due to temporary back-ups.	>35 and ≤ 55.0	>25 and ≤ 35.0
E	Unstable Flow	Generally considered to be the limit of acceptable delay. Indicative of poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.	There are typically long queues of vehicles waiting upstream of the intersection.	>55 and ≤ 80.0	>35 and ≤ 50.0
F	Forced Flow	Generally considered to be unacceptable to most drivers. Often occurs with over saturation. May also occur at high volume-to-capacity ratios. There are many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors.	Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions.	> 80.0	> 50.0

References: 2010 Highway Capacity Manual

City of Rocklin LOS Guidelines

The City of Rocklin General Plan (October 2012) Circulation Element quotes the following:

C-10 A. Maintain a minimum traffic Level of Service “C” for all signalized intersections during the p.m. peak hour on an average weekday, except in the circumstances described in C-10. B and C. below.

B. Recognizing that some signalized intersections within the City serve and are impacted by development located in adjacent jurisdictions, and that these impacts are outside the control of the City, a development project which is determined to result in a Level of Service worse than “C” may be approved, if the approving body finds (1) the diminished level of service is an interim situation which will be alleviated by the implementation of planned improvements or (2) based on the specific circumstances described in Section C below, there are no feasible street improvements that will improve the Level of Service to “C” or better as set forward in the Action Plan for the Circulation Element.

C. All development in another jurisdiction outside of Rocklin’s control which creates traffic impacts in Rocklin should be required to construct all mitigation necessary in order to maintain a LOS C in Rocklin unless the mitigation is determined to be infeasible by the Rocklin City Council. The standard for determining the feasibility of the mitigation would be whether or not the improvements create unusual economic, legal, social, technological, physical, or other similar burdens and considerations.

Caltrans LOS Guidelines

Intersection Analysis

The Caltrans published Guide for the Preparation of Traffic Impact Studies (dated December 2002) states the following:

“Caltrans endeavors to maintain a target LOS at the transition between LOS “C” and LOS “D” on State highway facilities, however, Caltrans acknowledges that this may not be always feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS.”

Mainline and Ramp Analysis

The analysis evaluation criteria will be used to determine acceptable traffic operating conditions. According to the Interstate 80 and Capital City Freeway Corridor System Management Plan, Caltrans District 3, May 2009, Caltrans has identified level of service (LOS) F as the route concept LOS for I-80 within the study area. However, LOS E conditions are desired when feasible.

Target LOS Threshold

Consistent with the agencies’ policies, this study will consider LOS “C” as the standard acceptable threshold for all intersections in the jurisdiction of the City of Rocklin, LOS “C” as the standard acceptable threshold for all intersections in the jurisdiction of Caltrans, and LOS “E” for all mainline and ramp analysis.

Table 3 presents the intersection, jurisdiction, and LOS threshold for each of the study intersection.

**TABLE 3
INTERSECTION LOS THRESHOLD AND JURISDICTION**

#	Intersection	Jurisdiction	LOS
1	Sierra College Boulevard/Rocklin Road	City of Rocklin	C
2	Sierra College Boulevard/Water Lily Lane - Cobblecreek Circle	City of Rocklin	C
3	Rocklin Road/Rocklin Manor Drive (west entrance)	City of Rocklin	C
4	Rocklin Road/I-80 WB Ramps	Caltrans	C
5	Rocklin Road/I-80 EB Ramps	Caltrans	C
6	Sierra College Boulevard/I-80 EB Ramps	Caltrans	C
7	Sierra College Boulevard/I-80 WB Ramps	Caltrans	C

Standards of Significance

To measure whether transportation facilities operate acceptably, or are significantly impacted by the addition of project generated traffic, standards of significance policies were established for this study. Standards of significance policies establish level of service thresholds for acceptable/tolerable operations of transportation facilities, as well as the policies regarding what triggers a significant project impact.

Significant Impact

The project is considered to have a significant impact if any of the following criteria from Circular 212 Planning or HCM 2010 methodologies are met:

- Cause intersection operations to deteriorate to levels below the LOS C threshold (based on General Plan Policy C-10). If an intersection already operates below the LOS standard, an impact is considered significant if the proposed project would cause intersection operations to deteriorate by volume-to-capacity increases of at least 0.05, or average delay increases of at least 5 seconds for highway ramp intersections or unsignalized intersections

Technical Analysis Parameters

The *Traffix 8.0 R1* (Dowling Associates), *Synchro Version 9* (Trafficware) and *Sim-Traffic* software programs were used to quantify traffic operations throughout the network of study intersections. Peak hour factors (PHF) and heavy vehicle percentages (HV%) were obtained from the existing turning movement counts taken at the study intersections. Signal timings for the interchange intersections were provided by City. The PHF for freeway mainline segments is 0.92, and the HV% is 9% based on AADT data from Caltrans.

Table 4 presents the technical analysis parameters used for this study.

**TABLE 4
TECHNICAL ANALYSIS PARAMETERS**

1	Analysis Period - 15 Minutes
2	Peak Hour Factor (PHF)- from counts for Existing conditions, 0.92 or higher for Year 2035 conditions. PHF greater than 0.92 due to Existing counts showing PHF higher.
3	% Trucks: weekday peak hour analysis - from counts
4	Cycle Length - 80 sec min, 150 sec max (optimize signal timing)
5	Coordinated Cycle Length - obtained from City and Caltrans (optimize signal timing for Year 2035 conditions)
6	Total Lost Time Per Signal Phase - 4 seconds (24 sec max for 8-phase signal)
7	Pedestrian Speed - 3.5 ft/s and 10 mph for bicycles

Existing Conditions

Existing conditions analysis establishes the baseline traffic conditions. Existing conditions is the analysis scenario in which current operations is quantified at the study intersections.

Intersection Operations

For the Existing conditions analysis, no project-generated trips are added to the existing volumes at study intersection locations. This scenario analyzes the existing transportation setting at the study locations that have been previously identified under the existing roadway geometry, and quantifies the operations of study intersections based on delay, volume/capacity ratio (V/C) and LOS as defined in the Level of Service Methodologies and Policies section.

Existing traffic operations have been quantified for the weekday AM and PM peak hour on the existing transportation system. Table 5 presents the results of the intersection LOS analysis, for both the AM peak hour and PM peak hour.

**TABLE 5
EXISTING INTERSECTION LEVEL OF SERVICE**

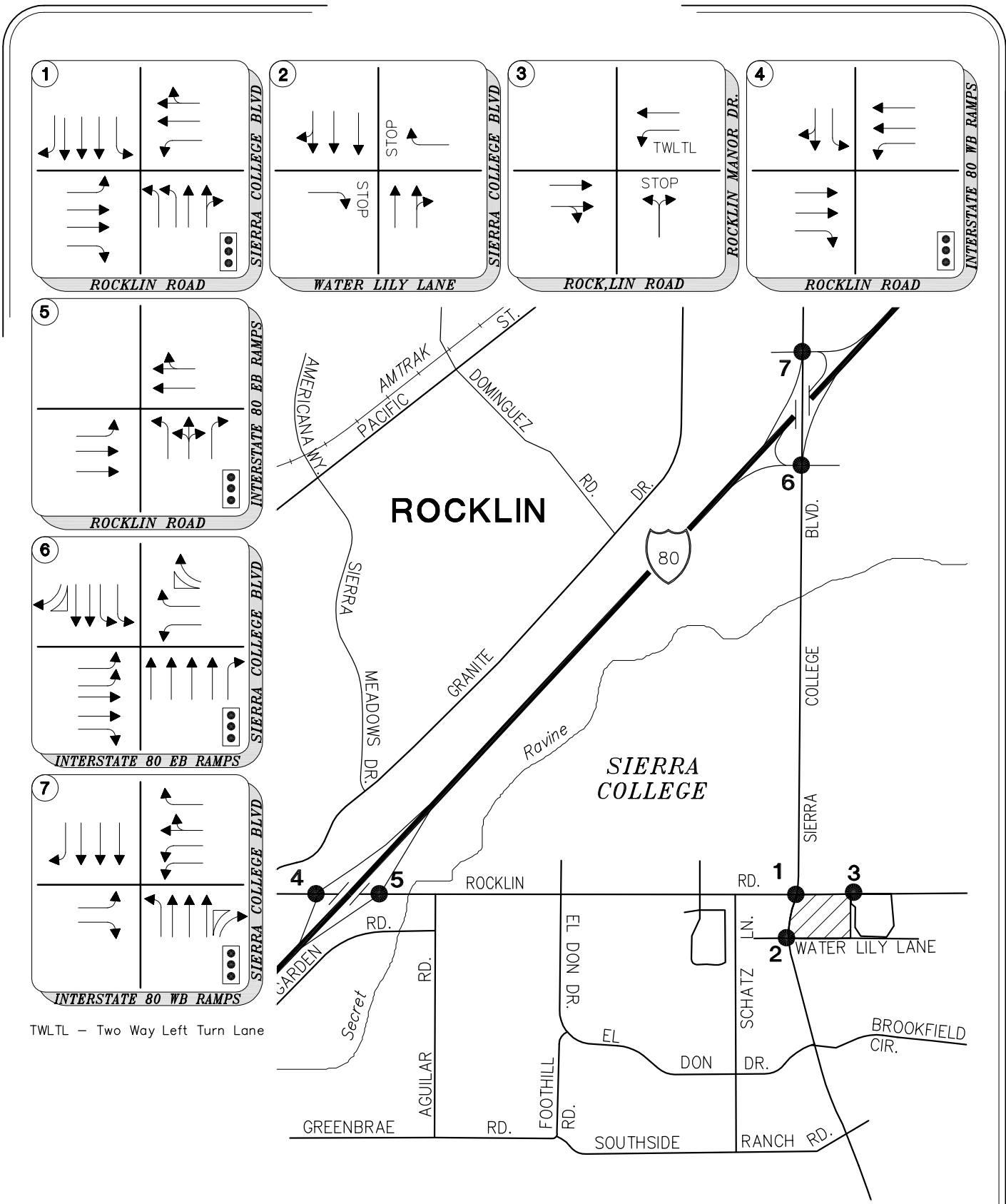
#	Intersection	Control Type ^{1,2}	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay or V/C	LOS	Impact?	Delay or V/C	LOS	Impact?
1	Sierra College Blvd/Rocklin Road	Signal	C	0.64	B	-	0.78	C	-
2	Sierra College Blvd/Water Lily Ln-Cobblecreek Circle	TWSC	C	14.0	B	-	14.3	B	-
3	Rocklin Road/Rocklin Manor Drive (West)	TWSC	C	13.3	B	-	12.9	B	-
4	Rocklin Road & I-80 WB Ramps	Signal	C	16.6	B	-	37.9	D	-
5	Rocklin Road & I-80 EB Ramps	Signal	C	26.9	C	-	39.9	D	-
6	Sierra College Blvd & I-80 EB Ramps	Signal	C	18.8	B	-	29.2	C	-
7	Sierra College Blvd & I-80 WB Ramps	Signal	C	22.7	C	-	27.3	C	-

Notes:

1. Delay based on worst minor street approach for TWSC intersections, average of all approaches for Signal
2. Unsignalized and Sierra College interchange intersections analyzed using HCM methodologies instead of Circular 212. Rocklin Road interchange intersections analyzed using Sim-Traffic.
3. **Bold** text indicates exceedance of LOS standard.

As shown in Table 5, the intersections of Rocklin Road/I-80 EB Ramps and Rocklin Road/I-80 WB Ramps currently operate at an unacceptable LOS in the PM peak hour. All other study intersections currently operate at acceptable LOS in both peak hours.

Figure 2 presents the Existing intersection turning lane geometrics and traffic control for all study intersections.



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Figure 2

Existing Lane Geometrics and Control



Ramp Operations

Table 6 presents a summary of the *Existing* ramp merge, ramp diverge and freeway mainline operations.

**TABLE 6
EXISTING RAMP AND MAINLINE LEVEL OF SERVICE**

Interchange Location	Target LOS	Segment Type	No. of Lanes	AM Peak Hour			PM Peak Hour		
				Volume	Density (pc/mi/ln)	LOS	Volume	Density (pc/mi/ln)	LOS
I-80 at Rocklin Road									
I-80 EB South of Rocklin Road	E	Freeway	3	4,013	23.4	C	5,027	31.0	D
I-80 EB Off Ramp	E	Diverge	1	1,432	23.0	C	1,028	28.1	D
I-80 EB On Ramp	E	Merge	1	211	18.3	B	260	26.0	C
I-80 WB Off Ramp	E	Diverge	1	282	28.6	D	340	25.7	C
I-80 WB On Ramp	E	Merge	1	776	26.7	C	1,170	25.9	C
I-80 WB South of Rocklin Road	E	Freeway	3	4,503	26.8	D	4,266	25.1	C
I-80 at Sierra College Boulevard									
I-80 EB South of Sierra College Boulevard	E	Freeway	3	2,792	16.3	B	4,259	25.1	C
I-80 EB Off Ramp	E	Diverge	1	539	22.5	C	575	30.4	D
I-80 EB On Ramp (Loop)	E	Merge	1	183	14.0	B	343	22.7	C
I-80 EB On Ramp	E	Merge	1	403	17.4	B	748	28.3	D
I-80 EB North of Sierra College Boulevard	E	Freeway	3	2,839	16.5	B	4,775	28.9	D
I-80 WB North of Sierra College Boulevard	E	Freeway	3	4,456	26.4	D	3,544	20.6	C
I-80 WB Off Ramp	E	Diverge	1	879	27.7	C	724	22.5	C
I-80 WB On Ramp (Loop)	E	Merge	1	111	21.0	C	234	17.8	B
I-80 WB On Ramp	E	Merge	1	321	23.5	C	382	20.2	C
I-80 WB South of Sierra College Boulevard	E	Freeway	3	4,009	23.4	C	3,436	20.0	C

As presented in Table 6, all mainline segments and ramps are currently operating at acceptable LOS.

Historical Collision Data

Historical collision data, as reported by Rocklin Police Department and other agencies, for a five year interval (January 2010 to December 2014) was obtained from the Statewide Integrated Traffic Records System (SWITRS). Table 7 provides the summary of the type of collision that occurred during the time period at the study intersections.

**TABLE 7
HISTORICAL COLLISION DATA AT STUDY INTERSECTIONS**

#	Intersection	Fatal	Injury (Severe)	Injury (Other Visible)	Injury (Complaint of Pain)	Property Damage Only
1	Sierra College Blvd/Rocklin Road	0	0	1	8	9
2	Sierra College Blvd/Water Lily Ln	0	0	0	0	0
3	Rocklin Road/Rocklin Manor Drive (West)	0	0	0	0	0
<i>Total</i>		<i>0</i>	<i>0</i>	<i>1</i>	<i>8</i>	<i>9</i>

As shown in Table 7, there were a total of 1 injury accident with other visible injuries, 8 injury accidents with complaint of pain, and 9 property damage only accidents. This would equate to less than 4 vehicle accidents per year. No accidents were recorded at the intersections of Sierra

College Blvd/Water Lily Lane and Rocklin Road/Rocklin Manor Drive (West) where the project is projected to have access to and from the project site.

Project Description

The proposed project is located within the +/- 9.83 acre parcel immediately southeast of the intersection of Rocklin Road/Sierra College Boulevard. Based on a review of the submitted site plan, the project is anticipated to construct an apartment complex with approximately 195 dwelling units. Access to the proposed project would be provided via two driveways. One driveway would be existing driveway (Rocklin Manor Drive) used by the residential development on the east along Rocklin Road. The second driveway will be on Water Lily Lane along Sierra College Boulevard. Within this report, the following two access scenarios are analyzed:

- Access on Water Lily Lane along Sierra College Boulevard will function as an emergency access only
- With outbound access from Water Lily Lane

Roadway Improvement

The project is responsible for creating a northbound right turn pocket on Sierra College Boulevard to Rocklin Road.

Project Trip Generation

Trip generation was developed using the Institute of Transportation Engineers *Trip Generation Manual 9th Edition*. Table 8 provides a summary of the land use, quantities, ITE land use code, and trip generation rates for AM and PM peak hours for the proposed project.

**TABLE 8
PROJECT TRIP GENERATION**

Land Use Category (ITE Code)	Unit ¹	Daily Trip Rate/Unit ²	AM Peak Hour Trip Rate/Unit			PM Peak Hour Trip Rate/Unit		
			Total	In %	Out %	Total	In %	Out %
Apartment (220)	DU	6.69	0.51	20%	80%	0.64	65%	35%
Project Name	Quantity (Units)	Daily Trips	AM Peak Hour Trips			PM Peak Hour Trips		
Rocklin Apartments	195	1,305	Total	In	Out	Total	In	Out
			99	20	79	125	81	44
Net New Project Trips		1,305	99	20	79	125	81	44

Notes:

1. 1 ksf = 1,000 square feet DU = dwelling unit

2. Trip rates based on ITE Trip Generation Manual 9th edition average rates when equations are not mentioned

As presented in Table 8, the proposed project is estimated to generate an additional 1,305 daily trips, 99 AM peak hour, and 125 PM peak hour trips. Of the 99 AM peak hour trips, 20 trips will be inbound and 79 trips will be outbound. Of the 125 PM peak hour, 81 trips will be inbound and 44 trips will be outbound.

Project Trip Distribution and Assignment

Trip distribution patterns from the project were estimated based on the knowledge of the existing traffic flow patterns, geographical location of the project site, area demographics, and locations of other similar destinations, etc.

Figure 3 presents the projected directional trip distribution patterns for the proposed project generated trips.

Existing Plus Project

The *Existing Plus Project* condition is the analysis scenario in which traffic impacts associated with the proposed project are investigated in comparison to the *Existing* condition.

Intersection Operations

The *Existing Plus Project* condition was simulated by superimposing traffic generated by the proposed project onto *Existing* intersection volumes. This condition assumes access on Water Lily Lane along Sierra College Boulevard will function as an emergency access only. The resulting *Existing Plus Project* intersection traffic volumes are included in the Appendix. Table 9 presents a summary of the *Existing Plus Project* peak hour intersection LOS.

**TABLE 9
EXISTING PLUS PROJECT INTERSECTION LEVEL OF SERVICE**

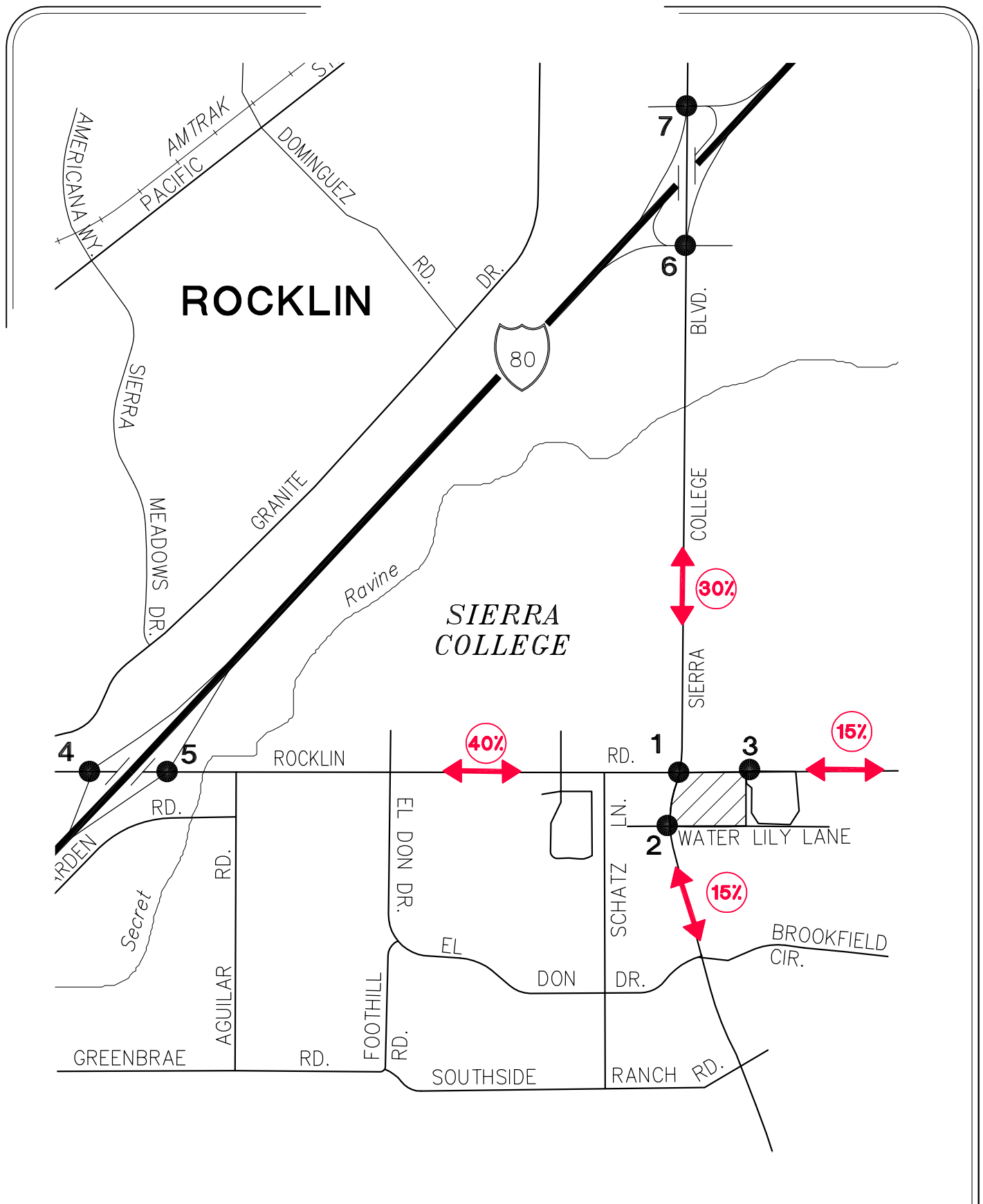
#	Intersection	Control Type ^{1,2}	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay or V/C	LOS	Impact?	Delay or V/C	LOS	Impact?
1	Sierra College Blvd/Rocklin Road	Signal	C	0.65	B	-	0.78	C	-
2	Sierra College Blvd/Water Lily Ln-Cobblecreek Circle	TWSC	C	14.2	B	-	14.4	B	-
3	Rocklin Road/Rocklin Manor Drive (West)	TWSC	C	16.8	C	-	14.9	B	-
4	Rocklin Road & I-80 WB Ramps	Signal	C	17.4	B	-	40.1	D	No
5	Rocklin Road & I-80 EB Ramps	Signal	C	27.2	C	-	40.8	D	No
6	Sierra College Blvd & I-80 EB Ramps	Signal	C	20.1	C	-	31.5	C	-
7	Sierra College Blvd & I-80 WB Ramps	Signal	C	22.7	C	-	28.7	C	-

Notes:

1. Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC & Signal
2. Unsignalized and Sierra College interchange intersections analyzed using HCM methodologies instead of Circular 212. Rocklin Road interchange intersections analyzed using Sim-Traffic.
3. **Bold text** indicates exceedance of LOS standard.

As presented in Table 9, the intersections of Rocklin Road/I-80 EB Ramps and Rocklin Road/I-80 WB Ramps are projected to operate at unacceptable LOS in the PM peak hour.

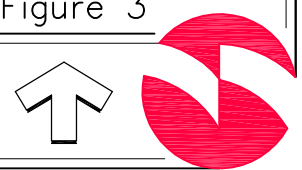
The proposed project does not create a significant impact at the Rocklin Road/I-80 EB Ramps and Rocklin Road/I-80 WB Ramps as the increase in delay due to the project is less than 5 seconds at a signalized intersection that operates at unacceptable LOS in the “no project” condition. All other study intersections are projected to operate at acceptable LOS in both peak hours.



Sierra Gateway Apartments Traffic Impact Study

Figure 3

Project Trip Distribution



Ramp Operations

Table 10 provides a summary of the *Existing Plus Project* ramp merge, ramp diverge and freeway mainline operations.

**TABLE 10
EXISTING PLUS PROJECT RAMP AND MAINLINE LEVEL OF SERVICE**

Interchange Location	Target LOS	Segment Type	No. of Lanes	AM Peak Hour			PM Peak Hour		
				Volume	Density (pc/mi/ln)	LOS	Volume	Density (pc/mi/ln)	LOS
I-80 at Rocklin Road									
I-80 EB South of Rocklin Road	E	Freeway	3	4,017	23.5	C	5,041	31.1	D
I-80 EB Off Ramp	E	Diverge	1	1,435	23.0	C	1,040	28.2	D
I-80 EB On Ramp	E	Merge	1	213	18.3	B	261	26.1	C
I-80 WB Off Ramp	E	Diverge	1	283	28.6	D	342	25.7	C
I-80 WB On Ramp	E	Merge	1	789	26.8	C	1,177	26.0	C
I-80 WB South of Rocklin Road	E	Freeway	3	4,518	26.9	D	4,274	25.2	C
I-80 at Sierra College Boulevard									
I-80 EB South of Sierra College Boulevard	E	Freeway	3	2,795	16.3	B	4,262	25.1	C
I-80 EB Off Ramp	E	Diverge	1	540	22.6	C	577	30.4	D
I-80 EB On Ramp (Loop)	E	Merge	1	183	14.0	B	343	22.7	C
I-80 EB On Ramp	E	Merge	1	414	17.5	B	754	28.3	D
I-80 EB North of Sierra College Boulevard	E	Freeway	3	2,852	16.6	B	4,782	28.9	D
I-80 WB North of Sierra College Boulevard	E	Freeway	3	4,460	26.5	D	3,557	20.7	C
I-80 WB Off Ramp	E	Diverge	1	882	27.5	C	735	22.6	C
I-80 WB On Ramp (Loop)	E	Merge	1	113	20.9	C	235	17.9	B
I-80 WB On Ramp	E	Merge	1	321	23.2	C	382	20.3	C
I-80 WB South of Sierra College Boulevard	E	Freeway	3	4,012	23.4	C	3,439	20.0	C

As presented in Table 10, all mainline segments and ramps are projected to operate at acceptable LOS under *Existing Plus Project* conditions.

Existing Plus Project with Outbound Access from Water Lily Lane

The *Existing Plus Project with Outbound Access from Water Lily Lane* condition is the analysis scenario in which traffic impacts associated with the proposed project are investigated in comparison to the *Existing* condition.

Intersection Operations

The *Existing Plus Project with Outbound Access from Water Lily Lane* condition was simulated by superimposing traffic generated by the proposed project onto *Existing* intersection volumes. This condition assumes outbound access from the project site to Water Lily Lane. The 15% outbound project traffic headed on eastbound Rocklin Road is not expected to use Water Lily Lane access due to the circuitous nature of the trip (head west on Water Lily Lane to northbound Sierra College Boulevard then eastbound Rocklin Road). The outbound trips on Water Lily Lane account for approximately 42% of the remaining 85% of outbound project traffic. This translates to 28 AM and 15 PM peak hour outbound project trips on Water Lily Lane.

The resulting *Existing Plus Project with Outbound Access from Water Lily Lane* traffic volumes are included in the Appendix. Table 11 provides a summary of the *Existing Plus Project with Outbound Access from Water Lily Lane* peak hour intersection LOS.

**TABLE 11
EXISTING PLUS PROJECT WITH OUTBOUND ACCESS FROM WATER LILY LANE**

#	Intersection	Control Type ^{1,2}	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay or V/C	LOS	Impact?	Delay or V/C	LOS	Impact?
1	Sierra College Blvd/Rocklin Road	Signal	C	0.66	B	-	0.78	C	-
2	Sierra College Blvd/Water Lily Ln-Cobblecreek Circle	TWSC	C	14.9	B	-	14.8	B	-
3	Rocklin Road/Rocklin Manor Drive (West)	TWSC	C	15.9	C	-	14.2	B	-
4	Rocklin Road & I-80 WB Ramps	Signal	C	17.4	B	-	40.1	D	No
5	Rocklin Road & I-80 EB Ramps	Signal	C	27.2	C	-	40.8	D	No
6	Sierra College Blvd & I-80 EB Ramps	Signal	C	20.1	C	-	31.5	C	-
7	Sierra College Blvd & I-80 WB Ramps	Signal	C	22.7	C	-	28.7	C	-

Notes:

1. Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC & Signal
2. Unsignalized and Sierra College interchange intersections analyzed using HCM methodologies instead of Circular 212. Rocklin Road interchange intersections analyzed using Sim-Traffic.
3. **Bold** text indicates exceedance of LOS standard.

As presented in Table 11, the intersections of Rocklin Road/I-80 EB Ramps and Rocklin Road/I-80 WB Ramps are projected to operate at unacceptable LOS in the PM peak hour.

The proposed project does not create a significant impact at the Rocklin Road/I-80 EB Ramps and Rocklin Road/I-80 WB Ramps as the increase in delay due to the project is less than 5 seconds at a signalized intersection that operates at unacceptable LOS in the “no project” condition. All other study intersections are projected to operate at acceptable LOS in both peak hours.

Short Term Conditions

The *Short Term* condition is the analysis scenario in which project trips generated by approved-pending development and imminent roadway and intersection improvements are accounted for in the LOS quantifications. No roadway or intersection improvements have been assumed for the *Short Term No Project* condition. The project’s obligation to create a right turn pocket from northbound Sierra College Boulevard to eastbound Rocklin Road is the only roadway and intersection improvement assumed in the *Short Term Plus Project* condition.

Approved/Pending Projects

The City of Rocklin has provided a list of projects within the vicinity of the proposed project that have been “approved” for construction. Vehicle trips for the approved project list were calculated based on appropriate trip generation rates from the *ITE Trip General Manual (9th Edition)*. Table 12 provides the approved-pending project list, quantities, ITE land use code, and trip generation rates for AM and PM peak hours.

**TABLE 12
APPROVED-PENDING PROJECT TRIPS**

Land Use Category (ITE Code)	Unit ¹	Daily Trip Rate/Unit ²	AM Peak Hour Trip Rate/Unit			PM Peak Hour Trip Rate/Unit		
			Total	In %	Out %	Total	In %	Out %
Single Family Detached Housing (210)	DU	9.52	0.75	25%	75%	1.00	63%	27%
Shopping Center (820)	KSF	42.70	0.96	62%	38%	3.71	48%	52%
Project Name ³	Quantity (Units)	Daily Trips	AM Peak Hour Trips			PM Peak Hour Trips		
Croftwood Unit 1 (210)	156	1,581	119	30	89	141	89	52
Rocklin 60 Residential (210)	179	1,794	135	34	101	162	102	60
Rocklin Meadows (210)	27	315	29	8	21	27	17	10
Granite Bluff (210)	78	836	64	17	47	78	49	29
Rocklin Commons (820) ⁴	252	12,380	274	170	104	1,113	535	578
Rocklin Crossings (820) ⁴	322	14,508	318	198	120	1,310	629	681
Center at Secret Ravine (820)	24	2,657	65	41	24	228	110	118
Net New Project Trips		34,071	1,003	498	505	3,058	1,531	1,527

Notes:

1. 1 KSF = 1,000 square feet DU = dwelling unit

2. Trip rates based on ITE Trip Generation Manual 9th edition average rates when equations are not mentioned

It should be noted that the trips assumed in the Approved Plus Pending Project Trips table are conservative given that some of the projects in the table are now partly occupied (Croftwood Unit 1, Center at Secret Ravine, Rocklin Commons, and Rocklin Crossings) and the recent traffic counts will have picked up these trips.

Approved/Pending Projects Trip Assignment and Distribution

The following generalized trip distribution patterns assumed for the approved projects has been estimated based upon existing traffic flow patterns, geographical location of the project site and area demographics, etc.

- 40% trips using I-80 South west of Sierra College Blvd interchange
- 10% trips using I-80 North east of Sierra College Blvd interchange
- 20% trips using Sierra College Blvd north of I-80 interchange
- 6% trips using Sierra College Blvd south of Rocklin Road
- 10% trips using Rocklin Road west of Sierra College Blvd
- 4% trips using Rocklin Road east of Sierra College Blvd
- 3% trips using Granite Drive west of Sierra College Blvd
- 6% trips circulating internally between approved projects

Short Term No Project Intersection Operation

The *Short Term No Project* condition was simulated by superimposing new trips generated by the approved/pending projects over *Existing* base traffic volumes at the study intersections. The resulting *Short Term No Project* peak hour intersection traffic volumes are provided in the appendix. *Short Term No Project* intersection operations were quantified utilizing lane geometries and controls for the *Short Term* condition (same as *Existing* condition). Table 13 provides a summary of the *Short Term No Project* peak hour intersection LOS.

**TABLE 13
SHORT TERM NO PROJECT INTERSECTION LEVEL OF SERVICE**

#	Intersection	Control Type ^{1,2}	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay or V/C	LOS	Impact?	Delay or V/C	LOS	Impact?
1	Sierra College Blvd/Rocklin Road	Signal	C	0.69	B	-	0.89	D	-
2	Sierra College Blvd/Water Lily Ln-Cobblecreek Circle	TWSC	C	14.7	B	-	15.9	C	-
3	Rocklin Road/Rocklin Manor Drive (West)	TWSC	C	15.6	C	-	14.6	B	-
4	Rocklin Road & I-80 WB Ramps	Signal	C	18.1	B	-	42.7	D	-
5	Rocklin Road & I-80 EB Ramps	Signal	C	27.2	C	-	65.6	E	-
6	Sierra College Blvd & I-80 EB Ramps	Signal	C	21.5	C	-	34.2	C	-
7	Sierra College Blvd & I-80 WB Ramps	Signal	C	25.1	C	-	31.4	C	-

Notes:

1. Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC & Signal
2. Unsignalized and Sierra College interchange intersections analyzed using HCM methodologies instead of Circular 212. Rocklin Road interchange intersections analyzed using Sim-Traffic.
3. **Bold text indicates exceedance of LOS standard.**

As shown in Table 13, the intersections of Sierra College Boulevard/Rocklin Road, Rocklin Road/I-80 WB Ramps, and Rocklin Road/I-80 EB Ramps are projected to operate at unacceptable LOS in the PM peak hour. All other study intersections are projected to operate at acceptable LOS in both peak hours.

Short Term No Project Ramp Operations

Table 14 provides a summary of the *Short Term No Project* ramp merge, ramp diverge and freeway mainline operations.

**TABLE 14
SHORT TERM NO PROJECT RAMP AND MAINLINE LEVEL OF SERVICE**

Interchange Location	Target LOS	Segment Type	No. of Lanes	AM Peak Hour			PM Peak Hour		
				Volume	Density (pc/mi/ln)	LOS	Volume	Density (pc/mi/ln)	LOS
I-80 at Rocklin Road									
I-80 EB South of Rocklin Road	E	Freeway	3	4,161	24.4	C	5,005	30.8	D
I-80 EB Off Ramp	E	Diverge	1	1,498	23.9	C	1,082	28.1	D
I-80 EB On Ramp	E	Merge	1	221	18.8	B	282	25.8	C
I-80 WB Off Ramp	E	Diverge	1	291	28.8	D	363	26.1	C
I-80 WB On Ramp	E	Merge	1	830	27.2	C	1,203	26.4	C
I-80 WB South of Rocklin Road	E	Freeway	3	4,585	27.4	D	4,344	25.6	C
I-80 at Sierra College Boulevard									
I-80 EB South of Sierra College Boulevard	E	Freeway	3	2,884	16.8	B	4,205	24.7	C
I-80 EB Off Ramp	E	Diverge	1	680	23.4	C	615	30.2	D
I-80 EB On Ramp (Loop)	E	Merge	1	185	13.7	B	345	22.2	C
I-80 EB On Ramp	E	Merge	1	450	17.5	B	840	28.5	D
I-80 EB North of Sierra College Boulevard	E	Freeway	3	2,839	16.5	B	4,775	28.9	D
I-80 WB North of Sierra College Boulevard	E	Freeway	3	4,456	26.4	D	3,544	20.6	C
I-80 WB Off Ramp	E	Diverge	1	900	27.7	C	745	22.5	C
I-80 WB On Ramp (Loop)	E	Merge	1	150	21.2	C	295	18.2	B
I-80 WB On Ramp	E	Merge	1	340	23.7	C	410	20.7	C
I-80 WB South of Sierra College Boulevard	E	Freeway	3	4,046	23.7	C	3,504	20.4	C

As shown in Table 14, all mainline segments and ramps are projected to operate at acceptable LOS under the *Short Term No Project* conditions.

Short Term Plus Project Conditions

The *Short Term Plus Project* condition is the analysis scenario in which traffic impacts associated with the proposed project are investigated in comparison to the *Short Term No Project* condition. With construction of the project, a northbound right turn pocket is analyzed as a project improvement at the intersection of Sierra College Boulevard/Rocklin Road.

Intersection Operations

Short Term Plus Project AM and PM intersection traffic operations were quantified by superimposing traffic generated by the proposed project onto *Short Term No Project* conditions. Table 15 provides a summary of the *Short Term Plus Project* peak hour intersection LOS.

**TABLE 15
SHORT TERM PLUS PROJECT INTERSECTION LEVEL OF SERVICE**

#	Intersection	Control Type ^{1,2}	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay or V/C	LOS	Impact?	Delay or V/C	LOS	Impact?
1	Sierra College Blvd/Rocklin Road	Signal	C	0.71	B	-	0.89	D	No
2	Sierra College Blvd/Water Lily Ln-Cobblecreek Circle	TWSC	C	14.8	B	-	16.1	C	-
3	Rocklin Road/Rocklin Manor Drive (West)	TWSC	C	17.8	C	-	16.1	C	-
4	Rocklin Road & I-80 WB Ramps	Signal	C	18.8	B	-	43.7	D	No
5	Rocklin Road & I-80 EB Ramps	Signal	C	28.5	C	-	66.3	E	No
6	Sierra College Blvd & I-80 EB Ramps	Signal	C	23.3	C	-	34.5	C	-
7	Sierra College Blvd & I-80 WB Ramps	Signal	C	25.1	C	-	31.9	C	-

Notes:

1. Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC & Signal
2. Unsignalized and Sierra College interchange intersections analyzed using HCM methodologies instead of Circular 212. Rocklin Road interchange intersections analyzed using Sim-Traffic.
3. **Bold** text indicates exceedance of LOS standard.

As shown in Table 15, the following study intersections are projected to operate at unacceptable LOS in the PM peak hour scenario of the *Short Term Plus Project* conditions:

- Sierra College Boulevard & Rocklin Road
- Rocklin Road & I-80 WB Ramps
- Rocklin Road & I-80 EB Ramps

The proposed project does not create a significant impact at the intersection of Sierra College Boulevard/Rocklin Road as the V/C increase due to the project is less than 0.05 at a signalized intersection that operates at unacceptable LOS in the “no project” condition.

The proposed project does not create a significant impact at the intersection of Rocklin Road/I-80 WB Ramps as the increase in delay due to the project is less than 5 seconds at a signalized intersection that operates at unacceptable LOS in the “no project” condition.

The proposed project does not create a significant impact at the intersection of Rocklin Road/I-80 EB Ramps as the increase in delay due to the project is less than 5 seconds at a signalized intersection that operates at unacceptable LOS in the “no project” condition.

All other study intersections are projected to operate at acceptable LOS in both peak hours.

Ramp Operations

Table 16 provides a summary of the *Short Term Plus Project* ramp merge, ramp diverge and freeway mainline operations.

**TABLE 16
SHORT TERM PLUS PROJECT RAMP AND MAINLINE LEVEL OF SERVICE**

Interchange Location	Target LOS	Segment Type	No. of Lanes	AM Peak Hour			PM Peak Hour		
				Volume	Density (pc/mi/ln)	LOS	Volume	Density (pc/mi/ln)	LOS
I-80 at Rocklin Road									
I-80 EB South of Rocklin Road	E	Freeway	3	4,102	24.0	C	5,019	30.9	D
I-80 EB Off Ramp	E	Diverge	1	1,501	23.6	C	1,074	28.2	D
I-80 EB On Ramp	E	Merge	1	223	18.5	B	283	25.8	C
I-80 WB Off Ramp	E	Diverge	1	292	28.8	D	365	26.1	C
I-80 WB On Ramp	E	Merge	1	842	27.3	C	1,210	26.4	C
I-80 WB South of Rocklin Road	E	Freeway	3	4,599	27.5	D	4,352	25.7	C
I-80 at Sierra College Boulevard									
I-80 EB South of Sierra College Boulevard	E	Freeway	3	2,824	16.4	B	4,208	24.7	C
I-80 EB Off Ramp	E	Diverge	1	681	23.1	C	617	30.2	D
I-80 EB On Ramp (Loop)	E	Merge	1	185	13.4	B	345	22.3	C
I-80 EB On Ramp	E	Merge	1	524	17.8	B	846	28.5	D
I-80 EB North of Sierra College Boulevard	E	Freeway	3	2,852	16.6	B	4,872	29.7	D
I-80 WB North of Sierra College Boulevard	E	Freeway	3	4,460	26.5	D	3,557	20.7	C
I-80 WB Off Ramp	E	Diverge	1	903	27.7	C	756	22.6	C
I-80 WB On Ramp (Loop)	E	Merge	1	152	21.3	C	296	18.2	B
I-80 WB On Ramp	E	Merge	1	340	23.7	C	410	20.7	C
I-80 WB South of Sierra College Boulevard	E	Freeway	3	4,049	23.7	C	3,507	20.4	C

As presented in Table 16, all mainline segments and ramps are projected to operate at acceptable LOS under *Short Term Plus Project* conditions.

Short Term Plus Project with Outbound Access from Water Lily Lane Intersection

The *Short Term Plus Project with Outbound Access from Water Lily Lane* condition in which traffic impacts associated with the proposed project are investigated in comparison to the *Short Term No Project* condition. With construction of the project, a northbound right turn pocket is analyzed as a project improvement at the intersection of Sierra College Boulevard/Rocklin Road.

Intersection Operations

The *Short Term Plus Project with Outbound Access from Water Lily Lane* condition was simulated by superimposing traffic generated by the proposed project onto *Short Term No Project* intersection volumes. This scenario includes the outbound access from the project site to Water Lily Lane. The 15% outbound project traffic headed on eastbound Rocklin Road is not expected to use Water Lily Lane access due to the circuitous nature of the trip (head west on

Water Lily Lane to northbound Sierra College Boulevard then eastbound Rocklin Road). The outbound trips on Water Lily Lane account for approximately 42% of the remaining 85% of outbound project traffic. This translates to 28 AM and 15 PM peak hour outbound project trips on Water Lily Lane.

The resulting *Short Term Plus Project with Outbound Access from Water Lily Lane* traffic volumes are included in the Appendix. Table 17 provides a summary of the *Short Term Plus Project with Outbound Access from Water Lily Lane* peak hour intersection LOS.

**TABLE 17
SHORT TERM PLUS PROJECT WITH OUTBOUND ACCESS FROM WATER LILY LANE INTERSECTION LOS**

#	Intersection	Control Type ^{1,2}	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay or V/C	LOS	Impact?	Delay or V/C	LOS	Impact?
1	Sierra College Blvd/Rocklin Road	Signal	C	0.71	C	-	0.92	E	No
2	Sierra College Blvd/Water Lily Ln-Cobblecreek Circle	TWSC	C	15.6	C	-	16.7	C	-
3	Rocklin Road/Rocklin Manor Drive (West)	TWSC	C	16.9	C	-	15.3	C	-
4	Rocklin Road & I-80 WB Ramps	Signal	C	18.8	B	-	43.7	D	No
5	Rocklin Road & I-80 EB Ramps	Signal	C	28.5	C	-	66.3	E	No
6	Sierra College Blvd & I-80 EB Ramps	Signal	C	23.3	C	-	34.5	C	-
7	Sierra College Blvd & I-80 WB Ramps	Signal	C	25.1	C	-	31.9	C	-

Notes:

1. Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC & Signal
2. Unsignalized and Sierra College interchange intersections analyzed using HCM methodologies instead of Circular 212. Rocklin Road interchange intersections analyzed using Sim-Traffic.
3. **Bold** text indicates exceedance of LOS standard.

As shown in Table 17, the following study intersections are projected to operate at unacceptable level of service for the PM peak hour of the Short Term Plus Project conditions:

- Sierra College Boulevard & Rocklin Road
- Rocklin Road & I-80 WB Ramps
- Rocklin Road & I-80 EB Ramps

The proposed project does not create a significant impact at the intersection of Sierra College Boulevard/Rocklin Road as the V/C increase due to the project is less than 0.05 at a signalized intersection that operates at unacceptable LOS in the “no project” condition.

The proposed project does not create a significant impact at the intersection of Rocklin Road/I-80 WB Ramps as the increase in delay due to the project is less than 5 seconds at a signalized intersection that operates at unacceptable LOS in the “no project” condition.

The proposed project does not create a significant impact at the intersection of Rocklin Road/I-80 EB Ramps as the increase in delay due to the project is less than 5 seconds at a signalized intersection that operates at unacceptable LOS in the “no project” condition.

All other study intersections are projected to operate at acceptable LOS in both peak hours. The addition of project traffic is projected to extend the vehicle queues by one or two vehicles and is not considered to be significant at the Rocklin Road interchange intersections.

Cumulative (Year 2030) Conditions

The *Cumulative* condition is the scenario approximately 15 years in the future. For this study, the *Cumulative* condition corresponds to the build-out scenario of City of Rocklin and resulting growth in both population and traffic volumes. The build-out uses are consistent with the land uses assumed in City of Rocklin General Plan. The *Cumulative* year for analysis in this report is assumed to be the *Year 2030*.

Year 2030 No Project condition assumes that the proposed project remains undeveloped notwithstanding all other General Plan land uses being developed elsewhere. *Year 2030 Plus Project* condition in which traffic impacts associated with the proposed project are investigated in comparison to the *Year 2030 No Project* condition.

Planned/Programmed Improvements

Rocklin Road Widening

The *City of Rocklin General Plan Circulation Element (October 2012)* calls for Rocklin Road to maintain the existing two-way left turn lane from the Loomis Town limits to east of Sierra College Boulevard. The *General Plan* also states, Rocklin Road will be widened to six (6) lanes from east of Sierra College Boulevard and I-80 interchange to west of Granite Drive.

Sierra College Boulevard Widening

The *City of Rocklin General Plan Circulation Element (October 2012)* calls for Sierra College Boulevard to be widened to accommodate six lanes between Roseville City Limits and Taylor Road by 2025.

Rocklin Road/Sierra College Boulevard Intersections Modification

Based on discussions with the City and consistent with the traffic analysis performed for the *City of Rocklin General Plan EIR*, the following lane geometrics are assumed to be in place at the Rocklin Road/Sierra College Boulevard intersection under *Year 2030 No Project* and *Year 2030 Plus Project* conditions.

- Eastbound approach - One (1) free right lane
- Northbound approach - One (1) additional through lane. One additional receiving lane will also need to be added on southbound approach

Other Study Intersections Modification

All other study intersection that fall on Sierra College Boulevard will have three through lanes for northbound and southbound movements. **Figure 4** shows the lane geometrics and control for *Cumulative* and *Cumulative Plus Project* conditions.

Year 2030 No Project Traffic Volumes

Year 2030 condition was developed using the City of Rocklin Travel Demand Model which is nested within the larger Placer County Travel Demand Model. The Placer County TDM not only includes Placer County, but also the Sacramento region. Therefore, the model captures the

inter-regional travel demand and its impact within the City of Rocklin. The resulting *Year 2030 No Project* traffic volumes are presented in the Appendix.

Intersection Operations

Table 18 provides a summary of the *Year 2030 No Project* peak hour intersection LOS.

**TABLE 18
YEAR 2030 NO PROJECT INTERSECTION LEVEL OF SERVICE**

#	Intersection	Control Type ^{1,2}	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay or V/C	LOS	Impact?	Delay or V/C	LOS	Impact?
1	Sierra College Blvd/Rocklin Road	Signal	C	0.92	E	-	0.92	E	-
2	Sierra College Blvd/Water Lily Ln-Cobblecreek Circle	TWSC	C	18.6	C	-	17.4	C	-
3	Rocklin Road/Rocklin Manor Drive (West)	TWSC	C	14.1	B	-	16.5	C	-
4	Rocklin Road & I-80 WB Ramps	Signal	C	41.3	D	-	70.5	E	-
5	Rocklin Road & I-80 EB Ramps	Signal	C	66.8	E	-	102.7	F	-
6	Sierra College Blvd & I-80 EB Ramps	Signal	C	77.4	E	-	30.7	C	-
7	Sierra College Blvd & I-80 WB Ramps	Signal	C	39.4	D	-	31.7	C	-

Notes:

1. Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC & Signal
2. Unsignalized and Sierra College interchange intersections analyzed using HCM methodologies instead of Circular 212. Rocklin Road interchange intersections analyzed using Sim-Traffic.
3. **Bold** text indicates exceedance of LOS standard.

As shown in Table 18, all study intersections, except the intersections listed below, are projected to operate at or above the threshold LOS:

- Sierra College Boulevard/Rocklin Road - AM and PM peak hours
- Rocklin Road/Interstate 80 WB Ramps – AM and PM peak hours
- Rocklin Road/Interstate 80 EB Ramps - AM and PM peak hours
- Sierra College Boulevard/Interstate 80 EB Ramps - AM peak hour
- Sierra College Boulevard/Interstate 80 WB Ramps - AM peak hour

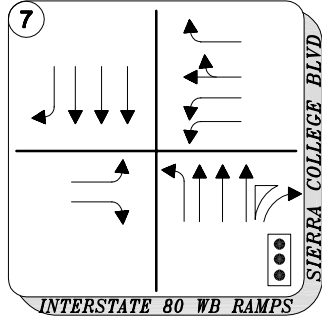
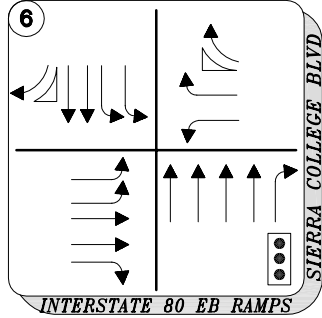
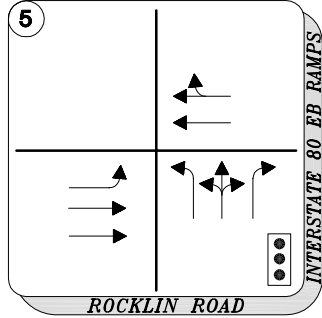
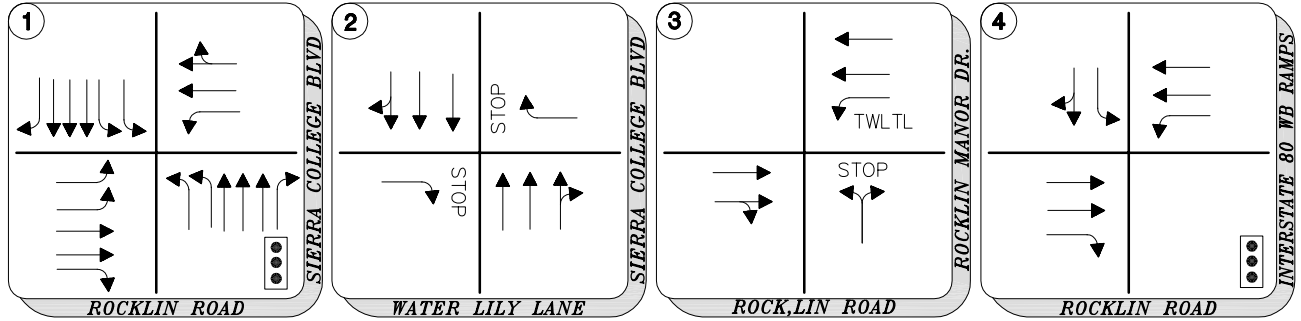
Ramp Operations

Table 19 provides a summary of the *Year 2030 No Project* ramp merge, diverge and freeway mainline operations.

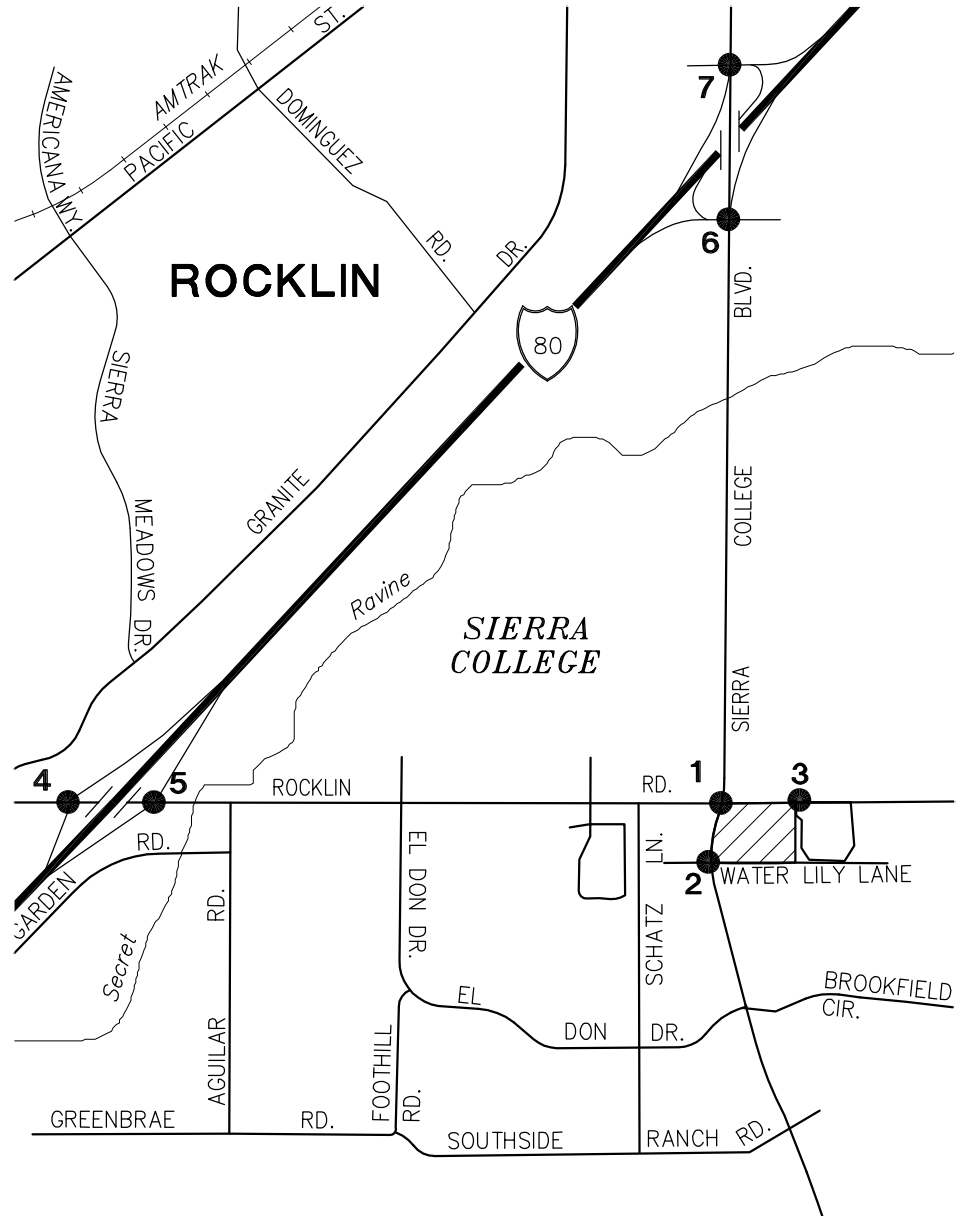
**TABLE 19
YEAR 2030 NO PROJECT RAMP AND MAINLINE LEVEL OF SERVICE**

Interchange Location	Target LOS	Segment Type	No. of Lanes	AM Peak Hour			PM Peak Hour		
				Volume	Density (pc/mi/ln)	LOS	Volume	Density (pc/mi/ln)	LOS
<i>I-80 at Rocklin Road</i>									
I-80 EB South of Rocklin Road	E	Freeway	3	5,516	35.8	E	6,033	42.4	E
I-80 EB Off Ramp	E	Diverge	1	1,810	30.6	D	1,195	31.2	D
I-80 EB On Ramp	E	Merge	1	355	25.3	C	640	33.3	D
I-80 WB Off Ramp	E	Diverge	1	635	35.8	E	535	33.1	D
I-80 WB On Ramp	E	Merge	1	970	33.8	D	1,375	33.9	D
I-80 WB South of Rocklin Road	E	Freeway	3	5,755	38.6	E	5,684	37.8	E
<i>I-80 at Sierra College Boulevard</i>									
I-80 EB South of Sierra College Boulevard	E	Freeway	3	4,061	23.8	C	5,478	35.4	E
I-80 EB Off Ramp	E	Diverge	1	1,650	32.1	D	780	36.3	E
I-80 EB On Ramp (Loop)	E	Merge	1	195	14.9	B	350	28.2	D
I-80 EB On Ramp	E	Merge	1	560	19.4	B	875	34.6	D
I-80 EB North of Sierra College Boulevard	E	Freeway	3	3,166	18.4	C	5,923	40.8	E
I-80 WB North of Sierra College Boulevard	E	Freeway	3	6,070	42.9	E	4,999	30.8	D
I-80 WB Off Ramp	E	Diverge	1	1,485	35.6	E	970	30.1	D
I-80 WB On Ramp (Loop)	E	Merge	1	150	27.3	C	305	24.8	C
I-80 WB On Ramp	E	Merge	1	685	31.6	D	510	28.0	C
I-80 WB South of Sierra College Boulevard	E	Freeway	3	5,420	34.8	D	4,844	29.4	D

As presented in Table 19, all mainline segments and ramps are projected to operate at acceptable LOS under *Year 2030 No Project* condition.



TWLTL - Two Way Left Turn Lane



Sierra Gateway Apartments Traffic Impact Study

Figure 4

Cumulative Lane Geometrics & Control



Year 2030 Plus Project

Year 2030 Plus Project condition is the analysis scenario in which traffic impacts associated with the proposed project are investigated in comparison to the Year 2030 No Project condition.

Intersection Operations

Year 2030 Plus Project condition was simulated by superimposing traffic generated by the proposed project onto Year 2030 No Project intersection volumes. This condition assumes access on Water Lily Lane along Sierra College Boulevard will function as an emergency access only. The resulting Year 2030 Plus Project intersection traffic volumes are included in the Appendix. Table 20 provides a summary of the Year 2030 Plus Project peak hour intersection LOS.

**TABLE 20
YEAR 2030 PLUS PROJECT INTERSECTION LEVEL OF SERVICE**

#	Intersection	Control Type ^{1,2}	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay or V/C	LOS	Impact?	Delay or V/C	LOS	Impact?
1	Sierra College Blvd/Rocklin Road	Signal	C	0.93	E	No	0.93	E	No
2	Sierra College Blvd/Water Lily Ln-Cobblecreek Circle	TWSC	C	18.7	C	-	17.5	C	-
3	Rocklin Road/Rocklin Manor Drive (West)	TWSC	C	16.9	C	-	19.9	C	-
4	Rocklin Road & I-80 WB Ramps	Signal	C	42.4	D	No	82.5	F	Yes
5	Rocklin Road & I-80 EB Ramps	Signal	C	71.9	E	No	115.7	F	Yes
6	Sierra College Blvd & I-80 EB Ramps	Signal	C	79.7	E	No	31.0	C	-
7	Sierra College Blvd & I-80 WB Ramps	Signal	C	39.5	D	No	32.2	C	-

Notes:

1. Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC & Signal
2. Unsignalized and Sierra College interchange intersections analyzed using HCM methodologies instead of Circular 212. Rocklin Road interchange intersections analyzed using Sim-Traffic.
3. **Bold** text indicates exceedance of LOS standard.

As shown in Table 20, all study intersections, except the intersections listed below, are projected to operate at or above the threshold LOS:

- Sierra College Boulevard/Rocklin Road - AM and PM peak hours
- Rocklin Road/Interstate 80 WB Ramps - AM and PM peak hours
- Rocklin Road/Interstate 80 EB Ramps - AM and PM peak hours
- Sierra College Boulevard/Interstate 80 EB Ramps - AM peak hour
- Sierra College Boulevard/Interstate 80 WB Ramps - AM peak hour

Sierra College Boulevard/Rocklin Road Intersection

The proposed project does not create a significant impact at the intersection of Sierra College Boulevard/Rocklin Road as the V/C increase due to the project is less than 0.05 at a signalized intersection that operates at unacceptable LOS in the “no project” condition.

As noted previously, the GP EIR forecasted LOS E conditions at the intersection of Sierra College Boulevard/Rocklin Road in the Cumulative conditions (Table 4.4-28). Page 4.4-76 identifies a mitigation measure (eastbound free right turn lane and westbound right turn lane) and a southbound free right turn lane that would result in acceptable LOS operations at this

intersection. The southbound free right turn lane is needed to mitigate the AM peak hour and was not identified in the GP EIR because the AM peak hour was not analyzed.

Sierra College Boulevard/Interstate 80 EB Ramps Intersection

The proposed project does not create a significant impact at the intersection of Sierra College Boulevard/I-80 EB Ramps as the increase in delay due to the project is less than 5 seconds at a signalized intersection that operates at unacceptable LOS in the “no project” condition.

A potential improvement to bring the intersection to acceptable LOS C in both the AM and PM peak hours would be the construction of an eastbound free-right turn lane.

Sierra College Boulevard/Interstate 80 WB Ramps Intersection

The proposed project does not create a significant impact at the intersection of Sierra College Boulevard/I-80 WB Ramps as the increase in delay due to the project is less than 5 seconds at a signalized intersection that operates at unacceptable LOS in the “no project” condition.

A potential improvement to bring the intersection to acceptable LOS C in both the AM and PM peak hours would be to convert the eastbound and westbound approaches to split phasing.

Rocklin Road Interchange Intersections

The proposed project creates a significant impact at the intersections of Rocklin Road/Interstate 80 WB Ramps and Rocklin Road/Interstate 80 EB Ramps as the delay increase due to the project is more than 5 seconds at a signalized intersection that operates at unacceptable LOS in the “no project” condition in the PM peak hour. In the PM peak hour, the project is expected to add 32 vehicles per hour (vph) to the Rocklin Road/Interstate 80 WB Ramps and 44 vehicles to the Rocklin Road/Interstate 80 EB Ramps. The addition of the project traffic results in an increase of 12 seconds of delay at the Rocklin Road/Interstate 80 WB Ramps intersection and an increase of 13 seconds delay at the Rocklin Road/Interstate 80 EB Ramps intersection.

The GP EIR also forecasted unacceptable LOS conditions at the Rocklin Road interchange intersections in the cumulative conditions (Table 4.4-30). The following is quoted from Pages 4.4-87 and 4.4-88 of the GP EIR:

“The City’s decision to include highway interchange and ramp intersections in its CIP is consistent with the Caltrans policy that has encouraged local and private funding of state highway improvements for the past 20 years (Caltrans 2004, pg. 9-1.1). Caltrans notes that projects constructed on the state highway system that are sponsored by a city, county, local transportation authority, local transit agency, or private entity generally use local or private funding. Thus, the City’s CIP, SPRTA, and Highway 65 Interchange Improvement fee programs are consistent with the Caltrans policy, which encourages local agencies to develop and implement local funding programs that supplement federal and state funding programs to meet their current and future transportation needs.

The City’s decision to include highway interchange and ramp intersections in its CIP is also consistent with the Caltrans policy that compels the local or private entities sponsoring state highway system projects to be responsible for the construction contract administration when such projects are financed with local and private funds (Caltrans 2004).”

However, while the City has policies and traffic impact fees currently in place that are expected to help reduce impacts to highway ramp intersections, the City does not have the complete jurisdiction, authority, or capability to fund implementation of improvements to highway ramp intersections. Since mitigation of this impact is outside of the City's control, the impact is considered to be **significant and unavoidable**. This is consistent with the findings of the GP EIR.

There are several technically feasible alternatives for mitigating future, cumulative traffic impacts at the Rocklin Road/I-80 intersection so that it will operate at acceptable levels of service. These potential alternatives are discussed in the following section.

Rocklin Road Interchange Improvement Alternatives

Consistent with the City of Rocklin General Plan, the impact to the Rocklin Road Interchange is considered to be **significant and unavoidable**. Subsequent reports have presented alternatives for the Rocklin Road Interchange that would provide acceptable operations. The LOS worksheets are provided in the appendix of this report for the following alternatives:

- Alternative 1 - Flyover (Westbound Rocklin Road to WB Interstate 80)
- Alternative 2 - Roundabouts on Rocklin Road
- Alternative 3 - Replacement Diamond

Alternative 1 would consist of a flyover structure from westbound Rocklin Road to Interstate 80. This would alleviate traffic congestion on westbound Rocklin Road and at the intersection of Rocklin Road/I-80 WB Ramps. This alternative would require additional right-of-way and modification of existing roadways, bridges, and ramps. This alternative would provide LOS C or better conditions at the intersection of Rocklin Road/I-80 WB Ramps and the intersection of Rocklin Road/I-80 EB Ramps.

Alternative 2 would consist of multi-lane roundabouts at the intersections of Rocklin Road/I-80 WB Ramps, Rocklin Road/I-80 EB Ramps, and Rocklin Road/Aguilar Road. Roundabouts would allow uninterrupted flow of traffic and reduced queuing along Rocklin Road while providing access to freeway ramps. This alternative would require additional right-of-way, ramp widening, lengthening, and metering, and a shared-use path along Rocklin Road underneath the interstate. This alternative would provide LOS B at the intersection of Rocklin Road/I-80 WB Ramps and LOS B at the intersection of Rocklin Road/I-80 EB Ramps.

Alternative 3 would consist of a replacement diamond for the undercrossing at I-80. This alternative would require additional right-of-way, lengthening of the freeway structure for additional lanes, and modification to the I-80 WB and EB Ramps. The mainline would be raised approximately one foot to meet current standard vertical clearance for the Rocklin Road undercrossing. This alternative would provide LOS C or better conditions at the intersections of Rocklin Road/I-80 WB Ramps and Rocklin Road/I-80 EB Ramps.

The City and Caltrans are still in the planning stages of evaluating these alternatives. Unless and until a particular plan is developed and approved, this cumulative impact is assumed to be **significant and unavoidable**. It would not be feasible to require the present Project to mitigate this cumulative impact in light of the following considerations: (1) These intersections will operate at LOS F regardless of whether the Project is approved, and the Project only contributes a small percentage to the cumulative impact; (2) This intersection is outside of the control of both the City and the applicant; (3) The decision and planning of whether and how to

improve the future operation of this intersection depends on future discussions and agreements between City and Caltrans.

Ramp Operations

Table 21 provides a summary of the *Year 2030 Plus Project* ramp merge, ramp diverge and freeway mainline operations.

**TABLE 21
YEAR 2030 PLUS PROJECT RAMP AND MAINLINE LEVEL OF SERVICE**

Interchange Location	Target LOS	Segment Type	No. of Lanes	AM Peak Hour			PM Peak Hour		
				Volume	Density (pc/mi/ln)	LOS	Volume	Density (pc/mi/ln)	LOS
<i>I-80 at Rocklin Road</i>									
I-80 EB South of Rocklin Road	E	Freeway	3	5,439	35.0	D	5,479	35.4	E
I-80 EB Off Ramp	E	Diverge	1	1,813	30.3	D	646	28.0	C
I-80 EB On Ramp	E	Merge	1	362	24.9	C	641	33.3	D
I-80 WB Off Ramp	E	Diverge	1	636	35.8	E	537	33.0	D
I-80 WB On Ramp	E	Merge	1	982	33.9	D	1,382	33.9	D
I-80 WB South of Rocklin Road	E	Freeway	3	5,765	38.8	E	5,679	37.7	E
<i>I-80 at Sierra College Boulevard</i>									
I-80 EB South of Sierra College Boulevard	E	Freeway	3	3,988	23.3	C	5,474	35.4	E
I-80 EB Off Ramp	E	Diverge	1	1,651	31.7	D	782	36.3	E
I-80 EB On Ramp (Loop)	E	Merge	1	195	14.5	B	350	28.1	D
I-80 EB On Ramp	E	Merge	1	634	19.6	B	881	34.6	D
I-80 EB North of Sierra College Boulevard	E	Freeway	3	3,166	18.4	C	5,923	40.8	E
I-80 WB North of Sierra College Boulevard	E	Freeway	3	6,070	42.9	E	4,999	30.8	D
I-80 WB Off Ramp	E	Diverge	1	1,488	35.6	E	981	30.1	D
I-80 WB On Ramp (Loop)	E	Merge	1	152	26.6	C	306	24.8	C
I-80 WB On Ramp	E	Merge	1	685	31.6	D	510	28.0	C
I-80 WB South of Sierra College Boulevard	E	Freeway	3	5,419	34.8	D	4,834	29.3	D

As presented in Table 21, all mainline segments and ramps are projected to operate at acceptable LOS under *Year 2030 Plus Project* condition.

Year 2030 Plus Project with Outbound Access from Water Lily Lane Intersection

The *Year 2030 Plus Project with Outbound Access from Water Lily Lane* condition in which traffic impacts associated with the proposed project are investigated in comparison to the *Year 2030 No Project* condition.

Intersection Operations

The *Year 2030 Plus Project with Outbound Access from Water Lily Lane* condition was simulated by superimposing traffic generated by the proposed project onto *Year 2030 No Project* intersection volumes. This scenario includes the outbound access from the project site to Water Lily Lane. The 15% outbound project traffic headed on eastbound Rocklin Road is not expected to use Water Lily Lane access due to the circuitous nature of the trip (head west on Water Lily Lane to northbound Sierra College Boulevard then eastbound Rocklin Road). The

outbound trips on Water Lily Lane account for approximately 42% of the remaining 85% of outbound project traffic. This translates to 28 AM and 15 PM peak hour outbound project trips on Water Lily Lane.

The resulting *Year 2030 Plus Project with Outbound Access from Water Lily Lane* traffic volumes are included in the Appendix. Table 22 provides a summary of the *Year 2030 Plus Project with Outbound Access from Water Lily Lane* peak hour intersection LOS.

**TABLE 22
YEAR 2030 PLUS PROJECT WITH OUTBOUND ACCESS FROM WATER LILY LANE INTERSECTION LOS**

#	Intersection	Control Type ^{1,2}	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay or V/C	LOS	Impact?	Delay or V/C	LOS	Impact?
1	Sierra College Blvd/Rocklin Road	Signal	C	0.93	E	No	0.93	E	No
2	Sierra College Blvd/Water Lily Ln-Cobblecreek Circle	TWSC	C	18.7	C	-	17.5	C	-
3	Rocklin Road/Rocklin Manor Drive (West)	TWSC	C	16.9	C	-	19.9	C	-
4	Rocklin Road & I-80 WB Ramps	Signal	C	42.4	D	No	82.5	F	Yes
5	Rocklin Road & I-80 EB Ramps	Signal	C	71.9	E	No	115.7	F	Yes
6	Sierra College Blvd & I-80 EB Ramps	Signal	C	79.7	E	No	31.0	C	-
7	Sierra College Blvd & I-80 WB Ramps	Signal	C	39.5	D	No	32.2	C	-

Notes:

1. Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC & Signal
2. Unsignalized and Sierra College interchange intersections analyzed using HCM methodologies instead of Circular 212. Rocklin Road interchange intersections analyzed using Sim-Traffic.
3. **Bold** text indicates exceedance of LOS standard.

As shown in Table 22, all study intersection, except the intersections listed below, are projected to operate at or above the threshold LOS:

- Sierra College Boulevard/Rocklin Road - AM and PM peak hours
- Rocklin Road/Interstate 80 WB Ramps - AM and PM peak hours
- Rocklin Road/Interstate 80 EB Ramps - AM and PM peak hours
- Sierra College Boulevard/Interstate 80 EB Ramps - AM peak hour
- Sierra College Boulevard/Interstate 80 WB Ramps - AM peak hour

Sierra College Boulevard/Rocklin Road Intersection

The proposed project does not create a significant impact at the intersection of Sierra College Boulevard/Rocklin Road as the V/C increase due to the project is less than 0.05 at a signalized intersection that operates at unacceptable LOS in the “no project” condition.

As noted previously, the GP EIR forecasted LOS E conditions at the intersection of Sierra College Boulevard/Rocklin Road in the *Cumulative* conditions (Table 4.4-28). Page 4.4-76 identifies a mitigation measure (eastbound free right turn lane and westbound right turn lane) and a southbound free right turn lane that would result in acceptable LOS operations at this intersection. The southbound free right turn lane is needed to mitigate the AM peak hour and was not identified in the GP EIR because the AM peak hour was not analyzed.

Sierra College Boulevard/Interstate 80 EB Ramps Intersection

The proposed project does not create a significant impact at the intersection of Sierra College Boulevard/Interstate 80 EB Ramps as the delay increase due to the project is less than 5

seconds at a signalized intersection that operates at unacceptable LOS in the “no project” condition.

A potential improvement to bring the intersection to acceptable LOS C in both the AM and PM peak hours would be the construction of an eastbound free-right turn lane.

Sierra College Boulevard/Interstate 80 WB Ramps Intersection

The proposed project does not create a significant impact at the intersection of Sierra College Boulevard/Interstate 80 WB Ramps as the delay increase due to the project is less than 5 seconds at a signalized intersection that operates at unacceptable LOS in the “no project” condition.

A potential improvement to bring the intersection to acceptable LOS C in both the AM and PM peak hours would be to convert the eastbound and westbound approaches to split phasing.

Rocklin Road Interchange Intersections

The proposed project does create a significant impact at the intersections of Rocklin Road/Interstate 80 WB Ramps and Rocklin Road/Interstate 80 EB Ramps as the delay increase due to the project is more than 5 seconds at a signalized intersection that operates at unacceptable LOS in the “no project” condition in the PM peak hour.

In the PM peak hour, the project is expected to add 32 vehicles per hour (vph) to the Rocklin Road/Interstate 80 WB Ramps and 44 vehicles to the Rocklin Road/Interstate 80 EB Ramps. The addition of the project traffic results in an increase of 12 seconds of delay at the Rocklin Road/Interstate 80 WB Ramps intersection and an increase of 13 seconds delay at the Rocklin Road/Interstate 80 EB Ramps intersection.

The GP EIR also forecasted unacceptable LOS conditions at the Rocklin Road interchange intersections in the cumulative conditions (Table 4.4-30). The following is quoted from Pages 4.4-87 and 4.4-88 of the GP EIR:

“The City’s decision to include highway interchange and ramp intersections in its CIP is consistent with the Caltrans policy that has encouraged local and private funding of state highway improvements for the past 20 years (Caltrans 2004, pg. 9-1.1). Caltrans notes that projects constructed on the state highway system that are sponsored by a city, county, local transportation authority, local transit agency, or private entity generally use local or private funding. Thus, the City’s CIP, SPRTA, and Highway 65 Interchange Improvement fee programs are consistent with the Caltrans policy, which encourages local agencies to develop and implement local funding programs that supplement federal and state funding programs to meet their current and future transportation needs.

The City’s decision to include highway interchange and ramp intersections in its CIP is also consistent with the Caltrans policy that compels the local or private entities sponsoring state highway system projects to be responsible for the construction contract administration when such projects are financed with local and private funds (Caltrans 2004).”

However, while the City has policies and traffic impact fees currently in place that are expected to help reduce impacts to highway ramp intersections, the City does not have the complete

jurisdiction, authority, or capability to fund implementation of improvements to highway ramp intersections. Since mitigation of this impact is outside of the City's control, the impact is considered to be **significant and unavoidable**. This is consistent with the findings of the GP EIR. Rocklin Road Interchange Improvement Alternatives.

There are several technically feasible alternatives for mitigating future cumulative traffic impacts at the Rocklin Road/I-80 intersection so that it will operate at acceptable levels of service. These potential alternatives are discussed in the following section.

Rocklin Road Interchange Improvement Alternatives

Consistent with the City of Rocklin General Plan, the impact to the Rocklin Road Interchange is considered to be **significant and unavoidable**. Subsequent reports have presented alternatives for the Rocklin Road Interchange that would provide acceptable operations. The LOS worksheets are provided in the appendix of this report for the following alternatives:

- Alternative 1 - Flyover (Westbound Rocklin Road to WB Interstate 80)
- Alternative 2 - Roundabouts on Rocklin Road
- Alternative 3 - Replacement Diamond

Alternative 1 would consist of a flyover structure from westbound Rocklin Road to Interstate 80. This would alleviate traffic congestion on westbound Rocklin Road and at the intersection of Rocklin Road/I-80 WB Ramps. This alternative would require additional right-of-way and modification of existing roadways, bridges, and ramps. This alternative would provide LOS C or better conditions at the intersection of Rocklin Road/I-80 WB Ramps and the intersection of Rocklin Road/I-80 EB Ramps.

Alternative 2 would consist of multi-lane roundabouts at the intersections of Rocklin Road/I-80 WB Ramps, Rocklin Road/I-80 EB Ramps, and Rocklin Road/Aguilar Road. Roundabouts would allow uninterrupted flow of traffic and reduced queuing along Rocklin Road while providing access to freeway ramps. This alternative would require additional right-of-way, ramp widening, lengthening, and metering, and a shared-use path along Rocklin Road underneath the interstate. This alternative would provide LOS B at the intersection of Rocklin Road/I-80 WB Ramps and LOS B at the intersection of Rocklin Road/I-80 EB Ramps.

Alternative 3 would consist of a replacement diamond for the undercrossing at I-80. This alternative would require additional right-of-way, lengthening of the freeway structure for additional lanes, and modification to the I-80 WB and EB Ramps. The mainline would be raised approximately one foot to meet current standard vertical clearance for the Rocklin Road undercrossing. This alternative would provide LOS C or better conditions at the intersections of Rocklin Road/I-80 WB Ramps and Rocklin Road/I-80 EB Ramps.

The City and Caltrans are still in the planning stages of evaluating these alternatives. Unless and until a particular plan is developed and approved, this cumulative impact is assumed to be **significant and unavoidable**. It would not be feasible to require the present Project to mitigate this cumulative impact in light of the following considerations: (1) These intersections will operate at LOS F regardless of whether the Project is approved, and the Project only contributes a small percentage to the cumulative impact; (2) This intersection is outside of the control of both the City and the applicant; (3) The decision and planning of whether and how to improve the future operation of this intersection depends on future discussions and agreements between City and Caltrans.

The proposed project is anticipated to pay both City and Regional Fees.

Project Site Access - Focused Analysis

Access to the proposed project would be provided via one driveway via the existing westernmost driveway at Rocklin Manor Drive shared with the residential development on the east along Rocklin Road. Table 23 shows the projected traffic volumes, delay, LOS, and queue lengths for Existing, Short Term, and Cumulative conditions, with and without the project. The queue lengths were determined assuming 25 feet per vehicle.

**TABLE 23
PROJECT SITE ACCESS SUMMARY TABLE**

Rocklin Rd at Rocklin Manor Drive/Project Access	AM Peak Hour						PM Peak Hour					
	NB Approach Volume (vph)	Delay (sec/veh)	LOS	Queue Length (ft)	Available Storage	Is Queue within Storage?	NB Approach Volume (vph)	Delay (sec/veh)	LOS	Queue Length (ft)	Available Storage	Is Queue within Storage?
Existing Conditions	23	13.3	B	25	100	YES	15	12.9	B	25	100	YES
Existing Plus Project Conditions	103	16.8	C	25	100	YES	60	14.4	B	25	100	YES
Existing Plus Project Conditions with Outbound Access from Water Lily Lane	75	15.9	C	25	100	YES	44	14.2	B	25	100	YES
Short Term No Project Conditions	23	15.6	C	25	100	YES	15	14.6	B	25	100	YES
Short Term Plus Project Conditions	103	17.8	C	25	100	YES	60	16.1	C	25	100	YES
Short Term Plus Project Conditions with Outbound Access from Water Lily Lane	75	16.9	C	25	100	YES	44	16.5	C	25	100	YES
Cumulative No Project Conditions	50	14.1	B	25	100	YES	40	16.5	C	25	100	YES
Cumulative Plus Project Conditions	130	16.9	C	50	100	YES	85	19.9	C	25	100	YES
Cumulative Plus Project Conditions with Outbound Access from Water Lily Lane	102	15.6	C	50	100	YES	69	18.6	C	25	100	YES

Note: 25 ft. assumed vehicle length for stacking and queues

The vehicles using the project site access are predominantly associated with the proposed project. As shown in Table 23, the northbound site access at Rocklin Road and Rocklin Manor Drive will have acceptable LOS and queue lengths during the AM and PM peak periods under the *Existing Plus Project*, *Short Term Plus Project* and *Cumulative Plus Project* for both access scenario conditions.

Appendix

Traffic LOS Worksheets

Synchro LOS Worksheets

HCS Worksheets

Traffic LOS Worksheets

Intersection #1 Rocklin Road/ Sierra College

 Cycle (sec): 100 Critical Vol./Cap. (X): 0.636
 Loss Time (sec): 16 Average Delay (sec/veh): xxxxxx
 Optimal Cycle: 78 Level Of Service: B

Street Name:	Rocklin Road						Sierra College					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2	0	1	1	0	1	1	0	2	1	0	1
Volume Module:												
Base Vol:	407	549	90	86	658	158	103	202	213	86	237	158
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	407	549	90	86	658	158	103	202	213	86	237	158
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
PHF Volume:	504	680	112	107	815	196	128	250	264	107	294	196
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	504	680	112	107	815	196	128	250	264	107	294	196
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	555	680	112	107	815	196	128	250	264	107	294	196
Saturation Flow Module:												
Sat/Lane:	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	1.72	0.28	1.00	3.00	1.00	1.00	2.00	1.00	1.00	1.20	0.80
Final Sat.:	2900	2492	408	1450	4350	1450	1450	2900	1450	1450	1740	1160
Capacity Analysis Module:												
Vol/Sat:	0.19	0.27	0.27	0.07	0.19	0.14	0.09	0.09	0.18	0.07	0.17	0.17
Crit Volume:	277			272			128			245		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
 2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2 Sierra College Blvd/Water Lily Lane

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: B[14.0]
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Sierra College Blvd			Water Lily Lane									
North Bound			South Bound			East Bound			West Bound			
L - T - R			L - T - R			L - T - R			L - T - R			
Uncontrolled			Uncontrolled			Stop Sign			Stop Sign			
Include			Include			Include			Include			
0 0 1 1 0			0 0 2 1 0			0 0 0 1 0			0 0 0 0 1			

Volume Module:												
Base Vol:	0	1013	16	0	957	0	0	0	0	0	0	33
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1013	16	0	957	0	0	0	0	0	0	33
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
PHF Volume:	0	1216	19	0	1149	0	0	0	0	0	0	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Volume:	0	1216	19	0	1149	0	0	0	0	0	0	40

Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	6.5	6.9	xxxxx	xxxx	6.9
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	4.0	3.3	xxxxx	xxxx	3.3

Capacity Module:												
Cnflct Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	2384	383	xxxx	xxxx	618
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	35	621	xxxx	xxxx	437
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	35	621	xxxx	xxxx	437
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	0.00	xxxx	xxxx	0.09

Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	0.3
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	14.0
LOS by Move:	*	*	*	*	*	*	*	*	*	*	*	B
Movement:	LT - LTR - RT	LT - LTR - RT	LT - LTR - RT	LT - LTR - RT	LT - LTR - RT	LT - LTR - RT	LT - LTR - RT	LT - LTR - RT	LT - LTR - RT	LT - LTR - RT	LT - LTR - RT	LT - LTR - RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	0	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxxx			xxxxxxx			xxxxxxx					14.0
ApproachLOS:	*			*			*					B

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #3 Rocklin Road/ Rocklin Manor Dr

Average Delay (sec/veh): 0.4 Worst Case Level Of Service: B[13.3]

Rocklin Road		Rocklin Manor Dr	
North Bound		South Bound	
East Bound		West Bound	

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Movement:      L - T - R      | L - T - R      | L - T - R      | L - T - R
-----|-----|-----|-----|
Control :      Stop Sign      | Stop Sign      | Uncontrolled   | Uncontrolled
Rights:         Include      | Include      | Include      | Include
Lanes:          1 0 0 0 0      | 0 0 0 0 0      | 0 0 1 1 0      | 1 0 1 0 0
-----|-----|-----|-----|
Volume Module:
Base Vol :      23 0 0 0 0      | 0 0 0 0 0      | 0 373 5      | 1 458 0
Growth Adj :    1.00 1.00 1.00  | 1.00 1.00 1.00  | 1.00 1.00 1.00  | 1.00 1.00 1.00
Initial Bse:    23 0 0 0 0      | 0 0 0 0 0      | 0 373 5      | 1 458 0
User Adj :      1.00 1.00 1.00  | 1.00 1.00 1.00  | 1.00 1.00 1.00  | 1.00 1.00 1.00
PHF Adj :       1.00 1.00 1.00  | 1.00 1.00 1.00  | 1.00 1.00 1.00  | 1.00 1.00 1.00
PHF Volume:     23 0 0 0 0      | 0 0 0 0 0      | 0 373 5      | 1 458 0
Reduct Vol :    0 0 0 0 0      | 0 0 0 0 0      | 0 0 0 0      | 0 0 0 0
Final Volume:   23 0 0 0 0      | 0 0 0 0 0      | 0 373 5      | 1 458 0
-----|-----|-----|-----|
Critical Gap Module:
Critical Gp:    6.4 xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | 4.1 xxxx xxxxxx
FollowUpTIm:   3.5 xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | 2.2 xxxx xxxxxx
-----|-----|-----|-----|
Capacity Module:
Conflict Vol :  836 xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | 378 xxxx xxxxxx
Potent Cap. :   340 xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | 1192 xxxx xxxxxx
Move Cap. :     340 xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | 1192 xxxx xxxxxx
Total Cap:      459 410 xxxxxx  | 477 409 xxxxxx  | xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx
Volume/Cap:     0.05 xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | 0.00 xxxx xxxxxx
-----|-----|-----|-----|
Level Of Service Module:
2Way95thQ:     0.2 xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | 0.0 xxxx xxxxxx
Control Del :  13.3 xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | 8.0 xxxx xxxxxx
LOS by Move:    B * * * * *      | * * * * *      | * * * * *      | A * * * * *
Movement:      LT - LTR - RT    | LT - LTR - RT    | LT - LTR - RT    | LT - LTR - RT
Shared Cap. :   xxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx
SharedQueue:    xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx
Shrd ConDel:    xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx  | xxxxxx xxxx xxxxxx
Shared LOS:     * * * * *      | * * * * *      | * * * * *      | * * * * *
ApproachDel :   13.3             | xxxxxxxx         | xxxxxxxx         | xxxxxxxx
ApproachLOS:    B * * * * *      | * * * * *      | * * * * *      | * * * * *
*****
Note: Queue reported is the number of cars per lane.
*****

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Intersection #1 Rocklin Road/ Sierra College

 Cycle (sec): 100 Critical Vol./Cap. (X): 0.778
 Loss Time (sec): 16 Average Delay (sec/veh): xxxxxx
 Optimal Cycle: 128 Level Of Service: C

Street Name:	Rocklin Road						Sierra College					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2	0	1	1	0	3	1	0	2	1	0	1
Volume Module:												
Base Vol:	306	837	61	166	646	146	216	254	352	59	185	144
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	306	837	61	166	646	146	216	254	352	59	185	144
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
PHF Volume:	336	920	67	182	710	160	237	279	387	65	203	158
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	336	920	67	182	710	160	237	279	387	65	203	158
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	336	920	67	182	710	160	237	279	387	65	203	158
Saturation Flow Module:												
Sat/Lane:	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	1.86	0.14	1.00	3.00	1.00	1.00	2.00	1.00	1.00	1.12	0.88
Final Sat.:	2900	2703	197	1450	4350	1450	1450	2900	1450	1450	1631	1269
Capacity Analysis Module:												
Vol/Sat:	0.12	0.34	0.34	0.13	0.16	0.11	0.16	0.10	0.27	0.04	0.12	0.12
Crit Volume:	493			182			387			65		
Crit Moves:	****			****			****			****		

 Level Of Service Computation Report
 2000 HCM Unsignalized Method (Base Volume Alternative)

 Intersection #2 Sierra College Blvd/Water Lily Lane

 Average Delay (sec/veh): 0.1 Worst Case Level Of Service: B[14.3]
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Movement:      L - T - R      | L - T - R      | L - T - R      | L - T - R
-----|-----|-----|-----|
Control:       Stop Sign      | Stop Sign      | Uncontrolled   | Uncontrolled
Rights:        Include       | Include       | Include       | Include
Lanes:         0 0 1! 0 0     | 0 0 0 0 0     | 0 0 1 1 0     | 1 0 1 0 0
-----|-----|-----|-----|
Volume Module:
Base Vol:      14 0 1 0 0 0   | 0 0 0 0 0     | 0 456 25      | 0 374 0
Growth Adj:    1.00 1.00 1.00 | 1.00 1.00 1.00 | 1.00 1.00 1.00 | 1.00 1.00 1.00
Initial Bse:   14 0 1 0 0 0   | 0 0 0 0 0     | 0 456 25      | 0 374 0
User Adj:      1.00 1.00 1.00 | 1.00 1.00 1.00 | 1.00 1.00 1.00 | 1.00 1.00 1.00
PHF Adj:       1.00 1.00 1.00 | 1.00 1.00 1.00 | 1.00 1.00 1.00 | 1.00 1.00 1.00
PHF Volume:    14 0 1 0 0 0   | 0 0 0 0 0     | 0 456 25      | 0 374 0
Reduct Vol:    0 0 0 0 0 0    | 0 0 0 0 0     | 0 0 0 0 0     | 0 0 0 0 0
Final Volume:  14 0 1 0 0 0   | 0 0 0 0 0     | 0 456 25      | 0 374 0
-----|-----|-----|-----|
Critical Gap Module:
Critical Gp:   6.4 6.5 6.2     | xxxxx xxxxx xxxxx | xxxxx xxxxx xxxxx | xxxxx xxxxx xxxxx
FollowUpTm:   3.5 4.0 3.3     | xxxxx xxxxx xxxxx | xxxxx xxxxx xxxxx | xxxxx xxxxx xxxxx
-----|-----|-----|-----|
Capacity Module:
Conflict Vol:  843 843 241     | xxxxx xxxxx xxxxx | xxxxx xxxxx xxxxx | xxxxx xxxxx xxxxx
Potent Cap.:  337 303 803     | xxxxx xxxxx xxxxx | xxxxx xxxxx xxxxx | xxxxx xxxxx xxxxx
Move Cap.:    337 303 803     | xxxxx xxxxx xxxxx | xxxxx xxxxx xxxxx | xxxxx xxxxx xxxxx
Total Cap:    457 407 xxxxxx   | 509 403 xxxxxx   | xxxxx xxxxx xxxxx | xxxxx xxxxx xxxxx
Volume/Cap:   0.03 0.00 0.00   | xxxxx xxxxx xxxxx | xxxxx xxxxx xxxxx | xxxxx xxxxx xxxxx
-----|-----|-----|-----|
Level Of Service Module:
2Way95thQ:    xxxxx xxxxx xxxxxx | xxxxx xxxxx xxxxxx | xxxxx xxxxx xxxxxx | xxxxx xxxxx xxxxxx
Control Del:  xxxxx xxxxx xxxxxx | xxxxxx xxxxx xxxxxx | xxxxxx xxxxx xxxxxx | xxxxxx xxxxx xxxxxx
LOS by Move:  * * * * *          | * * * * *          | * * * * *          | * * * * *
Movement:     LT - LTR - RT      | LT - LTR - RT      | LT - LTR - RT      | LT - LTR - RT
Shared Cap.:  xxxxx 470 xxxxxx   | xxxxx xxxxx xxxxxx | xxxxx xxxxx xxxxxx | xxxxx xxxxx xxxxxx
SharedQueue: xxxxxx 0.1 xxxxxx   | xxxxxx xxxxx xxxxxx | xxxxxx xxxxx xxxxxx | xxxxxx xxxxx xxxxxx
Shrd ConDel: xxxxxx 12.9 xxxxxx  | xxxxxx xxxxx xxxxxx | xxxxxx xxxxx xxxxxx | xxxxxx xxxxx xxxxxx
Shared LOS:   * B * * *          | * * * * *          | * * * * *          | * * * * *
ApproachDel:  12.9 *             | xxxxxxxx          | xxxxxxxx          | xxxxxxxx
ApproachLOS:  B * *             | * * * * *          | * * * * *          | * * * * *
*****
Note: Queue reported is the number of cars per lane.
*****

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Level Of Service Computation Report
Circular 212 Planning Method (Future Volume Alternative)

Intersection #1 Rocklin Road/ Sierra College

Cycle (sec): 100 Critical Vol./Cap. (X): 0.649
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 65 Level Of Service: B

Street Name:	Rocklin Road						Sierra College					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L - T - R			L - T - R			L - T - R			L - T - R		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2	0	2	0	1	1	1	0	2	0	1	1

Volume Module:												
Base Vol:	407	549	90	86	658	158	103	202	213	86	237	158
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	407	549	90	86	658	158	103	202	213	86	237	158
Added Vol:	0	0	12	25	0	0	0	33	0	7	18	14
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	407	549	102	111	658	158	103	235	213	93	255	172
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
PHF Volume:	504	680	126	138	815	196	128	291	264	115	316	213
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	504	680	126	138	815	196	128	291	264	115	316	213
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	555	680	126	138	815	196	128	291	264	115	316	213

Saturation Flow Module:												
Sat/Lane:	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	3.00	1.00	1.00	2.00	1.00	1.00	1.19	0.81
Final Sat.:	2900	2900	1450	1450	4350	1450	1450	2900	1450	1450	1732	1168

Capacity Analysis Module:												
Vol/Sat:	0.19	0.23	0.09	0.09	0.19	0.14	0.09	0.10	0.18	0.08	0.18	0.18
Crit Volume:	277			272			128			265		
Crit Moves:	****			****			****			****		

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Intersection #2 Sierra College Blvd/Water Lily Lane

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: B[14.2]

Street Name: Sierra College Blvd Water Lily Lane

Approach: North Bound South Bound East Bound West Bound

Movement: L - T - R L - T - R L - T - R L - T - R

Control: Uncontrolled Uncontrolled Stop Sign Stop Sign

Rights: Include Include Include Include

Lanes: 0 0 1 1 0 0 0 2 1 0 0 0 0 1 0 0 0 0 1

Volume Module:

Table with 13 columns for traffic volume metrics: Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, Final Volume. Rows include values for each approach and movement.

Critical Gap Module:

Table with 13 columns for critical gap and follow-up time metrics. Rows include Critical Gp and FollowUpTi m values.

Capacity Module:

Table with 13 columns for capacity metrics: Conflict Vol, Potent Cap., Move Cap., Volume/Cap. Rows include values for each approach and movement.

Level Of Service Module:

Table with 13 columns for level of service metrics: 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., Shared Queue, Shrd ConDel, Shared LOS, ApproachDel, ApproachLOS. Rows include values for each approach and movement.

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report

2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Rocklin Road/ Rocklin Manor Dr

Average Delay (sec/veh): 1.3 Worst Case Level Of Service: C[16.8]

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 Intersection #1 Rocklin Road/ Sierra College

Cycle (sec): 100 Critical Vol./Cap. (X): 0.779
 Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
 Optimal Cycle: 103 Level Of Service: C

Street Name:	Rocklin Road						Sierra College					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2	0	2	0	1	1	1	0	2	0	1	1

Volume Module:	Rocklin Road			Rocklin Road			Sierra College			Sierra College		
Base Vol:	306	837	61	166	646	146	216	254	352	59	185	144
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	306	837	61	166	646	146	216	254	352	59	185	144
Added Vol:	0	0	12	25	0	0	0	33	0	7	18	14
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	306	837	73	191	646	146	216	287	352	66	203	158
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
PHF Volume:	336	920	80	210	710	160	237	315	387	73	223	174
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	336	920	80	210	710	160	237	315	387	73	223	174
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	336	920	80	210	710	160	237	315	387	73	223	174

Saturation Flow Module:	Rocklin Road			Rocklin Road			Sierra College			Sierra College		
Sat/Lane:	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	3.00	1.00	1.00	2.00	1.00	1.00	1.12	0.88
Final Sat.:	2900	2900	1450	1450	4350	1450	1450	2900	1450	1450	1631	1269

Capacity Analysis Module:	Rocklin Road			Rocklin Road			Sierra College			Sierra College		
Vol/Sat:	0.12	0.32	0.06	0.14	0.16	0.11	0.16	0.11	0.27	0.05	0.14	0.14
Crit Volume:	460			210			387			73		
Crit Moves:	****			****			****			****		

 Level Of Service Computation Report
 2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 Sierra College Blvd/Water Lily Lane

EXPP_PM.TXT

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1	0	0	0	0	0	1	1	0	0
Volume Module:												
Base Vol:	14	0	1	0	0	0	0	456	25	0	374	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	14	0	1	0	0	0	0	456	25	0	374	0
Added Vol:	38	0	7	0	0	0	0	0	70	12	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	52	0	8	0	0	0	0	456	95	12	374	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
PHF Volume:	57	0	9	0	0	0	0	501	104	13	411	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Volume:	57	0	9	0	0	0	0	501	104	13	411	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflct Vol:	991	991	303	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	605	xxxx	xxxxx
Potent Cap.:	275	248	742	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	982	xxxx	xxxxx
Move Cap.:	273	245	742	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	982	xxxx	xxxxx
Total Cap:	403	360	xxxxx	458	340	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	0.14	0.00	0.01	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.01	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.7	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	429	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.5	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	14.9	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	*	*	*
ApproachDel:	14.9			xxxxxxx			xxxxxxx			xxxxxxx		
ApproachLOS:	B			*			*			*		

Note: Queue reported is the number of cars per lane.

 Level Of Service Computation Report
 Circular 212 Planning Method (Future Volume Alternative)

 Intersection #1 Rocklin Road/ Sierra College

Cycle (sec):	100	Critical Vol./Cap. (X):	0.655
Loss Time (sec):	16	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	82	Level Of Service:	B

Street Name:	Rocklin Road	Sierra College	
Approach:	North Bound	South Bound	East Bound West Bound
Movement:	L - T - R	L - T - R	L - T - R L - T - R

Control:	Protected	Protected	Protected Protected
Rights:	Include	Include	Include Include
Min. Green:	0 0 0	0 0 0	0 0 0 0 0 0
Y+R:	4.0 4.0 4.0	4.0 4.0 4.0	4.0 4.0 4.0 4.0 4.0 4.0
Lanes:	2 0 2 0 1	1 0 3 0 1	1 0 2 0 1 1 0 1 1 0

Volume Module:

Base Vol:	407 549 90	86 658 158	103 202 213	86 237 158
Growth Adj:	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
Initial Bse:	407 549 90	86 658 158	103 202 213	86 237 158
Added Vol:	16 12 3	6 0 0	0 8 0	12 16 12
PasserByVol:	0 0 0	0 0 0	0 0 0	0 0 0
Initial Fut:	423 561 93	92 658 158	103 210 213	98 253 170
User Adj:	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
PHF Adj:	0.81 0.81 0.81	0.81 0.81 0.81	0.81 0.81 0.81	0.81 0.81 0.81
PHF Volume:	524 695 115	114 815 196	128 260 264	121 314 211
Reduct Vol:	0 0 0	0 0 0	0 0 0	0 0 0
Reduced Vol:	524 695 115	114 815 196	128 260 264	121 314 211
PCE Adj:	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
MLF Adj:	1.10 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
Final Volume:	577 695 115	114 815 196	128 260 264	121 314 211

Saturation Flow Module:

Sat/Lane:	1450 1450 1450	1450 1450 1450	1450 1450 1450	1450 1450 1450
Adjustment:	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
Lanes:	2.00 2.00 1.00	1.00 3.00 1.00	1.00 2.00 1.00	1.00 1.20 0.80
Final Sat.:	2900 2900 1450	1450 4350 1450	1450 2900 1450	1450 1735 1165

Capacity Analysis Module:

Vol/Sat:	0.20 0.24 0.08	0.08 0.19 0.14	0.09 0.09 0.18	0.08 0.18 0.18
Crit Volume:	288	272	128	262
Crit Moves:	****	****	****	****

 Intersection #2 Sierra College Blvd/Water Lily Lane

Average Delay (sec/veh): 0.4 Worst Case Level Of Service: B [14.9]

Street Name:	Sierra College Blvd						Water Lily Lane													
Approach:	North Bound			South Bound			East Bound			West Bound										
Movement:	L	T	R	L	T	R	L	T	R	L	T	R								
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign										
Rights:	Include			Include			Include			Include										
Lanes:	0	0	1	1	0	0	0	2	1	0	0	0	0	1	0	0	0	0	0	1

Volume Module:	Sierra College Blvd						Water Lily Lane					
Base Vol:	0	1013	16	0	957	0	0	0	0	0	0	33
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1013	16	0	957	0	0	0	0	0	0	33
Added Vol:	0	3	0	0	12	0	0	0	0	0	0	28
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	1016	16	0	969	0	0	0	0	0	0	61
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
PHF Volume:	0	1220	19	0	1163	0	0	0	0	0	0	73
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Volume:	0	1220	19	0	1163	0	0	0	0	0	0	73

Critical Gap Module:	Sierra College Blvd						Water Lily Lane					
Critical Gp:	xxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	6.5	6.9	xxxxxx	xxxx	6.9
FollowUpTim:	xxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	4.0	3.3	xxxxxx	xxxx	3.3

Capacity Module:	Sierra College Blvd						Water Lily Lane					
Cnflct Vol:	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	2402	388	xxxx	xxxx	619
Potent Cap.:	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	34	616	xxxx	xxxx	436
Move Cap.:	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	34	616	xxxx	xxxx	436
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	0.00	xxxx	xxxx	0.17

Level Of Service Module:	Sierra College Blvd						Water Lily Lane					
2Way95thQ:	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	0.6
Control Del:	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	14.9
LOS by Move:	*	*	*	*	*	*	*	*	*	*	*	B
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	0	xxxx	xxxx	xxxxxx
SharedQueue:	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx
Shrd ConDel:	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxxx			xxxxxxx			xxxxxxx			14.9		
ApproachLOS:	*			*			*			B		

Note: Queue reported is the number of cars per lane.

 Level Of Service Computation Report
 2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Rocklin Road/ Rocklin Manor Dr

EXPP_WO_AM.txt

Average Delay (sec/veh): 1.3 Worst Case Level Of Service: C [15.9]

Street Name:	Rocklin Road						Rocklin Manor Dr									
Approach:	North Bound			South Bound			East Bound			West Bound						
Movement:	L	T	R	L	T	R	L	T	R	L	T	R				
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled						
Rights:	Include			Include			Include			Include						
Lanes:	0	0	1	0	0	0	0	0	1	1	0	1	0	1	0	0
Volume Module:																
Base Vol:	23	0	0	0	0	0	0	373	5	1	458	0				
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Initial Bse:	23	0	0	0	0	0	0	373	5	1	458	0				
Added Vol:	40	0	12	0	0	0	0	0	17	3	0	0				
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0				
Initial Fut:	63	0	12	0	0	0	0	373	22	4	458	0				
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
PHF Adj:	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81				
PHF Volume:	78	0	15	0	0	0	0	460	27	5	565	0				
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0				
Final Volume:	78	0	15	0	0	0	0	460	27	5	565	0				
Critical Gap Module:																
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx				
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx				
Capacity Module:																
Cnflct Vol:	1049	1049	244	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	488	xxxx	xxxxx				
Potent Cap.:	254	229	800	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1086	xxxx	xxxxx				
Move Cap.:	253	228	800	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1086	xxxx	xxxxx				
Total Cap:	387	346	xxxxx	401	342	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx				
Volume/Cap:	0.20	0.00	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	xxxx	xxxx				
Level Of Service Module:																
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx				
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.3	xxxx	xxxxx				
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*				
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT				
Shared Cap.:	xxxx	421	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx				
SharedQueue:	xxxxx	0.8	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx				
Shrd ConDel:	xxxxx	15.9	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx				
Shared LOS:	*	C	*	*	*	*	*	*	*	*	*	*				
ApproachDel:	15.9			xxxxxx			xxxxxx			xxxxxx						
ApproachLOS:	C			*			*			*						

Note: Queue reported is the number of cars per lane.

 Level Of Service Computation Report
 Circular 212 Planning Method (Future Volume Alternative)

 Intersection #1 Rocklin Road/ Sierra College

Cycle (sec):	100	Critical Vol./Cap. (X):	0.781
Loss Time (sec):	16	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	129	Level Of Service:	C

Street Name:	Rocklin Road	Sierra College	
Approach:	North Bound	South Bound	East Bound West Bound
Movement:	L - T - R	L - T - R	L - T - R L - T - R

Control:	Protected	Protected	Protected Protected
Rights:	Include	Include	Include Include
Min. Green:	0 0 0	0 0 0	0 0 0 0 0 0
Y+R:	4.0 4.0 4.0	4.0 4.0 4.0	4.0 4.0 4.0 4.0 4.0 4.0
Lanes:	2 0 2 0 1	1 0 3 0 1	1 0 2 0 1 1 0 1 1 0

Volume Module:

Base Vol:	306 837 61	166 646 146	216 254 352	59 185 144
Growth Adj:	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
Initial Bse:	306 837 61	166 646 146	216 254 352	59 185 144
Added Vol:	9 7 12	24 0 0	0 32 0	7 9 7
PasserByVol:	0 0 0	0 0 0	0 0 0	0 0 0
Initial Fut:	315 844 73	190 646 146	216 286 352	66 194 151
User Adj:	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
PHF Adj:	0.91 0.91 0.91	0.91 0.91 0.91	0.91 0.91 0.91	0.91 0.91 0.91
PHF Volume:	346 927 80	209 710 160	237 314 387	73 213 166
Reduct Vol:	0 0 0	0 0 0	0 0 0	0 0 0
Reduced Vol:	346 927 80	209 710 160	237 314 387	73 213 166
PCE Adj:	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
MLF Adj:	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
Final Volume:	346 927 80	209 710 160	237 314 387	73 213 166

Saturation Flow Module:

Sat/Lane:	1450 1450 1450	1450 1450 1450	1450 1450 1450	1450 1450 1450
Adjustment:	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
Lanes:	2.00 2.00 1.00	1.00 3.00 1.00	1.00 2.00 1.00	1.00 1.12 0.88
Final Sat.:	2900 2900 1450	1450 4350 1450	1450 2900 1450	1450 1631 1269

Capacity Analysis Module:

Vol/Sat:	0.12 0.32 0.06	0.14 0.16 0.11	0.16 0.11 0.27	0.05 0.13 0.13
Crit Volume:	464	209	387	73
Crit Moves:	****	****	****	****

Intersection #2 Sierra College Blvd/Water Lily Lane

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: B [14.8]

Table with columns for Street Name, Approach, Movement, Control, Rights, Lanes, and Volume Module. Rows include Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, and Final Volume.

Table for Critical Gap Module with columns for Critical Gp and FollowUpTim. Values include 6.5, 6.9, 4.0, and 3.3.

Table for Capacity Module with columns for Cnflct Vol, Potent Cap., Move Cap., and Volume/Cap. Values include 2531, 394, 28, 611, and 0.09.

Table for Level Of Service Module with columns for 2Way95thQ, Control Del, LOS by Move, Movement, Shared Cap., SharedQueue, Shrd ConDel, Shared LOS, ApproachDel, and ApproachLOS. Values include 0.3, 14.8, and 14.8 B.

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report 2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Rocklin Road/ Rocklin Manor Dr

With Outbound Access to WaterLily lane

EXPP_WO_PM.txt

Average Delay (sec/veh): 0.7 Worst Case Level Of Service: B[14.2]

Street Name:	Rocklin Road						Rocklin Manor Dr									
Approach:	North Bound			South Bound			East Bound			West Bound						
Movement:	L	T	R	L	T	R	L	T	R	L	T	R				
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled						
Rights:	Include			Include			Include			Include						
Lanes:	0	0	1	0	0	0	0	0	1	1	0	1	0	1	0	0
Volume Module:																
Base Vol:	14	0	1	0	0	0	0	456	25	0	374	0				
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Initial Bse:	14	0	1	0	0	0	0	456	25	0	374	0				
Added Vol:	22	0	7	0	0	0	0	0	69	12	0	0				
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0				
Initial Fut:	36	0	8	0	0	0	0	456	94	12	374	0				
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
PHF Adj:	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91				
PHF Volume:	40	0	9	0	0	0	0	501	103	13	411	0				
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0				
Final Volume:	40	0	9	0	0	0	0	501	103	13	411	0				
Critical Gap Module:																
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx				
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx				
Capacity Module:																
Cnflct Vol:	990	990	302	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	604	xxxx	xxxxx				
Potent Cap.:	276	248	742	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	983	xxxx	xxxxx				
Move Cap.:	273	245	742	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	983	xxxx	xxxxx				
Total Cap:	403	360	xxxxx	458	341	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx				
Volume/Cap:	0.10	0.00	0.01	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.01	xxxx	xxxx				
Level Of Service Module:																
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx				
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.7	xxxx	xxxxx				
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*				
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT				
Shared Cap.:	xxxx	439	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx				
SharedQueue:	xxxxx	0.4	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx				
Shrd ConDel:	xxxxx	14.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx				
Shared LOS:	*	B	*	*	*	*	*	*	*	*	*	*				
ApproachDel:	14.2			xxxxxx			xxxxxx			xxxxxx						
ApproachLOS:	B			*			*			*						

Note: Queue reported is the number of cars per lane.

Scenario Report

Scenario: STNP AM
 Command: Default Command
 Volume: STNP AM
 Geometry: Default Geometry
 Impact Fee: Default Impact Fee
 Trip Generation: AM
 Trip Distribution: STPP
 Paths: Default Path
 Routes: Default Route
 Configuration: Default Configuration

Level Of Service Computation Report
 Circular 212 Planning Method (Base Volume Alternative)

 Intersection #1 Rocklin Road/ Sierra College

 Cycle (sec): 100 Critical Vol./Cap.(X): 0.692
 Loss Time (sec): 16 Average Delay (sec/veh): xxxxxx
 Optimal Cycle: 92 Level Of Service: B

Street Name:	Rocklin Road						Sierra College								
	North Bound		South Bound		East Bound		West Bound								
Approach:	L	T	R	L	T	R	L	T	R	L	T	R			
Movement:	L	T	R	L	T	R	L	T	R	L	T	R			
Control:	Protected		Protected		Protected		Protected		Protected		Protected				
Rights:	Include		Include		Include		Include		Include		Include				
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0			
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			
Lanes:	2	0	1	1	0	1	0	3	0	1	1	0	1	1	0

Volume Module:

Base Vol:	410	578	90	103	684	204	152	203	214	86	238	176
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	410	578	90	103	684	204	152	203	214	86	238	176
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
PHF Volume:	506	714	111	127	844	252	188	251	264	106	294	217
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	506	714	111	127	844	252	188	251	264	106	294	217
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	557	714	111	127	844	252	188	251	264	106	294	217

Saturation Flow Module:

Sat/Lane:	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	1.73	0.27	1.00	3.00	1.00	1.00	2.00	1.00	1.00	1.15	0.85
Final Sat.:	2900	2509	391	1450	4350	1450	1450	2900	1450	1450	1667	1233

Capacity Analysis Module:

Vol/Sat:	0.19	0.28	0.28	0.09	0.19	0.17	0.13	0.09	0.18	0.07	0.18	0.18
Crit Volume:	278			281			188			256		
Crit Moves:	****			****			****			****		

Scenario Report

Scenario: STNP PM
 Command: Default Command
 Volume: STNP PM
 Geometry: Default Geometry
 Impact Fee: Default Impact Fee
 Trip Generation: PM
 Trip Distribution: STPP
 Paths: Default Path
 Routes: Default Route
 Configuration: Default Configuration

Level Of Service Computation Report
 Circular 212 Planning Method (Base Volume Alternative)

 Intersection #1 Rocklin Road/ Sierra College

 Cycle (sec): 100 Critical Vol./Cap.(X): 0.887
 Loss Time (sec): 16 Average Delay (sec/veh): xxxxxx
 Optimal Cycle: 180 Level Of Service: D

Street Name:	Rocklin Road						Sierra College								
	North Bound		South Bound		East Bound		West Bound								
Approach:	L	T	R	L	T	R	L	T	R	L	T	R			
Movement:															
Control:	Protected		Protected		Protected		Protected		Protected		Protected				
Rights:	Include		Include		Include		Include		Include		Include				
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0			
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			
Lanes:	2	0	1	1	0	1	0	3	0	1	1	0	1	1	0

Volume Module:

Base Vol:	313	925	61	226	735	298	365	256	356	59	188	202
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	313	925	61	226	735	298	365	256	356	59	188	202
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	313	925	61	226	735	298	365	256	356	59	188	202
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	313	925	61	226	735	298	365	256	356	59	188	202
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	313	925	61	226	735	298	365	256	356	59	188	202

Saturation Flow Module:

Sat/Lane:	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	1.88	0.12	1.00	3.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00
Final Sat.:	2900	2721	179	1450	4350	1450	1450	2900	1450	1450	1450	1450

Capacity Analysis Module:

Vol/Sat:	0.11	0.34	0.34	0.16	0.17	0.21	0.25	0.09	0.25	0.04	0.13	0.14
Crit Volume:	493		226	365		202						
Crit Moves:	***		***	***		***						

SHORT TERM PLUS PROJECT AM

Scenario Report

```
Scenario:          STNP AM

Command:          Default Command
Volume:           STNP AM
Geometry:         Default Geometry
Impact Fee:       Default Impact Fee
Trip Generation:  AM
Trip Distribution: STPP
Paths:            Default Path
Routes:           Default Route
Configuration:    Default Configuration
```

Level Of Service Computation Report
Circular 212 Planning Method (Future Volume Alternative)

```
*****
Intersection #1 Rocklin Road/ Sierra College
*****
Cycle (sec):      100          Critical Vol./Cap.(X):    0.705
Loss Time (sec):  0           Average Delay (sec/veh):  xxxxxx
Optimal Cycle:    77          Level Of Service:        C
*****
```

Street Name:	Rocklin Road						Sierra College					
	North Bound		South Bound		East Bound		West Bound					
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected		Protected		Protected		Protected		Protected		Protected	
Rights:	Include		Include		Include		Include		Include		Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2	0	2	0	1	1	1	0	2	0	1	1

Volume Module:

Base Vol:	410	578	90	103	684	204	152	203	214	86	238	176
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	410	578	90	103	684	204	152	203	214	86	238	176
Added Vol:	0	0	12	25	0	0	0	33	0	7	18	14
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	410	578	102	128	684	204	152	236	214	93	256	190
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
PHF Volume:	506	714	126	158	844	252	188	291	264	115	316	235
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	506	714	126	158	844	252	188	291	264	115	316	235
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	557	714	126	158	844	252	188	291	264	115	316	235

Saturation Flow Module:

Sat/Lane:	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	3.00	1.00	1.00	2.00	1.00	1.00	1.15	0.85
Final Sat.:	2900	2900	1450	1450	4350	1450	1450	2900	1450	1450	1665	1235

Capacity Analysis Module:

Vol/Sat:	0.19	0.25	0.09	0.11	0.19	0.17	0.13	0.10	0.18	0.08	0.19	0.19
Crit Volume:	278			281			188			275		
Crit Moves:	****			****			****			****		

SHORT TERM PLUS PROJECT PM

 Scenario Report

```

Scenario:          STNP PM

Command:          Default Command
Volume:           STNP PM
Geometry:         Default Geometry
Impact Fee:       Default Impact Fee
Trip Generation:  AM
Trip Distribution: STPP
Paths:            Default Path
Routes:           Default Route
Configuration:    Default Configuration
  
```

 Level Of Service Computation Report
 Circular 212 Planning Method (Future Volume Alternative)

```

*****
Intersection #1 Rocklin Road/ Sierra College
*****
Cycle (sec):      100          Critical Vol./Cap.(X):      0.893
Loss Time (sec):  0           Average Delay (sec/veh):    xxxxxx
Optimal Cycle:    180         Level Of Service:          D
*****
  
```

Street Name:	Rocklin Road						Sierra College					
	North Bound		South Bound		East Bound		West Bound					
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected		Protected		Protected		Protected		Protected		Protected	
Rights:	Include		Include		Include		Include		Include		Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2	0	2	0	1	1	1	0	2	0	1	1

Volume Module:

Base Vol:	313	925	61	226	735	298	365	256	356	59	188	202
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	313	925	61	226	735	298	365	256	356	59	188	202
Added Vol:	0	0	12	25	0	0	0	33	0	7	18	14
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	313	925	73	251	735	298	365	289	356	66	206	216
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	313	925	73	251	735	298	365	289	356	66	206	216
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	313	925	73	251	735	298	365	289	356	66	206	216
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	313	925	73	251	735	298	365	289	356	66	206	216

Saturation Flow Module:

Sat/Lane:	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	3.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00
Final Sat.:	2900	2900	1450	1450	4350	1450	1450	2900	1450	1450	1450	1450

Capacity Analysis Module:

Vol/Sat:	0.11	0.32	0.05	0.17	0.17	0.21	0.25	0.10	0.25	0.05	0.14	0.15
Crit Volume:	463		251		365		216		216		216	
Crit Moves:	****		****		****		****		****		****	

SHORT TERM PLUS PROJECT AM WITH WATERLILY ACCESS

Scenario Report

```

Scenario:          STNP AM
Command:          Default Command
Volume:           STNP AM
Geometry:         Default Geometry
Impact Fee:       Default Impact Fee
Trip Generation:  AM
Trip Distribution: STPP
Paths:            Default Path
Routes:           Default Route
Configuration:    Default Configuration
    
```

```

Level Of Service Computation Report
Circular 212 Planning Method (Future Volume Alternative)
*****
Intersection #1 Rocklin Road/ Sierra College
*****
Cycle (sec):      100          Critical Vol./Cap.(X):      0.711
Loss Time (sec):  16          Average Delay (sec/veh):    xxxxxx
Optimal Cycle:    98          Level Of Service:          C
*****
Street Name:      Rocklin Road          Sierra College
Approach:         North Bound          South Bound          East Bound          West Bound
Movement:         L - T - R          L - T - R          L - T - R          L - T - R
-----|-----|-----|-----|
Control:          Protected          Protected          Protected          Protected
Rights:           Include          Include          Include          Include
Min. Green:       0 0 0          0 0 0          0 0 0          0 0 0
Y+R:              4.0 4.0 4.0      4.0 4.0 4.0      4.0 4.0 4.0      4.0 4.0 4.0
Lanes:            2 0 1 1 0        1 0 3 0 1        1 0 2 0 1        1 0 1 1 0
-----|-----|-----|-----|
Volume Module:
Base Vol:         410 578 90 103 684 204 152 203 214 86 238 176
Growth Adj:       1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse:      410 578 90 103 684 204 152 203 214 86 238 176
Added Vol:        16 12 3 6 0 0 0 0 8 0 12 16 12
PasserByVol:      0 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut:      426 590 93 109 684 204 152 211 214 98 254 188
User Adj:         1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj:          0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81
PHF Volume:       526 728 115 135 844 252 188 260 264 121 314 232
Reduct Vol:       0 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol:      526 728 115 135 844 252 188 260 264 121 314 232
PCE Adj:          1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj:          1.10 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume:      579 728 115 135 844 252 188 260 264 121 314 232
-----|-----|-----|-----|
Saturation Flow Module:
Sat/Lane:         1450 1450 1450 1450 1450 1450 1450 1450 1450 1450 1450
Adjustment:       1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes:            2.00 1.73 0.27 1.00 3.00 1.00 1.00 2.00 1.00 1.00 1.15 0.85
Final Sat.:       2900 2505 395 1450 4350 1450 1450 2900 1450 1450 1667 1233
-----|-----|-----|-----|
Capacity Analysis Module:
Vol/Sat:          0.20 0.29 0.29 0.09 0.19 0.17 0.13 0.09 0.18 0.08 0.19 0.19
Crit Volume:      289          281          188          273
Crit Moves:       ****          ****          ****          ****
*****
    
```


SHORT TERM PLUS PROJECT AM WITH WATERLILY ACCESS

SHORT TERM PLUS PROJECT AM WITH WATERLILY ACCESS

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 Sierra College Blvd/Water Lily Lane

Average Delay (sec/veh): 0.4 Worst Case Level Of Service: C[15.6]

Street Name: Sierra College Blvd Water Lily Lane
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Control: Uncontrolled Uncontrolled Stop Sign Stop Sign
Rights: Include Include Include Include
Lanes: 0 0 1 1 0 0 0 2 1 0 0 0 0 1 0 0 0 0 1

Volume Module:
Base Vol: 0 1074 16 0 1010 0 0 0 0 0 0 0 33
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 0 1074 16 0 1010 0 0 0 0 0 0 0 33
Added Vol: 0 3 0 0 12 0 0 0 0 0 0 0 28
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 0 1077 16 0 1022 0 0 0 0 0 0 0 61
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 0.83 0.83 0.83 0.83 0.83 0.83 0.83 0.83 0.83 0.83 0.83
PHF Volume: 0 1298 19 0 1231 0 0 0 0 0 0 0 73
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0 0
FinalVolume: 0 1298 19 0 1231 0 0 0 0 0 0 0 73

Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxxx xxxxx 6.5 6.9 xxxxx xxxx 6.9
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxxx xxxxx xxxxx 4.0 3.3 xxxxx xxxx 3.3

Capacity Module:
Cnflct Vol: xxxx xxxx xxxxx xxxxx xxxxx xxxxx xxxxx 2548 410 xxxxx xxxxx 658
Potent Cap.: xxxx xxxx xxxxx xxxxx xxxxx xxxxx xxxxx 27 596 xxxxx xxxxx 411
Move Cap.: xxxx xxxx xxxxx xxxxx xxxxx xxxxx xxxxx 27 596 xxxxx xxxxx 411
Volume/Cap: xxxx xxxx xxxxx xxxxx xxxxx xxxxx xxxxx 0.00 0.00 xxxxx xxxxx 0.18

Level Of Service Module:
2Way95thQ: xxxx xxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 0.6
Control Del:xxxxx xxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 15.6
LOS by Move: * C
Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 0 xxxxx xxxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx
Shared LOS: *
ApproachDel: xxxxxx xxxxxx 15.6
ApproachLOS: * C

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Rocklin Road/ Rocklin Manor Dr

Average Delay (sec/veh): 1.3 Worst Case Level Of Service: C[16.9]

Street Name: Roklin Road Rocklin Manor Dr
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Control: Stop Sign Stop Sign Uncontrolled Uncontrolled
Rights: Include Include Include Include
Lanes: 0 0 1! 0 0 0 0 0 0 0 0 0 1 1 0 1 0 1 0 0

Volume Module:
Base Vol: 23 0 0 0 0 0 0 0 0 408 5 1 495 0
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 23 0 0 0 0 0 0 0 0 408 5 1 495 0
Added Vol: 40 0 12 0 0 0 0 0 0 17 3 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 63 0 12 0 0 0 0 0 0 408 22 4 495 0
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81
PHF Volume: 78 0 15 0 0 0 0 0 0 504 27 5 611 0
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0 0 0
FinalVolume: 78 0 15 0 0 0 0 0 0 504 27 5 611 0

Critical Gap Module:
Critical Gp: 6.4 6.5 6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx 4.1 xxxx xxxxx
FollowUpTim: 3.5 4.0 3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx 2.2 xxxx xxxxx

Capacity Module:
Cnflct Vol: 1138 1138 265 xxxxx xxxx xxxxx xxxxx xxxx xxxxx 531 xxxxx xxxxx
Potent Cap.: 225 203 778 xxxxx xxxx xxxxx xxxxx xxxx xxxxx 1047 xxxxx xxxxx
Move Cap.: 224 202 778 xxxxx xxxx xxxxx xxxxx xxxx xxxxx 1047 xxxxx xxxxx
Total Cap: 361 323 xxxxx 376 319 xxxxx xxxxx xxxx xxxxx xxxxx xxxxx xxxxx
Volume/Cap: 0.22 0.00 0.02 xxxxx xxxx xxxxx xxxxx xxxx xxxxx 0.00 xxxxx xxxxx

Level Of Service Module:
2Way95thQ: xxxxx xxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 0.0 xxxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 8.5 xxxxx xxxxx
LOS by Move: * A * *
Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
Shared Cap.: xxxxx 395 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx
SharedQueue:xxxxxx 0.9 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx
Shrd ConDel:xxxxxx 16.9 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx
Shared LOS: * C *
ApproachDel: 16.9 xxxxxxx xxxxxxx xxxxxxx
ApproachLOS: C * C

Note: Queue reported is the number of cars per lane.

SHORT TERM PLUS PROJECT PM WITH WATERLILY ACCESS

 Scenario Report

Scenario: STNP PM

Command: Default Command
 Volume: STNP PM
 Geometry: Default Geometry
 Impact Fee: Default Impact Fee
 Trip Generation: PM
 Trip Distribution: STPP
 Paths: Default Path
 Routes: Default Route
 Configuration: Default Configuration

 Level Of Service Computation Report
 Circular 212 Planning Method (Future Volume Alternative)

 Intersection #1 Rocklin Road/ Sierra College

 Cycle (sec): 100 Critical Vol./Cap.(X): 0.915
 Loss Time (sec): 16 Average Delay (sec/veh): xxxxxx
 Optimal Cycle: 180 Level Of Service: E

Street Name:	Rocklin Road						Sierra College													
Approach:	North Bound		South Bound		East Bound		West Bound		West Bound		West Bound									
Movement:	L	- T	- R	L	- T	- R	L	- T	- R	L	- T	- R								
Control:	Protected		Protected		Protected		Protected		Protected		Protected									
Rights:	Include		Include		Include		Include		Include		Include									
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0								
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0								
Lanes:	2	0	1	1	0	1	0	3	0	1	1	0	2	0	1	1	0	1	1	0

Volume Module:

Base Vol:	313	925	61	226	735	298	365	256	356	59	188	202
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	313	925	61	226	735	298	365	256	356	59	188	202
Added Vol:	9	7	12	24	0	0	0	32	0	7	9	7
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	322	932	73	250	735	298	365	288	356	66	197	209
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	322	932	73	250	735	298	365	288	356	66	197	209
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	322	932	73	250	735	298	365	288	356	66	197	209
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	322	932	73	250	735	298	365	288	356	66	197	209

Saturation Flow Module:

Sat/Lane:	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	1.85	0.15	1.00	3.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00
Final Sat.:	2900	2689	211	1450	4350	1450	1450	2900	1450	1450	1450	1450

Capacity Analysis Module:

Vol/Sat:	0.11	0.35	0.35	0.17	0.17	0.21	0.25	0.10	0.25	0.05	0.14	0.14
Crit Volume:	503			250			365			209		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
Circular 212 Planning Method (Base Volume Alternative)

Intersection #1 Rocklin Road/ Sierra College

Cycle (sec): 180 Critical Vol./Cap. (X): 0.922
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 180 Level Of Service: E

Street Name:	Rocklin Road					Sierra College						
	North Bound			South Bound		East Bound			West Bound			
Approach:	L - T - R			L - T - R		L - T - R			L - T - R			
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected		Protected			Protected			
Rights:	Include			Include		Ovl			Include			
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2	0	3	0	1		2	0	2	0	1	1

Volume Module:												
Base Vol:	988	1165	245	55	1104	498	14	296	724	115	225	123
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	988	1165	245	55	1104	498	14	296	724	115	225	123
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	988	1165	245	55	1104	498	14	296	724	115	225	123
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	988	1165	245	55	1104	498	14	296	724	115	225	123
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	988	1165	245	55	1104	498	14	296	724	115	225	123

Saturation Flow Module:												
Sat/Lane:	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	1.00	1.29	0.71
Final Sat.:	2900	4350	1450	2900	4350	1450	2900	2900	1450	1450	1875	1025

Capacity Analysis Module:												
Vol/Sat:	0.34	0.27	0.17	0.02	0.25	0.34	0.00	0.10	0.50	0.08	0.12	0.12
Crit Volume:	0			498			724			115		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2 Sierra College Blvd/Water Lily Lane

Average Delay (sec/veh): 0.3 Worst Case Level Of Service: C [18.6]

Street Name:	Sierra College Blvd				Water Lily Lane										
Approach:	North Bound		South Bound		East Bound		West Bound								
Movement:	L	T	R	L	T	R	L	T	R	L	T	R			
Control:	Uncontrolled		Uncontrolled		Stop Sign		Stop Sign								
Rights:	Include		Include		Include		Include								
Lanes:	0	0	2	1	0	0	0	2	1	0	0	0	0	1	0

Volume Module:

Base Vol:	0	2385	13	0	1943	0	0	0	0	0	0	68
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	2385	13	0	1943	0	0	0	0	0	0	68
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2385	13	0	1943	0	0	0	0	0	0	68
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Volume:	0	2385	13	0	1943	0	0	0	0	0	0	68

Critical Gap Module:

Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	6.5	6.9	xxxxx	xxxx	6.9
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	4.0	3.3	xxxxx	xxxx	3.3

Capacity Module:

Cnflct Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	4341	648	xxxx	xxxx	802
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	2	418	xxxx	xxxx	331
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	2	418	xxxx	xxxx	331
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	0.00	xxxx	xxxx	0.21

Level Of Service Module:

2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	0.8
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	18.6
LOS by Move:	*	*	*	*	*	*	*	*	*	*	*	C
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	0	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxxx			xxxxxxx			xxxxxxx			18.6		
ApproachLOS:	*			*			*			C		

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
 2000 HCM Unsignalized Method (Base Volume Alternative)
 Intersection #3 Rocklin Road/ Rocklin Manor Dr
 Average Delay (sec/veh): 0.7 Worst Case Level Of Service: B [14.1]
 Page 4

Level Of Service Computation Report
Circular 212 Planning Method (Base Volume Alternative)

Intersection #1 Rocklin Road/ Sierra College

Cycle (sec): 180 Critical Vol./Cap. (X): 0.920
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 180 Level Of Service: E

Street Name:	Rocklin Road					Sierra College						
	North Bound			South Bound		East Bound			West Bound			
Approach:	L - T - R			L - T - R		L - T - R			L - T - R			
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected		Protected			Protected			
Rights:	Include			Include		Ovl			Include			
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2	0	3	0	1		2	0	2	0	1	1

Volume Module:												
Base Vol:	666	1398	292	121	1022	180	28	463	905	89	256	63
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	666	1398	292	121	1022	180	28	463	905	89	256	63
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	666	1398	292	121	1022	180	28	463	905	89	256	63
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	666	1398	292	121	1022	180	28	463	905	89	256	63
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	666	1398	292	121	1022	180	28	463	905	89	256	63

Saturation Flow Module:												
Sat/Lane:	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	1.00	1.61	0.39
Final Sat.:	2900	4350	1450	2900	4350	1450	2900	2900	1450	1450	2327	573

Capacity Analysis Module:												
Vol/Sat:	0.23	0.32	0.20	0.04	0.23	0.12	0.01	0.16	0.62	0.06	0.11	0.11
Crit Volume:	0			341			905			89		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2 Sierra College Blvd/Water Lily Lane

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: C [17.4]

Street Name:	Sierra College Blvd				Water Lily Lane										
Approach:	North Bound		South Bound		East Bound		West Bound								
Movement:	L	T	R	L	T	R	L	T	R	L	T	R			
Control:	Uncontrolled		Uncontrolled		Stop Sign		Stop Sign								
Ri ghts:	Incl ude		Incl ude		Incl ude		Incl ude								
Lanes:	0	0	2	1	0	0	0	2	1	0	0	0	0	1	0

Volume Module:	Sierra College Blvd				Water Lily Lane						
Base Vol :	0	2294	62	0	2016	0	0	0	0	0	45
Growth Adj :	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	2294	62	0	2016	0	0	0	0	0	45
User Adj :	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj :	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2294	62	0	2016	0	0	0	0	0	45
Reduct Vol :	0	0	0	0	0	0	0	0	0	0	0
Final Volume:	0	2294	62	0	2016	0	0	0	0	0	45

Critical Gap Module:	Sierra College Blvd				Water Lily Lane								
Critical Gp:	xxxxx	xxxx	xxxxxx	xxxxxx	xxxxx	xxxx	xxxxxx	xxxxxx	6.5	6.9	xxxxxx	xxxx	6.9
FollowUpTim:	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxxx	xxxx	xxxxxx	xxxxxx	4.0	3.3	xxxxxx	xxxx	3.3

Capacity Module:	Sierra College Blvd				Water Lily Lane							
Cnfl ict Vol :	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	4372	672	xxxx	xxxx	796
Potent Cap. :	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	2	403	xxxx	xxxx	334
Move Cap. :	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	2	403	xxxx	xxxx	334
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	0.00	xxxx	xxxx	0.13

Level Of Service Module:	Sierra College Blvd				Water Lily Lane							
2Way95thQ:	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	0.5
Control Del:	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	17.4
LOS by Move:	*	*	*	*	*	*	*	*	*	*	*	C
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	0	xxxx	xxxx	xxxxxx
SharedQueue:	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx
Shrd ConDel:	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxxx			xxxxxxx			xxxxxxx			17.4		
ApproachLOS:	*			*			*			C		

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
 2000 HCM Unsignalized Method (Base Volume Alternative)
 Intersection #3 Rocklin Road/ Rocklin Manor Dr
 Average Delay (sec/veh): 0.6 Worst Case Level Of Service: C [16.5]
 Page 4

Level Of Service Computation Report
Circular 212 Planning Method (Base Volume Alternative)

Intersection #1 Rocklin Road/ Sierra College

Cycle (sec): 180 Critical Vol./Cap. (X): 0.930
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 180 Level Of Service: E

Street Name:	Rocklin Road					Sierra College						
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2	0	3	0	1	1	2	0	2	0	1	1

Volume Module:	North Bound			South Bound			East Bound			West Bound		
Base Vol:	988	1165	248	61	1104	498	14	304	724	127	257	147
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	988	1165	248	61	1104	498	14	304	724	127	257	147
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	988	1165	248	61	1104	498	14	304	724	127	257	147
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	988	1165	248	61	1104	498	14	304	724	127	257	147
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	988	1165	248	61	1104	498	14	304	724	127	257	147

Saturation Flow Module:	North Bound			South Bound			East Bound			West Bound		
Sat/Lane:	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	1.00	1.27	0.73
Final Sat.:	2900	4350	1450	2900	4350	1450	2900	2900	1450	1450	1845	1055

Capacity Analysis Module:	North Bound			South Bound			East Bound			West Bound		
Vol/Sat:	0.34	0.27	0.17	0.02	0.25	0.34	0.00	0.10	0.50	0.09	0.14	0.14
Crit Volume:	0			498			724			127		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2 Sierra College Blvd/Water Lily Lane

Average Delay (sec/veh): 0.3 Worst Case Level Of Service: C [18.7]

Street Name:	Sierra College Blvd				Water Lily Lane															
Approach:	North Bound		South Bound		East Bound		West Bound													
Movement:	L	T	R	L	T	R	L	T	R	L	T	R								
Control:	Uncontrolled		Uncontrolled		Stop Sign		Stop Sign													
Ri ghts:	I ncl ude		I ncl ude		I ncl ude		I ncl ude													
Lanes:	0	0	2	1	0	0	0	2	1	0	0	0	0	1	0	0	0	0	0	1

Volume Module:												
Base Vol :	0	2388	13	0	1955	0	0	0	0	0	0	68
Growth Adj :	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ini tial Bse:	0	2388	13	0	1955	0	0	0	0	0	0	68
User Adj :	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj :	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2388	13	0	1955	0	0	0	0	0	0	68
Reduct Vol :	0	0	0	0	0	0	0	0	0	0	0	0
Fi nal Vol ume:	0	2388	13	0	1955	0	0	0	0	0	0	68

Critical Gap Module:												
Cri tical Gp:	xxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	6.5	6.9	xxxxxx	xxxx	6.9
Fol lowUpTi m:	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	4.0	3.3	xxxxxx	xxxx	3.3

Capacity Module:												
Cnfl ict Vol :	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	4356	652	xxxx	xxxx	803
Potent Cap. :	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	2	416	xxxx	xxxx	331
Move Cap. :	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	2	416	xxxx	xxxx	331
Vol ume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	0.00	xxxx	xxxx	0.21

Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	0.8
Control Del:	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	18.7
LOS by Move:	*	*	*	*	*	*	*	*	*	*	*	C
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap. :	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	0	xxxx	xxxx	xxxxxx
SharedQueue:	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx
Shrd ConDel:	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel :	xxxxxxx			xxxxxxx			xxxxxxx			18.7		
ApproachLOS:	*			*			*			C		

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
 2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #3 Rocklin Road/ Rocklin Manor Dr

Average Delay (sec/veh): 1.8 Worst Case Level Of Service: C [16.9]

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Level Of Service Computation Report
Circular 212 Planning Method (Base Volume Alternative)

Intersection #1 Rocklin Road/ Sierra College

Cycle (sec): 180 Critical Vol./Cap. (X): 0.925
Loss Time (sec): 0 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 180 Level Of Service: E

Street Name:	Rocklin Road					Sierra College						
	North Bound			South Bound		East Bound			West Bound			
Approach:	L - T - R			L - T - R		L - T - R			L - T - R			
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected		Protected			Protected			
Rights:	Include			Include		Ovl			Include			
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2	0	3	0	1		2	0	2	0	1	1

Volume Module:												
Base Vol:	666	1398	304	146	1022	180	28	496	905	96	274	77
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	666	1398	304	146	1022	180	28	496	905	96	274	77
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	666	1398	304	146	1022	180	28	496	905	96	274	77
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	666	1398	304	146	1022	180	28	496	905	96	274	77
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	666	1398	304	146	1022	180	28	496	905	96	274	77

Saturation Flow Module:												
Sat/Lane:	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	1.00	1.56	0.44
Final Sat.:	2900	4350	1450	2900	4350	1450	2900	2900	1450	1450	2264	636

Capacity Analysis Module:												
Vol/Sat:	0.23	0.32	0.21	0.05	0.23	0.12	0.01	0.17	0.62	0.07	0.12	0.12
Crit Volume:	0			341			905			96		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2 Sierra College Blvd/Water Lily Lane

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: C [17.5]

Street Name:	Sierra College Blvd				Water Lily Lane										
Approach:	North Bound		South Bound		East Bound		West Bound								
Movement:	L	T	R	L	T	R	L	T	R	L	T	R			
Control:	Uncontrolled		Uncontrolled		Stop Sign		Stop Sign								
Ri ghts:	Incl ude		Incl ude		Incl ude		Incl ude								
Lanes:	0	0	2	1	0	0	0	2	1	0	0	0	0	1	0

Volume Module:	Sierra College Blvd				Water Lily Lane									
Base Vol :	0	2306	62	0	2023	0	0	0	0	0	0	0	0	45
Growth Adj :	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	2306	62	0	2023	0	0	0	0	0	0	0	0	45
User Adj :	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj :	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2306	62	0	2023	0	0	0	0	0	0	0	0	45
Reduct Vol :	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Final Volume:	0	2306	62	0	2023	0	0	0	0	0	0	0	0	45

Critical Gap Module:	Sierra College Blvd				Water Lily Lane								
Critical Gp:	xxxxx	xxxx	xxxxxx	xxxxxx	xxxxx	xxxx	xxxxxx	xxxxxx	6.5	6.9	xxxxxx	xxxx	6.9
FollowUpTim:	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	4.0	3.3	xxxxxx	xxxx	3.3

Capacity Module:	Sierra College Blvd				Water Lily Lane								
Cnfl ict Vol :	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxx	xxxxxx	xxxx	4391	674	xxxx	xxxx	800
Potent Cap. :	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxx	xxxxxx	xxxx	2	402	xxxx	xxxx	332
Move Cap. :	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxx	xxxxxx	xxxx	2	402	xxxx	xxxx	332
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	0.00	xxxx	xxxx	0.14

Level Of Service Module:	Sierra College Blvd				Water Lily Lane									
2Way95thQ:	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxx	xxxxxx	xxxx	0.5	
Control Del:	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	17.5	
LOS by Move:	*	*	*	*	*	*	*	*	*	*	*	*	C	
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT		
Shared Cap. :	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxx	0	xxxx	xxxx	xxxxxx
SharedQueue:	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxx	xxxxxx	
Shrd ConDel:	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxxxx	xxxx	xxxxxx	xxxxxx	xxxx	xxxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*	*	
ApproachDel :	xxxxxxx				xxxxxxx				xxxxxxx				17.5	
ApproachLOS:	*			*	*			*	*			*	C	

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
 2000 HCM Unsignalized Method (Base Volume Alternative)
 Intersection #3 Rocklin Road/ Rocklin Manor Dr
 Average Delay (sec/veh): 1.3 Worst Case Level Of Service: C [19.9]
 Page 4

CUMULATIVE PLUS PROJECT AM WITH WATERLILY ACCESS

CPP_WO_AM.txt

Level Of Service Computation Report
Circular 212 Planning Method (Future Volume Alternative)

Intersection #1 Rocklin Road/ Sierra College

Cycle (sec): 100 Critical Vol./Cap. (X): 0.930
 Loss Time (sec): 16 Average Delay (sec/veh): xxxxxx
 Optimal Cycle: 180 Level Of Service: E

Street Name:	Rocklin Road					Sierra College						
	North Bound			South Bound		East Bound			West Bound			
Approach:	L - T - R			L - T - R		L - T - R			L - T - R			
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected		Protected			Protected			
Rights:	Include			Include		Ovl			Include			
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2	0	3	0	1	1	2	0	2	0	1	1

Volume Module:												
Base Vol:	988	1165	245	55	1104	498	14	296	724	115	225	123
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	988	1165	245	55	1104	498	14	296	724	115	225	123
Added Vol:	16	12	3	6	0	0	0	8	0	12	16	12
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	1004	1177	248	61	1104	498	14	304	724	127	241	135
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	1004	1177	248	61	1104	498	14	304	724	127	241	135
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	1004	1177	248	61	1104	498	14	304	724	127	241	135
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.00
Final Volume:	1104	1177	248	67	1104	498	15	304	724	127	241	135

Saturation Flow Module:												
Sat/Lane:	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	1.00	1.28	0.72
Final Sat.:	2900	4350	1450	2900	4350	1450	2900	2900	1450	1450	1859	1041

Capacity Analysis Module:												
Vol/Sat:	0.38	0.27	0.17	0.02	0.25	0.34	0.01	0.10	0.50	0.09	0.13	0.13
Crit Volume:	0			498			724			127		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

CUMULATIVE PLUS PROJECT AM WITH WATERLILY ACCESS

CPP_WO_AM.txt

Intersection #2 Sierra College Blvd/Water Lily Lane

Average Delay (sec/veh): 0.4 Worst Case Level Of Service: C [20.3]

Street Name:	Sierra College Blvd					Water Lily Lane														
Approach:	North Bound		South Bound			East Bound			West Bound											
Movement:	L	T	R	L	T	R	L	T	R	L	T	R								
Control:	Uncontrolled					Uncontrolled					Stop Sign			Stop Sign						
Rights:	Incl ude					Incl ude					Incl ude			Incl ude						
Lanes:	0	0	2	1	0	0	0	2	1	0	0	0	0	1	0	0	0	0	0	1

Volume Module:	Sierra College Blvd					Water Lily Lane						
Base Vol:	0	2385	13	0	1943	0	0	0	0	0	0	68
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	2385	13	0	1943	0	0	0	0	0	0	68
Added Vol:	0	3	0	0	12	0	0	0	0	0	0	28
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	2388	13	0	1955	0	0	0	0	0	0	96
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2388	13	0	1955	0	0	0	0	0	0	96
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Volume:	0	2388	13	0	1955	0	0	0	0	0	0	96

Critical Gap Module:	Sierra College Blvd					Water Lily Lane						
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	6.5	6.9	xxxxx	xxxx	6.9
FollowUpTi m:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	4.0	3.3	xxxxx	xxxx	3.3

Capacity Module:	Sierra College Blvd					Water Lily Lane						
Cnfl ict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	4356	652	xxxx	xxxx	803
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	2	416	xxxx	xxxx	331
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	2	416	xxxx	xxxx	331
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	0.00	xxxx	xxxx	0.29

Level Of Service Module:	Sierra College Blvd					Water Lily Lane						
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	1.2
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	20.3
LOS by Move:	*	*	*	*	*	*	*	*	*	*	*	C
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	0	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxxx			xxxxxxx			xxxxxxx					20.3
ApproachLOS:	*			*			*					C

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Rocklin Road/ Rocklin Manor Dr

Average Delay (sec/veh): 1.4 Worst Case Level Of Service: C [15.6]
Page 4

CUMULATIVE PLUS PROJECT AM WITH WATERLILY ACCESS

CPP_WO_AM.txt

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*****
Street Name:      Roklin Road                      Rocklin Manor Dr
Approach:         North Bound          South Bound          East Bound          West Bound
Movement:        L - T - R            L - T - R            L - T - R            L - T - R
-----|-----|-----|-----|-----|
Control :        Stop Sign            Stop Sign            Uncontrolled        Uncontrolled
Rights:          Include              Include              Include              Include
Lanes:           0 0 1! 0 0            0 0 0 0 0          0 0 1 1 0          1 0 2 0 0
-----|-----|-----|-----|
Volume Module:
Base Vol :       40  0  10  0  0  0  0  0  585  10  10  514  0
Growth Adj :    1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse:     40  0  10  0  0  0  0  0  585  10  10  514  0
Added Vol :      40  0  12  0  0  0  0  0  0  17  3  0  0
PasserByVol :    0  0  0  0  0  0  0  0  0  0  0  0  0
Initial Fut:     80  0  22  0  0  0  0  0  585  27  13  514  0
User Adj :       1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj :        1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume:      80  0  22  0  0  0  0  0  585  27  13  514  0
Reduct Vol :     0  0  0  0  0  0  0  0  0  0  0  0  0
Final Volume:    80  0  22  0  0  0  0  0  585  27  13  514  0
-----|-----|-----|-----|
Critical Gap Module:
Critical Gp:     6.8  6.5  6.9 xxxxxx xxxxx xxxxxx xxxxxx xxxxx xxxxxx 4.1 xxxxx xxxxxx
FollowUpTim:    3.5  4.0  3.3 xxxxxx xxxxx xxxxxx xxxxxx xxxxx xxxxxx 2.2 xxxxx xxxxxx
-----|-----|-----|-----|
Capacity Module:
Conflict Vol :   882 1139 306 xxxxx xxxxx xxxxxx xxxxx xxxxx xxxxxx 612 xxxxx xxxxxx
Potent Cap. :    290 203 696 xxxxx xxxxx xxxxxx xxxxx xxxxx xxxxxx 977 xxxxx xxxxxx
Move Cap. :      287 200 696 xxxxx xxxxx xxxxxx xxxxx xxxxx xxxxxx 977 xxxxx xxxxxx
Total Cap:       401 322 xxxxxx 369 315 xxxxxx xxxxx xxxxx xxxxxx xxxxx xxxxx xxxxxx
Volume/Cap:      0.20 0.00 0.03 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 0.01 xxxxx xxxxx
-----|-----|-----|-----|
Level Of Service Module:
2Way95thQ:      xxxxx xxxxx xxxxxx xxxxx xxxxx xxxxxx xxxxx xxxxx xxxxxx 0.0 xxxxx xxxxxx
Control Del:    xxxxxx xxxxx xxxxxx xxxxxx xxxxx xxxxxx xxxxxx xxxxx xxxxxx 8.7 xxxxx xxxxxx
LOS by Move:    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
Movement:       LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap. :   xxxxx 441 xxxxxx xxxxx xxxxx xxxxxx xxxxx xxxxx xxxxxx xxxxx xxxxx xxxxxx
SharedQueue:    xxxxxx 0.9 xxxxxx xxxxxx xxxxx xxxxxx xxxxxx xxxxx xxxxxx xxxxxx xxxxx xxxxxx
Shrd ConDel:    xxxxxx 15.6 xxxxxx xxxxxx xxxxx xxxxxx xxxxxx xxxxx xxxxxx xxxxxx xxxxx xxxxxx
Shared LOS:     * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
ApproachDel:    15.6 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
ApproachLOS:    C * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Note: Queue reported is the number of cars per lane.

CUMULATIVE PLUS PROJECT PM WITH WATERLILY ACCESS

CPP_WO_PM.txt

Level Of Service Computation Report
Circular 212 Planning Method (Future Volume Alternative)

Intersection #1 Rocklin Road/ Sierra College

Cycle (sec): 100 Critical Vol./Cap. (X): 0.925
Loss Time (sec): 16 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 180 Level Of Service: E

Street Name:	Rocklin Road					Sierra College														
	North Bound			South Bound		East Bound			West Bound											
Approach:	L	T	R	L	T	R	L	T	R	L	T	R								
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R					
Control:	Protected			Protected			Protected			Protected										
Rights:	Include			Include			Ovl			Include										
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0								
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0								
Lanes:	2	0	3	0	1	2	0	3	0	1	2	0	2	0	1	1	0	1	1	0

Volume Module:												
Base Vol:	666	1398	292	121	1022	180	28	463	905	89	256	63
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	666	1398	292	121	1022	180	28	463	905	89	256	63
Added Vol:	9	7	12	24	0	0	0	32	0	7	9	7
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	675	1405	304	145	1022	180	28	495	905	96	265	70
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	675	1405	304	145	1022	180	28	495	905	96	265	70
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	675	1405	304	145	1022	180	28	495	905	96	265	70
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	675	1405	304	145	1022	180	28	495	905	96	265	70

Saturation Flow Module:												
Sat/Lane:	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	1.00	1.58	0.42
Final Sat.:	2900	4350	1450	2900	4350	1450	2900	2900	1450	1450	2294	606

Capacity Analysis Module:												
Vol/Sat:	0.23	0.32	0.21	0.05	0.23	0.12	0.01	0.17	0.62	0.07	0.12	0.12
Crit Volume:	0				341				905	96		
Crit Moves:	****				****				****	****		

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Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

CUMULATIVE PLUS PROJECT PM WITH WATERLILY ACCESS

CPP_WO_PM.txt

Intersection #2 Sierra College Blvd/Water Lily Lane

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: C [18.2]

Street Name:	Sierra College Blvd						Water Lily Lane													
Approach:	North Bound			South Bound			East Bound			West Bound										
Movement:	L	T	R	L	T	R	L	T	R	L	T	R								
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign										
Rights:	Include			Include			Include			Include										
Lanes:	0	0	2	1	0	0	0	2	1	0	0	0	0	1	0	0	0	0	0	1

Volume Module:	Sierra College Blvd NB			Sierra College Blvd SB			Water Lily Lane EB			Water Lily Lane WB		
Base Vol:	0	2294	62	0	2016	0	0	0	0	0	0	45
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	2294	62	0	2016	0	0	0	0	0	0	45
Added Vol:	0	12	0	0	7	0	0	0	0	0	0	15
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	2306	62	0	2023	0	0	0	0	0	0	60
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2306	62	0	2023	0	0	0	0	0	0	60
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Volume:	0	2306	62	0	2023	0	0	0	0	0	0	60

Critical Gap Module:	Sierra College Blvd NB			Sierra College Blvd SB			Water Lily Lane EB			Water Lily Lane WB		
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	6.5	6.9	xxxxx	xxxx	6.9
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	4.0	3.3	xxxxx	xxxx	3.3

Capacity Module:	Sierra College Blvd NB			Sierra College Blvd SB			Water Lily Lane EB			Water Lily Lane WB		
Cnflct Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	4391	674	xxxx	xxxx	800
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	2	402	xxxx	xxxx	332
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	2	402	xxxx	xxxx	332
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	0.00	xxxx	xxxx	0.18

Level Of Service Module:	Sierra College Blvd NB			Sierra College Blvd SB			Water Lily Lane EB			Water Lily Lane WB		
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	0.6
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	18.2
LOS by Move:	*	*	*	*	*	*	*	*	*	*	*	C
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	0	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxxx			xxxxxxx			xxxxxxx			18.2		
ApproachLOS:	*			*			*			C		

Note: Queue reported is the number of cars per lane.

Traffic 8.0.0715 (c) 2008 Dowling Assoc. Licensed to OMNI-MEANS, ROSEVILLE, CA
CNP PM Mon Nov 23, 2015 01:54:07 Page 5-1

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Rocklin Road/ Rocklin Manor Dr

Average Delay (sec/veh): 1.0 Worst Case Level Of Service: C [18.6]
Page 4

CUMULATIVE PLUS PROJECT PM WITH WATERLILY ACCESS

CPP_WO_PM.txt

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*****
Street Name:      Roklin Road                      Rocklin Manor Dr
Approach:         North Bound          South Bound          East Bound          West Bound
Movement:        L - T - R            L - T - R            L - T - R            L - T - R
-----|-----|-----|-----|-----|
Control :        Stop Sign            Stop Sign            Uncontrolled        Uncontrolled
Rights:          Include                Include                Include                Include
Lanes:           0 0 1! 0 0            0 0 0 0 0            0 0 1 1 0            1 0 2 0 0
-----|-----|-----|-----|
Volume Module:
Base Vol:        30 0 10 0 0 0 0 0 836 40 10 425 0
Growth Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse:    30 0 10 0 0 0 0 0 836 40 10 425 0
Added Vol:      22 0 7 0 0 0 0 0 0 69 12 0 0
PasserByVol:    0 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut:    52 0 17 0 0 0 0 0 836 109 22 425 0
User Adj:       1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj:        1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume:     52 0 17 0 0 0 0 0 836 109 22 425 0
Reduct Vol:     0 0 0 0 0 0 0 0 0 0 0 0 0
Final Volume:   52 0 17 0 0 0 0 0 836 109 22 425 0
-----|-----|-----|-----|
Critical Gap Module:
Critical Gp:    6.8 6.5 6.9 xxxxx xxxx xxxxxx xxxxxx xxxx xxxxxx 4.1 xxxxx xxxxxx
FollowUpTim:   3.5 4.0 3.3 xxxxxx xxxx xxxxxx xxxxxx xxxx xxxxxx 2.2 xxxxx xxxxxx
-----|-----|-----|-----|
Capacity Module:
Conflict Vol:   1147 1360 473 xxxxx xxxxx xxxxxx xxxxx xxxxx xxxxxx 945 xxxxx xxxxxx
Potent Cap.:   196 150 543 xxxxx xxxxx xxxxxx xxxxx xxxxx xxxxxx 734 xxxxx xxxxxx
Move Cap.:     191 145 543 xxxxx xxxxx xxxxxx xxxxx xxxxx xxxxxx 734 xxxxx xxxxxx
Total Cap:     296 262 xxxxxx 351 240 xxxxxx xxxxx xxxxx xxxxxx xxxxx xxxxx xxxxxx
Volume/Cap:    0.18 0.00 0.03 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx 0.03 xxxxx xxxxx
-----|-----|-----|-----|
Level Of Service Module:
2Way95thQ:     xxxxx xxxxx xxxxxx xxxxx xxxxx xxxxxx xxxxx xxxxx xxxxxx 0.1 xxxxx xxxxxx
Control Del:   xxxxxx xxxxx xxxxxx xxxxxx xxxxx xxxxxx xxxxxx xxxxx xxxxxx 10.1 xxxxx xxxxxx
LOS by Move:   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:   xxxxx 333 xxxxxx xxxxx xxxxx xxxxxx xxxxx xxxxx xxxxxx xxxxx xxxxx xxxxxx
SharedQueue:   xxxxxx 0.8 xxxxxx xxxxxx xxxxx xxxxxx xxxxxx xxxxx xxxxxx xxxxxx xxxxx xxxxxx
Shrd ConDel:   xxxxxx 18.6 xxxxxx xxxxxx xxxxx xxxxxx xxxxxx xxxxx xxxxxx xxxxxx xxxxx xxxxxx
Shared LOS:    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
ApproachDel:   18.6 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
ApproachLOS:   C * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*****

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Note: Queue reported is the number of cars per lane.

Synchro LOS Worksheets

4: I-80 WB On Ramp/I-80 WB Off Ramp & Rocklin Rd Performance by approach

Approach	EB	WB	SB	All
Denied Delay (hr)	0.5	0.0	0.0	0.5
Denied Del/Veh (s)	1.4	0.0	0.3	0.6
Total Delay (hr)	8.9	4.4	2.0	15.3
Total Del/Veh (s)	25.2	9.3	21.4	16.6
Vehicles Entered	1269	1704	341	3314
Vehicles Exited	1265	1695	339	3299
Hourly Exit Rate	1012	1356	271	2639
Input Volume	1018	1374	282	2674
% of Volume	99	99	96	99

5: I-80 EB Off Ramp/I-80 EB On Ramp & Rocklin Rd Performance by approach































Approach	EB	WB	NB	All
Denied Delay (hr)	0.0	0.1	3.2	3.3
Denied Del/Veh (s)	0.0	0.2	6.4	3.3
Total Delay (hr)	4.4	5.8	16.4	26.6
Total Del/Veh (s)	19.0	22.6	32.7	26.9
Vehicles Entered	825	926	1804	3555
Vehicles Exited	812	917	1792	3521
Hourly Exit Rate	650	734	1434	2817
Input Volume	674	744	1432	2850
% of Volume	96	99	100	99

Total Network Performance

Denied Delay (hr)	3.8
Denied Del/Veh (s)	3.1
Total Delay (hr)	42.8
Total Del/Veh (s)	35.2
Vehicles Entered	4381
Vehicles Exited	4319
Hourly Exit Rate	3455
Input Volume	8999
% of Volume	38

HCM Signalized Intersection Capacity Analysis
6: Sierra College Blvd & I-80 EB Ramps/Crossing Dr

Existing Conditions
AM Peak Hour

												
Movement	EBL2	EBT	EBR	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL	SBT	SBR
Lane Configurations	 	 					  			 	 	
Traffic Volume (vph)	283	85	171	56	107	63	330	340	50	162	1007	183
Future Volume (vph)	283	85	171	56	107	63	330	340	50	162	1007	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1	4.1	3.7	3.7	4.0	5.7	5.7	5.7	4.1	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	3471	1553	1736	1553	1553	4988	1553	1553	3367	3471	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3367	3471	1553	1736	1553	1553	4988	1553	1553	3367	3471	1553
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	314	94	190	62	119	70	367	378	56	180	1119	203
RTOR Reduction (vph)	0	0	147	0	0	0	0	0	37	0	0	100
Lane Group Flow (vph)	314	94	43	62	119	70	367	378	19	180	1119	103
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	NA	Perm	Prot	pt+ov	Free	NA	Perm	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8 1		2			1	6	
Permitted Phases			4			Free		2	2			6
Actuated Green, G (s)	13.6	16.6	16.6	6.1	21.3	73.8	25.0	25.0	25.0	8.5	37.6	37.6
Effective Green, g (s)	13.6	16.6	16.6	6.1	21.3	73.8	25.0	25.0	25.0	8.5	37.6	37.6
Actuated g/C Ratio	0.18	0.22	0.22	0.08	0.29	1.00	0.34	0.34	0.34	0.12	0.51	0.51
Clearance Time (s)	4.1	4.1	4.1	3.7			5.7	5.7	5.7	4.1	5.7	5.7
Vehicle Extension (s)	2.5	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	620	780	349	143	448	1553	1689	526	526	387	1768	791
v/s Ratio Prot	c0.09	0.03		0.04	c0.08		0.07			0.05	c0.32	
v/s Ratio Perm			0.03			0.05		c0.24	0.01			0.07
v/c Ratio	0.51	0.12	0.12	0.43	0.27	0.05	0.22	0.72	0.04	0.47	0.63	0.13
Uniform Delay, d1	27.1	22.8	22.8	32.2	20.2	0.0	17.4	21.3	16.3	30.5	13.1	9.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.0	0.1	0.8	0.1	0.1	0.0	3.9	0.0	0.3	0.5	0.0
Delay (s)	27.6	22.8	22.9	33.0	20.3	0.1	17.4	25.2	16.3	30.8	13.7	9.5
Level of Service	C	C	C	C	C	A	B	C	B	C	B	A
Approach Delay (s)		25.3					21.0				15.2	
Approach LOS		C					C				B	
Intersection Summary												
HCM 2000 Control Delay			18.8				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			73.8				Sum of lost time (s)				17.6	
Intersection Capacity Utilization			53.3%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 7: Sierra College Blvd & Commons Dr/I-80 WB Ramps

Existing Conditions
 AM Peak Hour



Movement	EBL	EBR	EBR2	WBL2	WBT	WBR	NBL	NBT	NBR	SBT	SBR	SBR2
Lane Configurations												
Traffic Volume (vph)	10	24	26	615	58	206	62	547	111	713	295	45
Future Volume (vph)	10	24	26	615	58	206	62	547	111	713	295	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.4	4.8	4.8	4.2	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00		0.97	0.95	0.95	1.00	0.91	1.00	0.95	1.00	1.00
Frt	1.00	0.85		1.00	0.91	0.85	1.00	1.00	0.85	1.00	0.85	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1736	1553		3367	1586	1475	1736	4988	1553	3471	1553	1553
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1736	1553		3367	1586	1475	1736	4988	1553	3471	1553	1553
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	12	28	30	715	67	240	72	636	129	829	343	52
RTOR Reduction (vph)	0	47	0	0	31	98	0	0	68	0	0	34
Lane Group Flow (vph)	12	11	0	715	127	51	72	636	61	829	343	18
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	pt+ov		Prot	NA	Perm	Prot	NA	Perm	NA	Perm	Perm
Protected Phases	7	4 5		3	8		5	2		6		
Permitted Phases						8			2		6	6
Actuated Green, G (s)	0.9	16.0		22.7	27.4	27.4	5.9	37.9	37.9	27.8	27.8	27.8
Effective Green, g (s)	0.9	16.0		22.7	27.4	27.4	5.9	37.9	37.9	27.8	27.8	27.8
Actuated g/C Ratio	0.01	0.20		0.28	0.34	0.34	0.07	0.47	0.47	0.34	0.34	0.34
Clearance Time (s)	4.1			4.4	4.8	4.8	4.2	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	1.0			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	19	307		945	537	500	126	2339	728	1194	534	534
v/s Ratio Prot	0.01	0.01		c0.21	c0.08		c0.04	0.13		c0.24		
v/s Ratio Perm						0.03			0.04		0.22	0.01
v/c Ratio	0.63	0.04		0.76	0.24	0.10	0.57	0.27	0.08	0.69	0.64	0.03
Uniform Delay, d1	39.8	26.2		26.5	19.2	18.3	36.2	13.1	11.9	22.8	22.3	17.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	40.9	0.0		3.1	0.1	0.0	3.8	0.0	0.0	1.4	2.0	0.0
Delay (s)	80.7	26.2		29.6	19.3	18.3	40.1	13.1	11.9	24.3	24.3	17.6
Level of Service	F	C		C	B	B	D	B	B	C	C	B
Approach Delay (s)					26.4			15.2		24.0		
Approach LOS					C			B		C		

Intersection Summary

HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.8	Sum of lost time (s)	18.8
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

4: I-80 WB On Ramp/I-80 WB Off Ramp & Rocklin Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBR	All
Denied Delay (hr)	0.1	0.4	0.4	0.3	0.0	0.0	1.3
Denied Del/Veh (s)	0.6	2.6	2.6	1.2	0.2	0.3	1.5
Total Delay (hr)	5.2	2.7	17.1	3.0	0.5	4.5	33.0
Total Del/Veh (s)	27.7	17.0	116.6	10.5	40.6	53.7	37.9
Vehicles Entered	668	566	515	1006	42	298	3095
Vehicles Exited	668	562	513	1008	42	299	3092
Hourly Exit Rate	668	562	513	1008	42	299	3092
Input Volume	674	555	615	1103	40	300	3288
% of Volume	99	101	83	91	104	100	94

5: I-80 EB Off Ramp/I-80 EB On Ramp & Rocklin Rd Performance by movement































Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Delay (hr)	0.0	0.0	102.1	6.0	0.2	0.0	0.2	108.4
Denied Del/Veh (s)	0.0	0.0	300.7	299.2	1.3	2.2	1.3	127.7
Total Delay (hr)	2.7	1.9	17.3	0.4	5.2	0.0	4.3	32.0
Total Del/Veh (s)	53.8	12.6	59.8	25.9	38.7	66.4	27.5	39.9
Vehicles Entered	179	538	1024	60	483	2	560	2846
Vehicles Exited	181	542	1021	60	481	2	560	2847
Hourly Exit Rate	181	542	1021	60	481	2	560	2847
Input Volume	191	532	1222	69	475	2	551	3042
% of Volume	95	102	84	87	101	100	102	94

Total Network Performance

Denied Delay (hr)	109.7
Denied Del/Veh (s)	100.2
Total Delay (hr)	66.2
Total Del/Veh (s)	62.3
Vehicles Entered	3730
Vehicles Exited	3725
Hourly Exit Rate	3725
Input Volume	10219
% of Volume	36

HCM Signalized Intersection Capacity Analysis
 6: Sierra College Blvd & I-80 EB Ramps/Crossing Dr

Existing Conditions
 PM Peak Hour

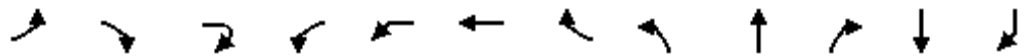
												
Movement	EBL2	EBT	EBR	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL	SBT	SBR
Lane Configurations	 	 					  			 	 	
Traffic Volume (vph)	365	164	46	80	282	229	679	519	103	323	663	343
Future Volume (vph)	365	164	46	80	282	229	679	519	103	323	663	343
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1	4.1	3.7	3.7	4.0	5.7	5.7	5.7	4.1	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	1583	1583	5085	1583	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	1583	1583	5085	1583	1583	3433	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	384	173	48	84	297	241	715	546	108	340	698	361
RTOR Reduction (vph)	0	0	37	0	0	0	0	0	52	0	0	157
Lane Group Flow (vph)	384	173	11	84	297	241	715	546	56	340	698	204
Turn Type	Prot	NA	Perm	Prot	pt+ov	Free	NA	Perm	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8 1		2			1	6	
Permitted Phases			4			Free		2	2			6
Actuated Green, G (s)	17.8	26.5	26.5	9.5	36.7	113.7	45.3	45.3	45.3	14.8	64.2	64.2
Effective Green, g (s)	17.8	26.5	26.5	9.5	36.7	113.7	45.3	45.3	45.3	14.8	64.2	64.2
Actuated g/C Ratio	0.16	0.23	0.23	0.08	0.32	1.00	0.40	0.40	0.40	0.13	0.56	0.56
Clearance Time (s)	4.1	4.1	4.1	3.7			5.7	5.7	5.7	4.1	5.7	5.7
Vehicle Extension (s)	2.5	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	537	824	368	147	510	1583	2025	630	630	446	1998	893
v/s Ratio Prot	c0.11	0.05		0.05	c0.19		0.14			c0.10	0.20	
v/s Ratio Perm			0.01			0.15		c0.34	0.04			0.13
v/c Ratio	0.72	0.21	0.03	0.57	0.58	0.15	0.35	0.87	0.09	0.76	0.35	0.23
Uniform Delay, d1	45.5	35.2	33.7	50.1	32.1	0.0	23.9	31.4	21.3	47.8	13.4	12.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.2	0.0	0.0	3.3	1.1	0.2	0.0	11.6	0.0	6.8	0.0	0.0
Delay (s)	49.7	35.2	33.7	53.4	33.2	0.2	24.0	43.1	21.3	54.6	13.5	12.4
Level of Service	D	D	C	D	C	A	C	D	C	D	B	B
Approach Delay (s)		44.3					31.4				23.2	
Approach LOS		D					C				C	

Intersection Summary		
HCM 2000 Control Delay	29.2	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.77	
Actuated Cycle Length (s)	113.7	Sum of lost time (s) 17.6
Intersection Capacity Utilization	57.7%	ICU Level of Service B
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Sierra College Blvd & Commons Dr/I-80 WB Ramps

Existing Conditions
PM Peak Hour



Movement	EBL	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	176	80	405	3	96	220	239	853	234	748	300
Future Volume (vph)	64	176	80	405	3	96	220	239	853	234	748	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.4	4.8	4.8	4.8	4.2	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00		0.95	0.95	0.95	0.95	1.00	0.91	1.00	0.95	1.00
Frt	1.00	0.85		1.00	1.00	0.94	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1736	1553		1649	1649	1627	1475	1736	4988	1553	3471	1553
Flt Permitted	0.95	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1736	1553		1649	1649	1627	1475	1736	4988	1553	3471	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	68	187	85	431	3	102	234	254	907	249	796	319
RTOR Reduction (vph)	0	55	0	0	0	19	121	0	0	117	0	0
Lane Group Flow (vph)	68	217	0	215	219	156	40	254	907	132	796	319
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	pt+ov		Prot	Perm	NA	Perm	Prot	NA	Perm	NA	Perm
Protected Phases	7	4 5		3		8		5	2		6	
Permitted Phases					8		8			2		6
Actuated Green, G (s)	6.4	36.0		17.2	23.7	23.7	23.7	18.6	50.5	50.5	27.7	27.7
Effective Green, g (s)	6.4	36.0		17.2	23.7	23.7	23.7	18.6	50.5	50.5	27.7	27.7
Actuated g/C Ratio	0.07	0.38		0.18	0.25	0.25	0.25	0.20	0.53	0.53	0.29	0.29
Clearance Time (s)	4.1			4.4	4.8	4.8	4.8	4.2	5.7	5.7	5.7	5.7
Vehicle Extension (s)	1.0			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	116	587		297	410	405	367	339	2645	823	1009	451
v/s Ratio Prot	0.04	0.14		c0.13		0.10		c0.15	0.18		c0.23	
v/s Ratio Perm					c0.13		0.03			0.09		0.21
v/c Ratio	0.59	0.37		0.72	0.53	0.39	0.11	0.75	0.34	0.16	0.79	0.71
Uniform Delay, d1	43.1	21.4		36.8	31.0	29.7	27.6	36.1	12.8	11.5	31.1	30.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	0.1		7.2	0.7	0.2	0.0	7.7	0.0	0.0	3.8	4.1
Delay (s)	47.9	21.5		44.0	31.6	29.9	27.6	43.8	12.9	11.5	34.9	34.2
Level of Service	D	C		D	C	C	C	D	B	B	C	C
Approach Delay (s)						33.9			18.2		34.2	
Approach LOS						C			B		C	

Intersection Summary		
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.74	C
Actuated Cycle Length (s)	95.2	Sum of lost time (s)
Intersection Capacity Utilization	63.3%	18.8
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		B

Movement	SBR2
Lane Configurations	7
Traffic Volume (vph)	56
Future Volume (vph)	56
Ideal Flow (vphpl)	1900
Total Lost time (s)	5.7
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1553
Flt Permitted	1.00
Satd. Flow (perm)	1553
Peak-hour factor, PHF	0.94
Adj. Flow (vph)	60
RTOR Reduction (vph)	43
Lane Group Flow (vph)	17
Heavy Vehicles (%)	4%
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Actuated Green, G (s)	27.7
Effective Green, g (s)	27.7
Actuated g/C Ratio	0.29
Clearance Time (s)	5.7
Vehicle Extension (s)	1.0
Lane Grp Cap (vph)	451
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.04
Uniform Delay, d1	24.2
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	24.2
Level of Service	C
Approach Delay (s)	
Approach LOS	
Intersection Summary	

4: I-80 WB On Ramp/I-80 WB Off Ramp & Rocklin Rd Performance by approach

Approach	EB	WB	SB	All
Denied Delay (hr)	0.5	0.0	0.0	0.5
Denied Del/Veh (s)	1.3	0.0	0.3	0.5
Total Delay (hr)	9.9	4.1	2.4	16.3
Total Del/Veh (s)	27.9	8.4	24.0	17.4
Vehicles Entered	1276	1742	356	3374
Vehicles Exited	1272	1734	351	3357
Hourly Exit Rate	1018	1387	281	2686
Input Volume	1022	1400	283	2704
% of Volume	100	99	99	99

5: I-80 EB Off Ramp/I-80 EB On Ramp & Rocklin Rd Performance by approach































Approach	EB	WB	NB	All
Denied Delay (hr)	0.0	0.1	2.3	2.3
Denied Del/Veh (s)	0.0	0.3	4.6	2.3
Total Delay (hr)	4.7	6.7	15.8	27.2
Total Del/Veh (s)	19.8	24.7	32.1	27.2
Vehicles Entered	854	969	1777	3600
Vehicles Exited	841	959	1763	3563
Hourly Exit Rate	673	767	1410	2850
Input Volume	679	772	1435	2886
% of Volume	99	99	98	99

Total Network Performance

Denied Delay (hr)	2.8
Denied Del/Veh (s)	2.3
Total Delay (hr)	44.5
Total Del/Veh (s)	36.2
Vehicles Entered	4415
Vehicles Exited	4347
Hourly Exit Rate	3478
Input Volume	9101
% of Volume	38

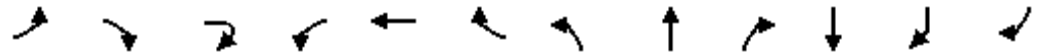
HCM Signalized Intersection Capacity Analysis
6: Sierra College Blvd & I-80 EB Ramps/Crossing Dr

Existing Plus Project Conditions
AM Peak Hour

													
Movement	EBL2	EBT	EBR	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL	SBT	SBR	
Lane Configurations	 	 					  			 	 		
Traffic Volume (vph)	283	85	172	56	107	63	345	414	50	162	1013	183	
Future Volume (vph)	283	85	172	56	107	63	345	414	50	162	1013	183	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.1	4.1	4.1	3.7	3.7	4.0	5.7	5.7	5.7	4.1	5.7	5.7	
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.97	0.95	1.00	
Frt	1.00	1.00	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3367	3471	1553	1736	1553	1553	4988	1553	1553	3367	3471	1553	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	3367	3471	1553	1736	1553	1553	4988	1553	1553	3367	3471	1553	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	314	94	191	62	119	70	383	460	56	180	1126	203	
RTOR Reduction (vph)	0	0	154	0	0	0	0	0	30	0	0	82	
Lane Group Flow (vph)	314	94	37	62	119	70	383	460	26	180	1126	121	
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	
Turn Type	Prot	NA	Perm	Prot	pt+ov	Free	NA	Perm	Perm	Prot	NA	Perm	
Protected Phases	7	4		3	8	1	2			1	6		
Permitted Phases			4			Free		2	2			6	
Actuated Green, G (s)	13.8	17.8	17.8	6.3	22.6	92.8	42.5	42.5	42.5	8.6	55.2	55.2	
Effective Green, g (s)	13.8	17.8	17.8	6.3	22.6	92.8	42.5	42.5	42.5	8.6	55.2	55.2	
Actuated g/C Ratio	0.15	0.19	0.19	0.07	0.24	1.00	0.46	0.46	0.46	0.09	0.59	0.59	
Clearance Time (s)	4.1	4.1	4.1	3.7			5.7	5.7	5.7	4.1	5.7	5.7	
Vehicle Extension (s)	2.5	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	500	665	297	117	378	1553	2284	711	711	312	2064	923	
v/s Ratio Prot	c0.09	0.03		0.04	c0.08		0.08			0.05	c0.32		
v/s Ratio Perm			0.02			0.05		c0.30	0.02			0.08	
v/c Ratio	0.63	0.14	0.12	0.53	0.31	0.05	0.17	0.65	0.04	0.58	0.55	0.13	
Uniform Delay, d1	37.1	31.2	31.0	41.8	28.8	0.0	14.8	19.4	13.9	40.4	11.3	8.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.1	0.0	0.1	2.0	0.2	0.1	0.0	1.5	0.0	1.6	0.2	0.0	
Delay (s)	39.2	31.2	31.1	43.8	28.9	0.1	14.8	20.9	13.9	42.0	11.4	8.3	
Level of Service	D	C	C	D	C	A	B	C	B	D	B	A	
Approach Delay (s)		35.4					17.9				14.7		
Approach LOS		D					B				B		
Intersection Summary													
HCM 2000 Control Delay			20.1	HCM 2000 Level of Service						C			
HCM 2000 Volume to Capacity ratio			0.60										
Actuated Cycle Length (s)			92.8	Sum of lost time (s)						17.6			
Intersection Capacity Utilization			53.5%	ICU Level of Service						A			
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 7: Sierra College Blvd & Commons Dr/I-80 WB Ramps

Existing Plus Project Conditions
 AM Peak Hour



Movement	EBL	EBR	EBR2	WBL2	WBT	WBR	NBL	NBT	NBR	SBT	SBR	SBR2
Lane Configurations												
Traffic Volume (vph)	10	24	26	618	58	206	62	560	113	716	295	45
Future Volume (vph)	10	24	26	618	58	206	62	560	113	716	295	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.4	4.8	4.8	4.2	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00		0.97	0.95	0.95	1.00	0.91	1.00	0.95	1.00	1.00
Frt	1.00	0.85		1.00	0.91	0.85	1.00	1.00	0.85	1.00	0.85	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1736	1553		3367	1586	1475	1736	4988	1553	3471	1553	1553
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1736	1553		3367	1586	1475	1736	4988	1553	3471	1553	1553
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	12	28	30	719	67	240	72	651	131	833	343	52
RTOR Reduction (vph)	0	47	0	0	31	99	0	0	69	0	0	34
Lane Group Flow (vph)	12	11	0	719	127	50	72	651	62	833	343	18
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	pt+ov		Prot	NA	Perm	Prot	NA	Perm	NA	Perm	Perm
Protected Phases	7	4 5		3	8		5	2		6		
Permitted Phases						8			2		6	6
Actuated Green, G (s)	0.9	16.0		22.9	27.5	27.5	6.0	38.3	38.3	28.1	28.1	28.1
Effective Green, g (s)	0.9	16.0		22.9	27.5	27.5	6.0	38.3	38.3	28.1	28.1	28.1
Actuated g/C Ratio	0.01	0.20		0.28	0.34	0.34	0.07	0.47	0.47	0.35	0.35	0.35
Clearance Time (s)	4.1			4.4	4.8	4.8	4.2	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	1.0			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	19	305		948	536	498	128	2349	731	1199	536	536
v/s Ratio Prot	0.01	0.01		c0.21	c0.08		c0.04	0.13		c0.24		
v/s Ratio Perm						0.03			0.04		0.22	0.01
v/c Ratio	0.63	0.04		0.76	0.24	0.10	0.56	0.28	0.08	0.69	0.64	0.03
Uniform Delay, d1	40.0	26.4		26.7	19.4	18.4	36.4	13.1	11.8	22.9	22.3	17.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	40.9	0.0		3.1	0.1	0.0	3.3	0.0	0.0	1.4	1.9	0.0
Delay (s)	80.9	26.4		29.8	19.4	18.5	39.7	13.1	11.9	24.3	24.2	17.6
Level of Service	F	C		C	B	B	D	B	B	C	C	B
Approach Delay (s)					26.6			15.2		24.0		
Approach LOS					C			B		C		

Intersection Summary		
HCM 2000 Control Delay	22.7	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.67	
Actuated Cycle Length (s)	81.3	Sum of lost time (s) 18.8
Intersection Capacity Utilization	53.5%	ICU Level of Service A
Analysis Period (min)	15	
c Critical Lane Group		

4: I-80 WB On Ramp/I-80 WB Off Ramp & Rocklin Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBR	All
Denied Delay (hr)	0.1	0.4	1.8	1.0	0.0	0.0	3.4
Denied Del/Veh (s)	0.6	2.6	13.3	3.8	0.2	0.3	4.0
Total Delay (hr)	5.8	2.3	17.3	3.0	0.4	6.1	34.8
Total Del/Veh (s)	29.6	14.9	120.4	10.8	34.5	67.7	40.1
Vehicles Entered	695	550	500	976	42	317	3080
Vehicles Exited	692	549	500	976	42	314	3073
Hourly Exit Rate	692	549	500	976	42	314	3073
Input Volume	689	555	622	1111	42	300	3319
% of Volume	100	99	80	88	99	105	93

5: I-80 EB Off Ramp/I-80 EB On Ramp & Rocklin Rd Performance by movement































Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Delay (hr)	0.0	0.0	151.4	7.6	0.2	0.0	0.2	159.4
Denied Del/Veh (s)	0.1	0.0	438.7	422.2	1.5	1.2	1.5	186.1
Total Delay (hr)	2.8	1.8	17.4	0.4	5.4	0.0	4.5	32.3
Total Del/Veh (s)	53.3	11.7	62.3	26.5	40.6	41.8	28.4	40.8
Vehicles Entered	187	557	990	51	472	3	558	2818
Vehicles Exited	188	559	982	50	469	2	558	2808
Hourly Exit Rate	188	559	982	50	469	2	558	2808
Input Volume	191	549	1237	70	475	2	563	3087
% of Volume	98	102	79	71	99	100	99	91

Total Network Performance

Denied Delay (hr)	162.8
Denied Del/Veh (s)	147.4
Total Delay (hr)	68.2
Total Del/Veh (s)	64.6
Vehicles Entered	3712
Vehicles Exited	3695
Hourly Exit Rate	3695
Input Volume	10340
% of Volume	36

HCM Signalized Intersection Capacity Analysis
 6: Sierra College Blvd & I-80 EB Ramps/Crossing Dr

Existing Plus Project Conditions
 PM Peak Hour

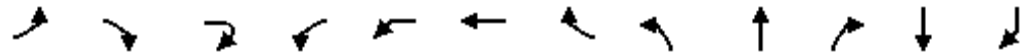
												
Movement	EBL2	EBT	EBR	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL	SBT	SBR
Lane Configurations	 	 					  			 	 	
Traffic Volume (vph)	365	164	48	80	282	229	686	525	103	323	685	343
Future Volume (vph)	365	164	48	80	282	229	686	525	103	323	685	343
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1	4.1	3.7	3.7	4.0	5.7	5.7	5.7	4.1	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	1583	1583	5085	1583	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	1583	1583	5085	1583	1583	3433	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	384	173	51	84	297	241	722	553	108	340	721	361
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	49	0	0	163
Lane Group Flow (vph)	384	173	13	84	297	241	722	553	59	340	721	198
Turn Type	Prot	NA	Perm	Prot	pt+ov	Free	NA	Perm	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8 1		2			1		6
Permitted Phases			4			Free		2	2			6
Actuated Green, G (s)	18.5	30.2	30.2	9.8	40.6	118.7	45.7	45.7	45.7	15.4	65.2	65.2
Effective Green, g (s)	18.5	30.2	30.2	9.8	40.6	118.7	45.7	45.7	45.7	15.4	65.2	65.2
Actuated g/C Ratio	0.16	0.25	0.25	0.08	0.34	1.00	0.39	0.39	0.39	0.13	0.55	0.55
Clearance Time (s)	4.1	4.1	4.1	3.7			5.7	5.7	5.7	4.1	5.7	5.7
Vehicle Extension (s)	2.5	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	535	900	402	146	541	1583	1957	609	609	445	1943	869
v/s Ratio Prot	c0.11	0.05		0.05	c0.19		0.14			c0.10	0.20	
v/s Ratio Perm			0.01			0.15		c0.35	0.04			0.13
v/c Ratio	0.72	0.19	0.03	0.58	0.55	0.15	0.37	0.91	0.10	0.76	0.37	0.23
Uniform Delay, d1	47.6	34.7	33.3	52.4	31.6	0.0	26.2	34.5	23.3	49.9	15.1	13.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.3	0.0	0.0	3.4	0.6	0.2	0.0	17.0	0.0	6.9	0.0	0.0
Delay (s)	51.9	34.7	33.3	55.8	32.2	0.2	26.2	51.5	23.3	56.8	15.2	13.8
Level of Service	D	C	C	E	C	A	C	D	C	E	B	B
Approach Delay (s)		45.4					36.1				24.8	
Approach LOS		D					D				C	

Intersection Summary		
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.78	
Actuated Cycle Length (s)	118.7	Sum of lost time (s) 17.6
Intersection Capacity Utilization	58.1%	ICU Level of Service B
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 7: Sierra College Blvd & Commons Dr/I-80 WB Ramps

Existing Plus Project Conditions
 PM Peak Hour



Movement	EBL	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Configurations	↶	↷		↶	↷	↶	↷	↶	↑↑↑	↷	↑↑	↷
Traffic Volume (vph)	64	176	80	416	3	96	220	239	859	235	759	300
Future Volume (vph)	64	176	80	416	3	96	220	239	859	235	759	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.4	4.4	4.8	4.8	4.2	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00		0.95	0.95	0.95	0.95	1.00	0.91	1.00	0.95	1.00
Frt	1.00	0.85		1.00	1.00	0.94	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1736	1553		1649	1649	1627	1475	1736	4988	1553	3471	1553
Flt Permitted	0.95	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1736	1553		1649	1649	1627	1475	1736	4988	1553	3471	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	68	187	85	443	3	102	234	254	914	250	807	319
RTOR Reduction (vph)	0	55	0	0	0	19	120	0	0	117	0	0
Lane Group Flow (vph)	68	217	0	221	225	156	41	254	914	133	807	319
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	pt+ov		Prot	Prot	NA	Perm	Prot	NA	Perm	NA	Perm
Protected Phases	7	4 5		3	3	8		5	2		6	
Permitted Phases							8			2		6
Actuated Green, G (s)	6.4	36.4		17.9	17.9	24.6	24.6	18.8	51.6	51.6	28.6	28.6
Effective Green, g (s)	6.4	36.4		17.9	17.9	24.6	24.6	18.8	51.6	51.6	28.6	28.6
Actuated g/C Ratio	0.07	0.37		0.18	0.18	0.25	0.25	0.19	0.53	0.53	0.29	0.29
Clearance Time (s)	4.1			4.4	4.4	4.8	4.8	4.2	5.7	5.7	5.7	5.7
Vehicle Extension (s)	1.0			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	114	581		303	303	411	373	335	2647	824	1021	456
v/s Ratio Prot	0.04	0.14		0.13	c0.14	c0.10		c0.15	0.18		c0.23	
v/s Ratio Perm							0.03			0.09		0.21
v/c Ratio	0.60	0.37		0.73	0.74	0.38	0.11	0.76	0.35	0.16	0.79	0.70
Uniform Delay, d1	44.1	22.1		37.4	37.5	30.0	27.9	37.1	13.1	11.7	31.5	30.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	0.1		7.3	8.3	0.2	0.0	8.4	0.0	0.0	4.0	3.8
Delay (s)	49.6	22.3		44.6	45.8	30.2	27.9	45.5	13.1	11.7	35.5	34.3
Level of Service	D	C		D	D	C	C	D	B	B	D	C
Approach Delay (s)						38.3			18.7		34.6	
Approach LOS						D			B		C	

Intersection Summary		
HCM 2000 Control Delay	28.7	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.71	C
Actuated Cycle Length (s)	97.2	Sum of lost time (s)
Intersection Capacity Utilization	63.6%	18.8
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		B

Movement	SBR2
Lane Configurations	7
Traffic Volume (vph)	56
Future Volume (vph)	56
Ideal Flow (vphpl)	1900
Total Lost time (s)	5.7
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1553
Flt Permitted	1.00
Satd. Flow (perm)	1553
Peak-hour factor, PHF	0.94
Adj. Flow (vph)	60
RTOR Reduction (vph)	42
Lane Group Flow (vph)	18
Heavy Vehicles (%)	4%
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Actuated Green, G (s)	28.6
Effective Green, g (s)	28.6
Actuated g/C Ratio	0.29
Clearance Time (s)	5.7
Vehicle Extension (s)	1.0
Lane Grp Cap (vph)	456
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.04
Uniform Delay, d1	24.5
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	24.5
Level of Service	C
Approach Delay (s)	
Approach LOS	
Intersection Summary	

4: I-80 WB On Ramp/I-80 WB Off Ramp & Rocklin Rd Performance by approach

Approach	EB	WB	SB	All
Denied Delay (hr)	0.5	0.0	0.0	0.5
Denied Del/Veh (s)	1.3	0.0	0.3	0.5
Total Delay (hr)	10.3	4.7	2.4	17.4
Total Del/Veh (s)	28.2	9.4	24.4	18.1
Vehicles Entered	1308	1800	360	3468
Vehicles Exited	1300	1791	357	3448
Hourly Exit Rate	1040	1433	286	2758
Input Volume	1055	1449	291	2795
% of Volume	99	99	98	99

5: I-80 EB Off Ramp/I-80 EB On Ramp & Rocklin Rd Performance by approach































Approach	EB	WB	NB	All
Denied Delay (hr)	0.0	0.1	3.8	3.9
Denied Del/Veh (s)	0.0	0.3	7.4	3.7
Total Delay (hr)	4.8	7.2	16.5	28.5
Total Del/Veh (s)	19.6	24.9	32.2	27.2
Vehicles Entered	883	1045	1839	3767
Vehicles Exited	867	1035	1823	3725
Hourly Exit Rate	694	828	1458	2980
Input Volume	713	821	1498	3031
% of Volume	97	101	97	98

Total Network Performance

Denied Delay (hr)	4.4
Denied Del/Veh (s)	3.4
Total Delay (hr)	46.9
Total Del/Veh (s)	36.7
Vehicles Entered	4599
Vehicles Exited	4527
Hourly Exit Rate	3622
Input Volume	9490
% of Volume	38

HCM Signalized Intersection Capacity Analysis
6: Sierra College Blvd & I-80 EB Ramps/Crossing Dr

Short Term Conditions
AM Peak Hour

												
Movement	EBL2	EBT	EBR	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL	SBT	SBR
Lane Configurations	 	 					  			 	 	
Traffic Volume (vph)	305	175	200	80	145	75	366	376	115	200	1013	185
Future Volume (vph)	305	175	200	80	145	75	366	376	115	200	1013	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1	4.1	3.7	3.7	4.0	5.7	5.7	5.7	4.1	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	3471	1553	1736	1553	1553	4988	1553	1553	3367	3471	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3367	3471	1553	1736	1553	1553	4988	1553	1553	3367	3471	1553
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	339	194	222	89	161	83	407	418	128	222	1126	206
RTOR Reduction (vph)	0	0	180	0	0	0	0	0	63	0	0	92
Lane Group Flow (vph)	339	194	42	89	161	83	407	418	65	222	1126	114
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	NA	Perm	Prot	pt+ov	Free	NA	Perm	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	1	2			1	6	
Permitted Phases			4			Free		2	2			6
Actuated Green, G (s)	15.1	16.8	16.8	9.2	24.7	88.3	34.6	34.6	34.6	10.1	48.8	48.8
Effective Green, g (s)	15.1	16.8	16.8	9.2	24.7	88.3	34.6	34.6	34.6	10.1	48.8	48.8
Actuated g/C Ratio	0.17	0.19	0.19	0.10	0.28	1.00	0.39	0.39	0.39	0.11	0.55	0.55
Clearance Time (s)	4.1	4.1	4.1	3.7			5.7	5.7	5.7	4.1	5.7	5.7
Vehicle Extension (s)	2.5	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	575	660	295	180	434	1553	1954	608	608	385	1918	858
v/s Ratio Prot	c0.10	0.06		0.05	c0.10		0.08			0.07	c0.32	
v/s Ratio Perm			0.03			0.05		c0.27	0.04			0.07
v/c Ratio	0.59	0.29	0.14	0.49	0.37	0.05	0.21	0.69	0.11	0.58	0.59	0.13
Uniform Delay, d1	33.7	30.7	29.8	37.4	25.6	0.0	17.8	22.3	17.0	37.1	13.1	9.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.1	0.1	0.8	0.2	0.1	0.0	2.6	0.0	1.3	0.3	0.0
Delay (s)	35.0	30.8	29.8	38.1	25.8	0.1	17.8	24.9	17.1	38.4	13.4	9.6
Level of Service	D	C	C	D	C	A	B	C	B	D	B	A
Approach Delay (s)		32.4					20.8				16.4	
Approach LOS		C					C				B	
Intersection Summary												
HCM 2000 Control Delay			21.5				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			88.3				Sum of lost time (s)				17.6	
Intersection Capacity Utilization			56.3%				ICU Level of Service				B	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

7: Sierra College Blvd & Commons Dr/I-80 WB Ramps

Short Term Conditions
AM Peak Hour



Movement	EBL	EBR	EBR2	WBL2	WBT	WBR	NBL	NBT	NBR	SBT	SBR	SBR2
Lane Configurations	↖	↗		↖↗	↖	↗	↖	↑↑↑	↗	↑↑	↗	↗
Traffic Volume (vph)	25	50	45	616	70	215	75	591	150	732	295	55
Future Volume (vph)	25	50	45	616	70	215	75	591	150	732	295	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.4	4.8	4.8	4.2	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00		0.97	0.95	0.95	1.00	0.91	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	0.92	0.85	1.00	1.00	0.85	1.00	0.85	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1736	1553		3367	1599	1475	1736	4988	1553	3471	1553	1553
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1736	1553		3367	1599	1475	1736	4988	1553	3471	1553	1553
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	29	58	52	716	81	250	87	687	174	851	343	64
RTOR Reduction (vph)	0	67	0	0	27	110	0	0	90	0	0	42
Lane Group Flow (vph)	29	43	0	716	144	50	87	687	84	851	343	22
Confl. Peds. (#/hr)	62											
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	pt+ov		Prot	NA	Perm	Prot	NA	Perm	NA	Perm	Perm
Protected Phases	7	4 5		3	8		5	2		6		
Permitted Phases						8			2		6	6
Actuated Green, G (s)	3.3	20.4		23.2	27.4	27.4	8.4	42.2	42.2	29.6	29.6	29.6
Effective Green, g (s)	3.3	20.4		23.2	27.4	27.4	8.4	42.2	42.2	29.6	29.6	29.6
Actuated g/C Ratio	0.04	0.23		0.27	0.31	0.31	0.10	0.48	0.48	0.34	0.34	0.34
Clearance Time (s)	4.1			4.4	4.8	4.8	4.2	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	1.0			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	65	362		892	500	461	166	2405	748	1174	525	525
v/s Ratio Prot	0.02	0.03		c0.21	c0.09		c0.05	0.14		c0.25		
v/s Ratio Perm						0.03			0.05		0.22	0.01
v/c Ratio	0.45	0.12		0.80	0.29	0.11	0.52	0.29	0.11	0.72	0.65	0.04
Uniform Delay, d1	41.2	26.5		30.0	22.7	21.4	37.6	13.6	12.4	25.4	24.6	19.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.1		5.0	0.1	0.0	1.4	0.0	0.0	1.9	2.2	0.0
Delay (s)	43.0	26.5		35.0	22.8	21.4	39.0	13.6	12.4	27.3	26.8	19.4
Level of Service	D	C		C	C	C	D	B	B	C	C	B
Approach Delay (s)					30.9			15.7		26.8		
Approach LOS					C			B		C		

Intersection Summary

HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	87.5	Sum of lost time (s)	18.8
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

4: I-80 WB On Ramp/I-80 WB Off Ramp & Rocklin Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBR	All
Denied Delay (hr)	0.1	0.4	0.5	0.3	0.0	0.0	1.4
Denied Del/Veh (s)	0.7	2.6	3.8	1.2	0.3	0.4	1.6
Total Delay (hr)	7.7	2.7	18.0	3.1	0.4	6.4	38.4
Total Del/Veh (s)	36.0	17.1	127.6	11.1	31.8	69.4	42.7
Vehicles Entered	767	574	488	992	44	320	3185
Vehicles Exited	758	568	492	994	44	330	3186
Hourly Exit Rate	758	568	492	994	44	330	3186
Input Volume	766	555	648	1170	43	320	3503
% of Volume	99	102	76	85	102	103	91

5: I-80 EB Off Ramp/I-80 EB On Ramp & Rocklin Rd Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Delay (hr)	0.0	0.0	171.6	8.3	0.2	0.0	0.2	180.4
Denied Del/Veh (s)	0.0	0.0	466.2	435.2	1.5	1.2	1.5	198.1
Total Delay (hr)	3.3	2.0	38.4	0.9	5.1	0.0	4.7	54.5
Total Del/Veh (s)	56.4	11.8	134.7	63.3	38.6	54.6	28.1	65.6
Vehicles Entered	202	607	994	50	471	2	601	2927
Vehicles Exited	206	617	988	50	470	2	602	2935
Hourly Exit Rate	206	617	988	50	470	2	602	2935
Input Volume	210	608	1321	72	475	2	605	3293
% of Volume	98	101	75	69	99	100	100	89































Total Network Performance

Denied Delay (hr)	181.8
Denied Del/Veh (s)	155.7
Total Delay (hr)	94.3
Total Del/Veh (s)	85.2
Vehicles Entered	3852
Vehicles Exited	3858
Hourly Exit Rate	3858
Input Volume	10955
% of Volume	35

HCM Signalized Intersection Capacity Analysis

6: Sierra College Blvd & I-80 EB Ramps/Crossing Dr

Short Term Conditions
PM Peak Hour

												
Movement	EBL2	EBT	EBR	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL	SBT	SBR
Lane Configurations	 	 					  			 	 	
Traffic Volume (vph)	365	175	75	200	380	300	702	542	130	380	668	345
Future Volume (vph)	365	175	75	200	380	300	702	542	130	380	668	345
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1	4.1	3.7	3.7	4.0	5.7	5.7	5.7	4.1	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	1583	1583	5085	1583	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	1583	1583	5085	1583	1583	3433	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	384	184	79	211	400	316	739	571	137	400	703	363
RTOR Reduction (vph)	0	0	65	0	0	0	0	0	54	0	0	158
Lane Group Flow (vph)	384	184	14	211	400	316	739	571	83	400	703	205
Turn Type	Prot	NA	Perm	Prot	pt+ov	Free	NA	Perm	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	1	2			1	6	
Permitted Phases			4			Free		2	2			6
Actuated Green, G (s)	18.3	20.5	20.5	17.6	41.0	118.5	45.3	45.3	45.3	17.5	66.9	66.9
Effective Green, g (s)	18.3	20.5	20.5	17.6	41.0	118.5	45.3	45.3	45.3	17.5	66.9	66.9
Actuated g/C Ratio	0.15	0.17	0.17	0.15	0.35	1.00	0.38	0.38	0.38	0.15	0.56	0.56
Clearance Time (s)	4.1	4.1	4.1	3.7			5.7	5.7	5.7	4.1	5.7	5.7
Vehicle Extension (s)	2.5	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	530	612	273	262	547	1583	1943	605	605	506	1997	893
v/s Ratio Prot	0.11	0.05		c0.12	c0.25		0.15			0.12	0.20	
v/s Ratio Perm			0.01			c0.20		c0.36	0.05			0.13
v/c Ratio	0.72	0.30	0.05	0.81	0.73	0.20	0.38	0.94	0.14	0.79	0.35	0.23
Uniform Delay, d1	47.7	42.7	40.9	48.8	33.9	0.0	26.5	35.4	23.9	48.7	14.0	12.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	0.1	0.0	15.5	4.3	0.3	0.0	23.2	0.0	7.7	0.0	0.0
Delay (s)	52.3	42.8	40.9	64.3	38.2	0.3	26.5	58.6	23.9	56.4	14.1	13.0
Level of Service	D	D	D	E	D	A	C	E	C	E	B	B
Approach Delay (s)		48.2					38.9				25.3	
Approach LOS		D					D				C	

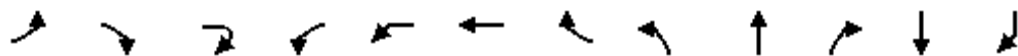
Intersection Summary		
HCM 2000 Control Delay	34.2	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.86	
Actuated Cycle Length (s)	118.5	Sum of lost time (s) 17.6
Intersection Capacity Utilization	65.2%	ICU Level of Service C
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

7: Sierra College Blvd & Commons Dr/I-80 WB Ramps

Short Term Conditions
PM Peak Hour



Movement	EBL	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	226	105	405	5	115	220	286	866	295	762	300
Future Volume (vph)	75	226	105	405	5	115	220	286	866	295	762	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.4	4.8	4.8	4.8	4.2	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00		0.95	0.95	0.95	0.95	1.00	0.91	1.00	0.95	1.00
Frt	1.00	0.85		1.00	1.00	0.95	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1736	1553		1649	1649	1644	1475	1736	4988	1553	3471	1553
Flt Permitted	0.95	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1736	1553		1649	1649	1644	1475	1736	4988	1553	3471	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	80	240	112	431	5	122	234	304	921	314	811	319
RTOR Reduction (vph)	0	52	0	0	0	14	125	0	0	146	0	0
Lane Group Flow (vph)	80	300	0	220	216	174	43	304	921	168	811	319
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	pt+ov		Prot	Perm	NA	Perm	Prot	NA	Perm	NA	Perm
Protected Phases	7	4 5		3		8		5	2		6	
Permitted Phases					8		8			2		6
Actuated Green, G (s)	7.3	43.8		18.6	27.6	27.6	27.6	23.0	57.2	57.2	30.0	30.0
Effective Green, g (s)	7.3	43.8		18.6	27.6	27.6	27.6	23.0	57.2	57.2	30.0	30.0
Actuated g/C Ratio	0.07	0.41		0.17	0.26	0.26	0.26	0.22	0.54	0.54	0.28	0.28
Clearance Time (s)	4.1			4.4	4.8	4.8	4.8	4.2	5.7	5.7	5.7	5.7
Vehicle Extension (s)	1.0			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	118	637		287	426	425	381	374	2673	832	975	436
v/s Ratio Prot	0.05	0.19		c0.13		0.11		c0.18	0.18		c0.23	
v/s Ratio Perm					c0.13		0.03			0.11		0.21
v/c Ratio	0.68	0.47		0.77	0.51	0.41	0.11	0.81	0.34	0.20	0.83	0.73
Uniform Delay, d1	48.6	23.0		42.0	33.7	32.8	30.2	39.8	14.1	12.9	36.0	34.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.5	0.2		10.5	0.3	0.2	0.0	12.0	0.0	0.0	5.9	5.4
Delay (s)	60.0	23.2		52.5	34.1	33.0	30.3	51.8	14.1	12.9	41.9	40.1
Level of Service	E	C		D	C	C	C	D	B	B	D	D
Approach Delay (s)						38.1			21.3		40.0	
Approach LOS						D			C		D	

Intersection Summary

HCM 2000 Control Delay	31.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	106.7	Sum of lost time (s)	18.8
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR2
Lane Configurations	
Traffic Volume (vph)	125
Future Volume (vph)	125
Ideal Flow (vphpl)	1900
Total Lost time (s)	5.7
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1553
Flt Permitted	1.00
Satd. Flow (perm)	1553
Peak-hour factor, PHF	0.94
Adj. Flow (vph)	133
RTOR Reduction (vph)	82
Lane Group Flow (vph)	51
Heavy Vehicles (%)	4%
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Actuated Green, G (s)	30.0
Effective Green, g (s)	30.0
Actuated g/C Ratio	0.28
Clearance Time (s)	5.7
Vehicle Extension (s)	1.0
Lane Grp Cap (vph)	436
v/s Ratio Prot	
v/s Ratio Perm	0.03
v/c Ratio	0.12
Uniform Delay, d1	28.5
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	28.5
Level of Service	C
Approach Delay (s)	
Approach LOS	
Intersection Summary	

4: I-80 WB On Ramp/I-80 WB Off Ramp & Rocklin Rd Performance by approach

Approach	EB	WB	SB	All
Denied Delay (hr)	0.5	0.0	0.0	0.5
Denied Del/Veh (s)	1.3	0.0	0.2	0.5
Total Delay (hr)	10.2	5.6	2.6	18.4
Total Del/Veh (s)	28.1	10.9	25.6	18.8
Vehicles Entered	1311	1838	360	3509
Vehicles Exited	1306	1830	355	3491
Hourly Exit Rate	1045	1464	284	2793
Input Volume	1059	1475	292	2826
% of Volume	99	99	97	99

5: I-80 EB Off Ramp/I-80 EB On Ramp & Rocklin Rd Performance by approach































Approach	EB	WB	NB	All
Denied Delay (hr)	0.0	0.1	5.8	5.9
Denied Del/Veh (s)	0.0	0.4	11.1	5.6
Total Delay (hr)	4.8	8.2	17.4	30.4
Total Del/Veh (s)	19.5	27.5	33.3	28.5
Vehicles Entered	878	1072	1882	3832
Vehicles Exited	862	1061	1865	3788
Hourly Exit Rate	690	849	1492	3030
Input Volume	717	849	1501	3067
% of Volume	96	100	99	99

Total Network Performance

Denied Delay (hr)	6.5
Denied Del/Veh (s)	5.0
Total Delay (hr)	49.7
Total Del/Veh (s)	38.3
Vehicles Entered	4671
Vehicles Exited	4596
Hourly Exit Rate	3677
Input Volume	9594
% of Volume	38

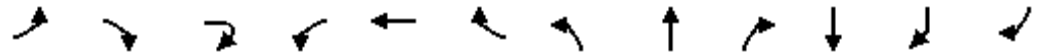
HCM Signalized Intersection Capacity Analysis
6: Sierra College Blvd & I-80 EB Ramps/Crossing Dr

Short Term+Project Conditions
AM Peak Hour

												
Movement	EBL2	EBT	EBR	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL	SBT	SBR
Lane Configurations	 	 					  			 	 	
Traffic Volume (vph)	305	175	201	80	145	75	381	450	115	200	1019	185
Future Volume (vph)	305	175	201	80	145	75	381	450	115	200	1019	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1	4.1	3.7	3.7	4.0	5.7	5.7	5.7	4.1	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	3471	1553	1736	1553	1553	4988	1553	1553	3367	3471	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3367	3471	1553	1736	1553	1553	4988	1553	1553	3367	3471	1553
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	339	194	223	89	161	83	423	500	128	222	1132	206
RTOR Reduction (vph)	0	0	183	0	0	0	0	0	48	0	0	83
Lane Group Flow (vph)	339	194	40	89	161	83	423	500	80	222	1132	123
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	NA	Perm	Prot	pt+ov	Free	NA	Perm	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	1	2			1	6	
Permitted Phases			4			Free		2	2			6
Actuated Green, G (s)	15.0	17.9	17.9	9.2	25.9	100.3	45.5	45.5	45.5	10.1	59.7	59.7
Effective Green, g (s)	15.0	17.9	17.9	9.2	25.9	100.3	45.5	45.5	45.5	10.1	59.7	59.7
Actuated g/C Ratio	0.15	0.18	0.18	0.09	0.26	1.00	0.45	0.45	0.45	0.10	0.60	0.60
Clearance Time (s)	4.1	4.1	4.1	3.7			5.7	5.7	5.7	4.1	5.7	5.7
Vehicle Extension (s)	2.5	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	503	619	277	159	401	1553	2262	704	704	339	2065	924
v/s Ratio Prot	c0.10	0.06		0.05	c0.10		0.08			c0.07	0.33	
v/s Ratio Perm			0.03			0.05		c0.32	0.05			0.08
v/c Ratio	0.67	0.31	0.14	0.56	0.40	0.05	0.19	0.71	0.11	0.65	0.55	0.13
Uniform Delay, d1	40.3	35.9	34.7	43.6	30.8	0.0	16.4	22.1	15.8	43.4	12.2	8.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	0.1	0.1	2.4	0.2	0.1	0.0	2.8	0.0	3.4	0.2	0.0
Delay (s)	43.6	36.0	34.8	46.0	31.0	0.1	16.4	24.9	15.8	46.9	12.4	8.9
Level of Service	D	D	C	D	C	A	B	C	B	D	B	A
Approach Delay (s)		39.0					20.4				16.8	
Approach LOS		D					C				B	
Intersection Summary												
HCM 2000 Control Delay			23.3				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			100.3				Sum of lost time (s)		17.6			
Intersection Capacity Utilization			56.5%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 7: Sierra College Blvd & Commons Dr/I-80 WB Ramps

Short Term+Project Conditions
 AM Peak Hour



Movement	EBL	EBR	EBR2	WBL2	WBT	WBR	NBL	NBT	NBR	SBT	SBR	SBR2
Lane Configurations	↖	↗		↖↗	↖	↗	↖	↑↑↑	↗	↑↑	↗	↖
Traffic Volume (vph)	25	50	45	619	70	215	75	604	152	735	295	55
Future Volume (vph)	25	50	45	619	70	215	75	604	152	735	295	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.4	4.8	4.8	4.2	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00		0.97	0.95	0.95	1.00	0.91	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	0.92	0.85	1.00	1.00	0.85	1.00	0.85	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1736	1553		3367	1599	1475	1736	4988	1553	3471	1553	1553
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1736	1553		3367	1599	1475	1736	4988	1553	3471	1553	1553
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	29	58	52	720	81	250	87	702	177	855	343	64
RTOR Reduction (vph)	0	68	0	0	27	110	0	0	91	0	0	42
Lane Group Flow (vph)	29	42	0	720	144	50	87	702	86	855	343	22
Confl. Peds. (#/hr)	62											
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	pt+ov		Prot	NA	Perm	Prot	NA	Perm	NA	Perm	Perm
Protected Phases	7	4 5		3	8		5	2		6		
Permitted Phases						8			2		6	6
Actuated Green, G (s)	3.3	20.3		23.4	27.5	27.5	8.4	42.6	42.6	30.0	30.0	30.0
Effective Green, g (s)	3.3	20.3		23.4	27.5	27.5	8.4	42.6	42.6	30.0	30.0	30.0
Actuated g/C Ratio	0.04	0.23		0.27	0.31	0.31	0.10	0.48	0.48	0.34	0.34	0.34
Clearance Time (s)	4.1			4.4	4.8	4.8	4.2	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	1.0			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	65	358		895	499	460	165	2414	751	1183	529	529
v/s Ratio Prot	0.02	0.03		c0.21	c0.09		c0.05	0.14		c0.25		
v/s Ratio Perm						0.03			0.06		0.22	0.01
v/c Ratio	0.45	0.12		0.80	0.29	0.11	0.53	0.29	0.11	0.72	0.65	0.04
Uniform Delay, d1	41.5	26.8		30.2	22.9	21.5	37.9	13.6	12.4	25.4	24.5	19.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.1		5.0	0.1	0.0	1.4	0.0	0.0	1.9	2.1	0.0
Delay (s)	43.2	26.8		35.2	23.0	21.6	39.3	13.7	12.4	27.2	26.6	19.4
Level of Service	D	C		D	C	C	D	B	B	C	C	B
Approach Delay (s)					31.1			15.7		26.7		
Approach LOS					C			B		C		

Intersection Summary		
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.69	
Actuated Cycle Length (s)	88.0	Sum of lost time (s) 18.8
Intersection Capacity Utilization	55.7%	ICU Level of Service B
Analysis Period (min)	15	

c Critical Lane Group

4: I-80 WB On Ramp/I-80 WB Off Ramp & Rocklin Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBR	All
Denied Delay (hr)	0.1	0.4	0.8	0.7	0.0	0.1	2.2
Denied Del/Veh (s)	0.6	2.6	5.7	2.6	1.1	1.4	2.5
Total Delay (hr)	9.3	2.5	17.7	3.3	0.4	6.6	39.8
Total Del/Veh (s)	41.7	16.1	124.8	11.6	31.6	71.4	43.7
Vehicles Entered	794	562	492	1008	48	323	3227
Vehicles Exited	790	561	493	1008	49	327	3228
Hourly Exit Rate	790	561	493	1008	49	327	3228
Input Volume	781	555	655	1179	45	320	3534
% of Volume	101	101	75	86	108	102	91

5: I-80 EB Off Ramp/I-80 EB On Ramp & Rocklin Rd Performance by movement































Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Delay (hr)	0.0	0.0	166.3	9.5	0.2	0.0	0.2	176.2
Denied Del/Veh (s)	0.0	0.0	448.8	461.9	1.4	1.7	1.3	189.0
Total Delay (hr)	3.7	1.9	39.9	1.1	5.2	0.0	5.0	56.9
Total Del/Veh (s)	63.4	10.7	136.4	68.9	39.1	56.5	28.4	66.3
Vehicles Entered	203	646	1019	57	472	1	626	3024
Vehicles Exited	207	654	1010	56	470	1	623	3021
Hourly Exit Rate	207	654	1010	56	470	1	623	3021
Input Volume	210	625	1336	73	475	2	617	3338
% of Volume	99	105	76	76	99	50	101	90

Total Network Performance

Denied Delay (hr)	178.4
Denied Del/Veh (s)	150.6
Total Delay (hr)	98.1
Total Del/Veh (s)	86.9
Vehicles Entered	3933
Vehicles Exited	3928
Hourly Exit Rate	3928
Input Volume	11076
% of Volume	35

HCM Signalized Intersection Capacity Analysis
 6: Sierra College Blvd & I-80 EB Ramps/Crossing Dr

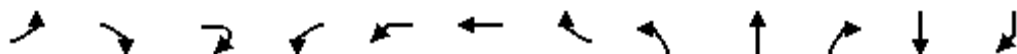
Short Term+Project Conditions
 PM Peak Hour

												
Movement	EBL2	EBT	EBR	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL	SBT	SBR
Lane Configurations	 	 					  			 	 	
Traffic Volume (vph)	365	175	77	200	380	300	709	548	130	380	690	345
Future Volume (vph)	365	175	77	200	380	300	709	548	130	380	690	345
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1	4.1	3.7	3.7	4.0	5.7	5.7	5.7	4.1	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	1583	1583	5085	1583	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	1583	1583	5085	1583	1583	3433	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	384	184	81	211	400	316	746	577	137	400	726	363
RTOR Reduction (vph)	0	0	67	0	0	0	0	0	54	0	0	158
Lane Group Flow (vph)	384	184	14	211	400	316	746	577	83	400	726	205
Turn Type	Prot	NA	Perm	Prot	pt+ov	Free	NA	Perm	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	1	2			1	6	
Permitted Phases			4			Free		2	2			6
Actuated Green, G (s)	18.3	20.5	20.5	17.6	41.0	118.5	45.3	45.3	45.3	17.5	66.9	66.9
Effective Green, g (s)	18.3	20.5	20.5	17.6	41.0	118.5	45.3	45.3	45.3	17.5	66.9	66.9
Actuated g/C Ratio	0.15	0.17	0.17	0.15	0.35	1.00	0.38	0.38	0.38	0.15	0.56	0.56
Clearance Time (s)	4.1	4.1	4.1	3.7			5.7	5.7	5.7	4.1	5.7	5.7
Vehicle Extension (s)	2.5	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	530	612	273	262	547	1583	1943	605	605	506	1997	893
v/s Ratio Prot	0.11	0.05		c0.12	c0.25		0.15			0.12	0.21	
v/s Ratio Perm			0.01			c0.20		c0.36	0.05			0.13
v/c Ratio	0.72	0.30	0.05	0.81	0.73	0.20	0.38	0.95	0.14	0.79	0.36	0.23
Uniform Delay, d1	47.7	42.7	40.9	48.8	33.9	0.0	26.5	35.6	23.9	48.7	14.1	12.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	0.1	0.0	15.5	4.3	0.3	0.0	25.2	0.0	7.7	0.0	0.0
Delay (s)	52.3	42.8	40.9	64.3	38.2	0.3	26.5	60.8	23.9	56.4	14.2	13.0
Level of Service	D	D	D	E	D	A	C	E	C	E	B	B
Approach Delay (s)		48.2					39.8				25.2	
Approach LOS		D					D				C	
Intersection Summary												
HCM 2000 Control Delay			34.5				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			118.5				Sum of lost time (s)			17.6		
Intersection Capacity Utilization			65.5%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Sierra College Blvd & Commons Dr/I-80 WB Ramps

Short Term+Project Conditions
PM Peak Hour



Movement	EBL	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	226	105	416	5	115	220	286	872	296	773	300
Future Volume (vph)	75	226	105	416	5	115	220	286	872	296	773	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.4	4.8	4.8	4.8	4.2	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00		0.95	0.95	0.95	0.95	1.00	0.91	1.00	0.95	1.00
Frt	1.00	0.85		1.00	1.00	0.95	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1736	1553		1649	1649	1644	1475	1736	4988	1553	3471	1553
Flt Permitted	0.95	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1736	1553		1649	1649	1644	1475	1736	4988	1553	3471	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	80	240	112	443	5	122	234	304	928	315	822	319
RTOR Reduction (vph)	0	52	0	0	0	14	124	0	0	146	0	0
Lane Group Flow (vph)	80	300	0	226	222	174	44	304	928	169	822	319
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	pt+ov		Prot	Perm	NA	Perm	Prot	NA	Perm	NA	Perm
Protected Phases	7	4 5		3		8		5	2		6	
Permitted Phases					8		8			2		6
Actuated Green, G (s)	7.4	44.1		19.1	28.2	28.2	28.2	23.1	58.0	58.0	30.7	30.7
Effective Green, g (s)	7.4	44.1		19.1	28.2	28.2	28.2	23.1	58.0	58.0	30.7	30.7
Actuated g/C Ratio	0.07	0.41		0.18	0.26	0.26	0.26	0.21	0.54	0.54	0.28	0.28
Clearance Time (s)	4.1			4.4	4.8	4.8	4.8	4.2	5.7	5.7	5.7	5.7
Vehicle Extension (s)	1.0			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	118	632		291	429	428	384	370	2673	832	984	440
v/s Ratio Prot	0.05	0.19		c0.14		0.11		c0.18	0.19		c0.24	
v/s Ratio Perm					c0.13		0.03			0.11		0.21
v/c Ratio	0.68	0.47		0.78	0.52	0.41	0.11	0.82	0.35	0.20	0.84	0.72
Uniform Delay, d1	49.2	23.5		42.5	34.2	33.1	30.5	40.6	14.3	13.1	36.4	34.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.5	0.2		11.2	0.4	0.2	0.0	13.0	0.0	0.0	6.0	5.0
Delay (s)	60.7	23.7		53.7	34.6	33.3	30.5	53.6	14.3	13.1	42.3	39.9
Level of Service	E	C		D	C	C	C	D	B	B	D	D
Approach Delay (s)						38.8			21.8		40.3	
Approach LOS						D			C		D	

Intersection Summary

HCM 2000 Control Delay	31.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	108.2	Sum of lost time (s)	18.8
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR2
Lane Configurations	
Traffic Volume (vph)	125
Future Volume (vph)	125
Ideal Flow (vphpl)	1900
Total Lost time (s)	5.7
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1553
Flt Permitted	1.00
Satd. Flow (perm)	1553
Peak-hour factor, PHF	0.94
Adj. Flow (vph)	133
RTOR Reduction (vph)	82
Lane Group Flow (vph)	51
Heavy Vehicles (%)	4%
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Actuated Green, G (s)	30.7
Effective Green, g (s)	30.7
Actuated g/C Ratio	0.28
Clearance Time (s)	5.7
Vehicle Extension (s)	1.0
Lane Grp Cap (vph)	440
v/s Ratio Prot	
v/s Ratio Perm	0.03
v/c Ratio	0.12
Uniform Delay, d1	28.7
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	28.7
Level of Service	C
Approach Delay (s)	
Approach LOS	
Intersection Summary	

4: I-80 WB On Ramp/I-80 WB Off Ramp & Rocklin Rd Performance by approach

Approach	EB	WB	SB	All
Denied Delay (hr)	0.5	0.0	146.0	146.6
Denied Del/Veh (s)	1.3	0.1	668.6	109.8
Total Delay (hr)	21.0	14.9	16.5	52.4
Total Del/Veh (s)	47.9	21.9	108.1	41.3
Vehicles Entered	1581	2438	549	4568
Vehicles Exited	1560	2418	532	4510
Hourly Exit Rate	1248	1934	426	3608
Input Volume	1290	2125	635	4050
% of Volume	97	91	67	89

5: I-80 EB Off Ramp/I-80 EB On Ramp & Rocklin Rd Performance by approach































Approach	EB	WB	NB	All
Denied Delay (hr)	0.1	14.8	212.2	227.1
Denied Del/Veh (s)	0.5	29.6	336.5	158.4
Total Delay (hr)	16.8	46.2	26.4	89.4
Total Del/Veh (s)	55.6	93.5	48.8	66.8
Vehicles Entered	1092	1776	1949	4817
Vehicles Exited	1071	1741	1904	4716
Hourly Exit Rate	857	1393	1523	3773
Input Volume	931	1440	1810	4181
% of Volume	92	97	84	90

Total Network Performance

Denied Delay (hr)	373.7
Denied Del/Veh (s)	207.0
Total Delay (hr)	144.5
Total Del/Veh (s)	87.9
Vehicles Entered	5917
Vehicles Exited	5733
Hourly Exit Rate	4586
Input Volume	13405
% of Volume	34

HCM Signalized Intersection Capacity Analysis
6: Sierra College Blvd & I-80 EB Ramps/Crossing Dr

Cumulative Conditions
AM Peak Hour

												
Movement	EBL2	EBT	EBR	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL	SBT	SBR
Lane Configurations	 	 					  			 	 	
Traffic Volume (vph)	630	175	845	80	145	75	475	485	115	360	1665	195
Future Volume (vph)	630	175	845	80	145	75	475	485	115	360	1665	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1	4.1	3.7	3.7	4.0	5.7	5.7	5.7	4.1	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	3471	1553	1736	1553	1553	4988	1553	1553	3367	3471	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3367	3471	1553	1736	1553	1553	4988	1553	1553	3367	3471	1553
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	630	175	845	80	145	75	475	485	115	360	1665	195
RTOR Reduction (vph)	0	0	181	0	0	0	0	0	51	0	0	71
Lane Group Flow (vph)	630	175	664	80	145	75	475	485	64	360	1665	124
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	NA	Perm	Prot	pt+ov	Free	NA	Perm	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	1	2			1	6	
Permitted Phases			4			Free		2	2			6
Actuated Green, G (s)	28.5	36.5	36.5	9.9	38.9	126.6	45.3	45.3	45.3	17.3	66.7	66.7
Effective Green, g (s)	28.5	36.5	36.5	9.9	38.9	126.6	45.3	45.3	45.3	17.3	66.7	66.7
Actuated g/C Ratio	0.23	0.29	0.29	0.08	0.31	1.00	0.36	0.36	0.36	0.14	0.53	0.53
Clearance Time (s)	4.1	4.1	4.1	3.7			5.7	5.7	5.7	4.1	5.7	5.7
Vehicle Extension (s)	2.5	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	757	1000	447	135	477	1553	1784	555	555	460	1828	818
v/s Ratio Prot	c0.19	0.05		0.05	0.09		0.10			0.11	c0.48	
v/s Ratio Perm			c0.43			0.05		0.31	0.04			0.08
v/c Ratio	0.83	0.17	1.48	0.59	0.30	0.05	0.27	0.87	0.11	0.78	0.91	0.15
Uniform Delay, d1	46.8	33.8	45.0	56.4	33.5	0.0	28.9	38.0	27.2	52.8	27.2	15.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.6	0.0	229.7	4.6	0.1	0.1	0.0	13.8	0.0	7.8	7.2	0.0
Delay (s)	54.4	33.8	274.7	61.0	33.6	0.1	28.9	51.8	27.3	60.7	34.4	15.4
Level of Service	D	C	F	E	C	A	C	D	C	E	C	B
Approach Delay (s)		165.1					39.1				37.0	
Approach LOS		F					D				D	
Intersection Summary												
HCM 2000 Control Delay			77.4				HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio			1.14									
Actuated Cycle Length (s)			126.6				Sum of lost time (s)				17.6	
Intersection Capacity Utilization			114.3%				ICU Level of Service				H	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

7: Sierra College Blvd & Commons Dr/I-80 WB Ramps

Cumulative Conditions
AM Peak Hour



Movement	EBL	EBR	EBR2	WBL2	WBT	WBR	NBL	NBT	NBR	SBT	SBR	SBR2
Lane Configurations	↖	↗		↖↗	↖	↗	↖	↑↑↑	↗	↑↑	↗	↖
Traffic Volume (vph)	25	50	45	945	70	470	75	1025	150	1225	640	55
Future Volume (vph)	25	50	45	945	70	470	75	1025	150	1225	640	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.4	4.8	4.8	4.2	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00		0.97	0.95	0.95	1.00	0.91	1.00	0.95	1.00	1.00
Frt	1.00	0.85		1.00	0.89	0.85	1.00	1.00	0.85	1.00	0.85	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1736	1553		3367	1541	1475	1736	4988	1553	3471	1553	1553
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1736	1553		3367	1541	1475	1736	4988	1553	3471	1553	1553
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	50	45	945	70	470	75	1025	150	1225	640	55
RTOR Reduction (vph)	0	79	0	0	78	85	0	0	69	0	0	31
Lane Group Flow (vph)	25	16	0	945	199	178	75	1025	81	1225	640	24
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	pt+ov		Prot	NA	Perm	Prot	NA	Perm	NA	Perm	Perm
Protected Phases	7	4 5		3	8		5	2		6		
Permitted Phases						8			2		6	6
Actuated Green, G (s)	3.0	20.0		35.7	39.4	39.4	8.8	66.4	66.4	53.4	53.4	53.4
Effective Green, g (s)	3.0	20.0		35.7	39.4	39.4	8.8	66.4	66.4	53.4	53.4	53.4
Actuated g/C Ratio	0.02	0.16		0.29	0.32	0.32	0.07	0.54	0.54	0.43	0.43	0.43
Clearance Time (s)	4.1			4.4	4.8	4.8	4.2	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	1.0			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	42	251		974	492	470	123	2683	835	1502	672	672
v/s Ratio Prot	0.01	0.01		c0.28	c0.13		c0.04	0.21		0.35		
v/s Ratio Perm						0.12			0.05		c0.41	0.02
v/c Ratio	0.60	0.06		0.97	0.41	0.38	0.61	0.38	0.10	0.82	0.95	0.04
Uniform Delay, d1	59.6	43.8		43.3	32.8	32.5	55.6	16.6	13.9	30.7	33.8	20.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.2	0.0		21.7	0.2	0.2	5.8	0.0	0.0	3.4	23.3	0.0
Delay (s)	73.8	43.8		65.1	33.0	32.7	61.4	16.6	13.9	34.0	57.1	20.2
Level of Service	E	D		E	C	C	E	B	B	C	E	C
Approach Delay (s)					53.4			19.0		41.3		
Approach LOS					D			B		D		

Intersection Summary

HCM 2000 Control Delay	39.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	123.4	Sum of lost time (s)	18.8
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

4: I-80 WB On Ramp/I-80 WB Off Ramp & Rocklin Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBR	All
Denied Delay (hr)	151.8	63.8	0.1	0.0	14.9	48.9	279.4
Denied Del/Veh (s)	325.8	325.1	0.7	0.1	447.3	440.8	226.4
Total Delay (hr)	26.1	4.9	16.5	4.7	3.4	24.1	79.8
Total Del/Veh (s)	64.7	28.9	140.4	14.8	120.1	251.9	70.5
Vehicles Entered	1419	601	406	1134	96	323	3979
Vehicles Exited	1419	605	403	1136	95	319	3977
Hourly Exit Rate	1419	605	403	1136	95	319	3977
Input Volume	1635	720	655	1557	125	410	5101
% of Volume	87	84	62	73	76	78	78

5: I-80 EB Off Ramp/I-80 EB On Ramp & Rocklin Rd Performance by movement































Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Delay (hr)	0.5	1.2	304.9	33.1	20.3	0.2	22.6	382.9
Denied Del/Veh (s)	4.5	3.9	661.5	688.8	130.7	172.6	131.1	302.5
Total Delay (hr)	18.6	5.2	42.0	2.5	22.2	0.2	19.0	109.7
Total Del/Veh (s)	157.7	16.6	144.9	83.7	147.0	203.5	115.1	102.7
Vehicles Entered	408	1125	1009	105	509	4	569	3729
Vehicles Exited	398	1125	1009	105	504	4	570	3715
Hourly Exit Rate	398	1125	1009	105	504	4	570	3715
Input Volume	470	1312	1610	170	575	5	615	4757
% of Volume	85	86	63	62	88	80	93	78

Total Network Performance

Denied Delay (hr)	662.3
Denied Del/Veh (s)	399.3
Total Delay (hr)	191.3
Total Del/Veh (s)	140.2
Vehicles Entered	4681
Vehicles Exited	4668
Hourly Exit Rate	4668
Input Volume	15722
% of Volume	30

HCM Signalized Intersection Capacity Analysis
 6: Sierra College Blvd & I-80 EB Ramps/Crossing Dr

Cumulative Conditions
 PM Peak Hour

												
Movement	EBL2	EBT	EBR	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL	SBT	SBR
Lane Configurations	 	 					  			 	 	
Traffic Volume (vph)	475	195	110	200	380	300	1050	575	130	380	1150	350
Future Volume (vph)	475	195	110	200	380	300	1050	575	130	380	1150	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1	4.1	3.7	3.7	4.0	5.7	5.7	5.7	4.1	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	1583	1583	5085	1583	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	1583	1583	5085	1583	1583	3433	3539	1583
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	475	195	110	200	380	300	1050	575	130	380	1150	350
RTOR Reduction (vph)	0	0	90	0	0	0	0	0	78	0	0	151
Lane Group Flow (vph)	475	195	20	200	380	300	1050	575	52	380	1150	199
Turn Type	Prot	NA	Perm	Prot	pt+ov	Free	NA	Perm	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8 1		2			1	6	
Permitted Phases			4			Free		2	2			6
Actuated Green, G (s)	17.2	17.3	17.3	14.4	31.9	104.9	41.9	41.9	41.9	13.7	59.7	59.7
Effective Green, g (s)	17.2	17.3	17.3	14.4	31.9	104.9	41.9	41.9	41.9	13.7	59.7	59.7
Actuated g/C Ratio	0.16	0.16	0.16	0.14	0.30	1.00	0.40	0.40	0.40	0.13	0.57	0.57
Clearance Time (s)	4.1	4.1	4.1	3.7			5.7	5.7	5.7	4.1	5.7	5.7
Vehicle Extension (s)	2.5	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	562	583	261	242	481	1583	2031	632	632	448	2014	900
v/s Ratio Prot	c0.14	0.06		0.11	c0.24		0.21			0.11	0.32	
v/s Ratio Perm			0.01			c0.19		c0.36	0.03			0.13
v/c Ratio	0.85	0.33	0.08	0.83	0.79	0.19	0.52	0.91	0.08	0.85	0.57	0.22
Uniform Delay, d1	42.6	38.7	37.0	44.0	33.4	0.0	23.8	29.7	19.6	44.6	14.4	11.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.0	0.1	0.0	19.2	8.0	0.3	0.1	16.7	0.0	13.4	0.2	0.0
Delay (s)	53.6	38.8	37.1	63.2	41.5	0.3	23.9	46.4	19.6	58.0	14.7	11.2
Level of Service	D	D	D	E	D	A	C	D	B	E	B	B
Approach Delay (s)		47.6					31.0				22.8	
Approach LOS		D					C				C	

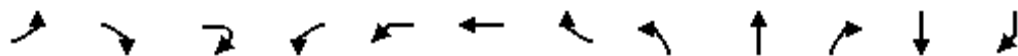
Intersection Summary		
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.88	
Actuated Cycle Length (s)	104.9	Sum of lost time (s) 17.6
Intersection Capacity Utilization	68.9%	ICU Level of Service C
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

7: Sierra College Blvd & Commons Dr/I-80 WB Ramps

Cumulative Conditions
PM Peak Hour



Movement	EBL	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	225	105	580	5	115	270	285	1315	305	1075	400
Future Volume (vph)	75	225	105	580	5	115	270	285	1315	305	1075	400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.4	4.8	4.8	4.8	4.2	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00		0.95	0.95	0.95	0.95	1.00	0.91	1.00	0.95	1.00
Frt	1.00	0.85		1.00	1.00	0.94	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1736	1553		1649	1649	1624	1475	1736	4988	1553	3471	1553
Flt Permitted	0.95	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1736	1553		1649	1649	1624	1475	1736	4988	1553	3471	1553
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	75	225	105	580	5	115	270	285	1315	305	1075	400
RTOR Reduction (vph)	0	87	0	0	0	27	95	0	0	131	0	0
Lane Group Flow (vph)	75	243	0	290	295	174	89	285	1315	174	1075	400
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	pt+ov		Prot	Perm	NA	Perm	Prot	NA	Perm	NA	Perm
Protected Phases	7	4 5		3		8		5	2		6	
Permitted Phases					8		8			2		6
Actuated Green, G (s)	4.2	28.4		18.0	20.8	20.8	20.8	16.9	52.7	52.7	31.6	31.6
Effective Green, g (s)	4.2	28.4		18.0	20.8	20.8	20.8	16.9	52.7	52.7	31.6	31.6
Actuated g/C Ratio	0.05	0.31		0.20	0.23	0.23	0.23	0.18	0.57	0.57	0.34	0.34
Clearance Time (s)	4.1			4.4	4.8	4.8	4.8	4.2	5.7	5.7	5.7	5.7
Vehicle Extension (s)	1.0			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	78	477		321	371	365	332	317	2847	886	1188	531
v/s Ratio Prot	0.04	0.16		c0.18		0.11		c0.16	0.26		c0.31	
v/s Ratio Perm					c0.18		0.06			0.11		0.26
v/c Ratio	0.96	0.51		0.90	0.80	0.48	0.27	0.90	0.46	0.20	0.90	0.75
Uniform Delay, d1	44.0	26.2		36.3	33.7	31.0	29.5	36.9	11.5	9.6	28.9	26.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	88.0	0.4		26.7	10.5	0.4	0.2	25.8	0.0	0.0	9.6	5.3
Delay (s)	132.0	26.6		63.0	44.2	31.4	29.6	62.7	11.6	9.6	38.6	32.2
Level of Service	F	C		E	D	C	C	E	B	A	D	C
Approach Delay (s)						44.4			18.9		35.6	
Approach LOS						D			B		D	

Intersection Summary

HCM 2000 Control Delay	31.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	92.3	Sum of lost time (s)	18.8
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR2
Lane Configurations	
Traffic Volume (vph)	125
Future Volume (vph)	125
Ideal Flow (vphpl)	1900
Total Lost time (s)	5.7
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1553
Flt Permitted	1.00
Satd. Flow (perm)	1553
Peak-hour factor, PHF	1.00
Adj. Flow (vph)	125
RTOR Reduction (vph)	82
Lane Group Flow (vph)	43
Heavy Vehicles (%)	4%
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Actuated Green, G (s)	31.6
Effective Green, g (s)	31.6
Actuated g/C Ratio	0.34
Clearance Time (s)	5.7
Vehicle Extension (s)	1.0
Lane Grp Cap (vph)	531
v/s Ratio Prot	
v/s Ratio Perm	0.03
v/c Ratio	0.08
Uniform Delay, d1	20.5
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	20.5
Level of Service	C
Approach Delay (s)	
Approach LOS	
Intersection Summary	

4: I-80 WB On Ramp/I-80 WB Off Ramp & Rocklin Rd Performance by approach

Approach	EB	WB	SB	All
Denied Delay (hr)	0.6	0.0	161.3	161.9
Denied Del/Veh (s)	1.3	0.0	727.7	120.2
Total Delay (hr)	22.7	15.0	16.2	53.9
Total Del/Veh (s)	50.7	22.2	109.8	42.4
Vehicles Entered	1612	2439	531	4582
Vehicles Exited	1592	2417	515	4524
Hourly Exit Rate	1274	1934	412	3619
Input Volume	1294	2152	636	4081
% of Volume	98	90	65	89

5: I-80 EB Off Ramp/I-80 EB On Ramp & Rocklin Rd Performance by approach
































Approach	EB	WB	NB	All
Denied Delay (hr)	0.0	19.1	206.2	225.4
Denied Del/Veh (s)	0.1	37.8	328.8	156.6
Total Delay (hr)	15.3	54.4	26.9	96.7
Total Del/Veh (s)	50.1	109.3	49.7	71.9
Vehicles Entered	1102	1792	1946	4840
Vehicles Exited	1082	1756	1900	4738
Hourly Exit Rate	866	1405	1520	3790
Input Volume	936	1468	1813	4217
% of Volume	92	96	84	90

Total Network Performance

Denied Delay (hr)	387.3
Denied Del/Veh (s)	212.7
Total Delay (hr)	153.3
Total Del/Veh (s)	92.8
Vehicles Entered	5946
Vehicles Exited	5763
Hourly Exit Rate	4610
Input Volume	13509
% of Volume	34

HCM Signalized Intersection Capacity Analysis
6: Sierra College Blvd & I-80 EB Ramps/Crossing Dr

Cumulative Plus Project Conditions
AM Peak Hour

												
Movement	EBL2	EBT	EBR	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL	SBT	SBR
Lane Configurations	 	 			 		  			 	 	
Traffic Volume (vph)	630	175	846	80	145	75	490	559	115	360	1671	195
Future Volume (vph)	630	175	846	80	145	75	490	559	115	360	1671	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1	4.1	3.7	3.7	4.0	5.7	5.7	5.7	4.1	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	3471	1553	1736	1553	1583	4988	1583	1553	3367	3471	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3367	3471	1553	1736	1553	1583	4988	1583	1553	3367	3471	1553
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	630	175	846	80	145	75	490	559	115	360	1671	195
RTOR Reduction (vph)	0	0	181	0	0	0	0	0	51	0	0	71
Lane Group Flow (vph)	630	175	665	80	145	75	490	559	64	360	1671	124
Heavy Vehicles (%)	4%	4%	4%	4%	4%	2%	4%	2%	4%	4%	4%	4%
Turn Type	Prot	NA	Perm	Prot	pt+ov	Free	NA	Perm	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8 1		2			1	6	
Permitted Phases			4			Free		2	2			6
Actuated Green, G (s)	28.5	36.5	36.5	9.9	38.9	126.6	45.3	45.3	45.3	17.3	66.7	66.7
Effective Green, g (s)	28.5	36.5	36.5	9.9	38.9	126.6	45.3	45.3	45.3	17.3	66.7	66.7
Actuated g/C Ratio	0.23	0.29	0.29	0.08	0.31	1.00	0.36	0.36	0.36	0.14	0.53	0.53
Clearance Time (s)	4.1	4.1	4.1	3.7			5.7	5.7	5.7	4.1	5.7	5.7
Vehicle Extension (s)	2.5	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	757	1000	447	135	477	1583	1784	566	555	460	1828	818
v/s Ratio Prot	c0.19	0.05		0.05	0.09		0.10			0.11	c0.48	
v/s Ratio Perm			c0.43			0.05		c0.35	0.04			0.08
v/c Ratio	0.83	0.17	1.49	0.59	0.30	0.05	0.27	0.99	0.11	0.78	0.91	0.15
Uniform Delay, d1	46.8	33.8	45.0	56.4	33.5	0.0	28.9	40.4	27.2	52.8	27.3	15.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.6	0.0	231.4	4.6	0.1	0.1	0.0	34.2	0.0	7.8	7.4	0.0
Delay (s)	54.4	33.8	276.4	61.0	33.6	0.1	29.0	74.6	27.3	60.7	34.7	15.4
Level of Service	D	C	F	E	C	A	C	E	C	E	C	B
Approach Delay (s)		166.0					50.7				37.2	
Approach LOS		F					D				D	
Intersection Summary												
HCM 2000 Control Delay			79.7				HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio			1.15									
Actuated Cycle Length (s)			126.6				Sum of lost time (s)				17.6	
Intersection Capacity Utilization			114.5%				ICU Level of Service				H	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: Sierra College Blvd & Commons Dr/I-80 WB Ramps

Cumulative Plus Project Conditions
AM Peak Hour



Movement	EBL	EBR	EBR2	WBL2	WBT	WBR	NBL	NBT	NBR	SBT	SBR	SBR2
Lane Configurations												
Traffic Volume (vph)	25	50	45	948	70	470	75	1038	152	1228	640	55
Future Volume (vph)	25	50	45	948	70	470	75	1038	152	1228	640	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.4	4.8	4.8	4.2	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00		0.97	0.95	0.95	1.00	0.91	1.00	0.95	1.00	1.00
Frt	1.00	0.85		1.00	0.89	0.85	1.00	1.00	0.85	1.00	0.85	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1736	1553		3367	1541	1475	1736	4988	1553	3471	1553	1553
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1736	1553		3367	1541	1475	1736	4988	1553	3471	1553	1553
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	50	45	948	70	470	75	1038	152	1228	640	55
RTOR Reduction (vph)	0	79	0	0	78	83	0	0	70	0	0	31
Lane Group Flow (vph)	25	16	0	948	199	180	75	1038	82	1228	640	24
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	pt+ov		Prot	NA	Perm	Prot	NA	Perm	NA	Perm	Perm
Protected Phases	7	4 5		3	8		5	2		6		
Permitted Phases						8			2		6	6
Actuated Green, G (s)	3.0	20.0		35.7	39.4	39.4	8.8	66.4	66.4	53.4	53.4	53.4
Effective Green, g (s)	3.0	20.0		35.7	39.4	39.4	8.8	66.4	66.4	53.4	53.4	53.4
Actuated g/C Ratio	0.02	0.16		0.29	0.32	0.32	0.07	0.54	0.54	0.43	0.43	0.43
Clearance Time (s)	4.1			4.4	4.8	4.8	4.2	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	1.0			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	42	251		974	492	470	123	2683	835	1502	672	672
v/s Ratio Prot	0.01	0.01		c0.28	c0.13		c0.04	0.21		0.35		
v/s Ratio Perm						0.12			0.05		c0.41	0.02
v/c Ratio	0.60	0.06		0.97	0.41	0.38	0.61	0.39	0.10	0.82	0.95	0.04
Uniform Delay, d1	59.6	43.8		43.4	32.8	32.6	55.6	16.6	13.9	30.7	33.8	20.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.2	0.0		22.3	0.2	0.2	5.8	0.0	0.0	3.4	23.3	0.0
Delay (s)	73.8	43.8		65.7	33.0	32.8	61.4	16.7	13.9	34.1	57.1	20.2
Level of Service	E	D		E	C	C	E	B	B	C	E	C
Approach Delay (s)					53.8			19.0		41.4		
Approach LOS					D			B		D		

Intersection Summary

HCM 2000 Control Delay	39.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	123.4	Sum of lost time (s)	18.8
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

4: I-80 WB On Ramp/I-80 WB Off Ramp & Rocklin Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBR	All
Denied Delay (hr)	86.6	38.3	1.6	2.2	1.2	4.2	134.1
Denied Del/Veh (s)	189.9	191.5	15.5	8.4	33.5	38.4	115.1
Total Delay (hr)	39.3	10.4	23.0	3.5	2.4	14.1	92.8
Total Del/Veh (s)	93.8	57.3	204.1	13.5	68.0	123.6	82.5
Vehicles Entered	1486	646	377	934	125	395	3963
Vehicles Exited	1475	644	378	936	125	396	3954
Hourly Exit Rate	1475	644	378	936	125	396	3954
Input Volume	1650	720	662	1564	127	410	5133
% of Volume	89	89	57	60	98	97	77

5: I-80 EB Off Ramp/I-80 EB On Ramp & Rocklin Rd Performance by movement































Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Delay (hr)	0.1	0.2	386.3	41.6	112.9	0.8	123.4	665.4
Denied Del/Veh (s)	0.8	0.5	835.8	856.3	693.6	969.8	694.3	510.7
Total Delay (hr)	14.2	9.3	42.4	2.4	36.1	0.2	10.0	114.6
Total Del/Veh (s)	116.6	27.4	160.0	85.5	315.2	238.7	83.4	115.7
Vehicles Entered	418	1204	912	97	374	2	412	3419
Vehicles Exited	416	1206	912	98	370	3	420	3425
Hourly Exit Rate	416	1206	912	98	370	3	420	3425
Input Volume	470	1328	1625	171	575	5	627	4801
% of Volume	88	91	56	57	64	60	67	71

Total Network Performance

Denied Delay (hr)	799.5
Denied Del/Veh (s)	479.4
Total Delay (hr)	209.5
Total Del/Veh (s)	158.7
Vehicles Entered	4501
Vehicles Exited	4497
Hourly Exit Rate	4497
Input Volume	15843
% of Volume	28

HCM Signalized Intersection Capacity Analysis
6: Sierra College Blvd & I-80 EB Ramps/Crossing Dr

Cumulative Plus Project Conditions
PM Peak Hour

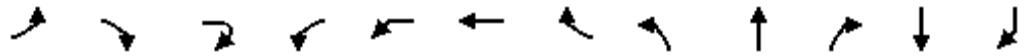
												
Movement	EBL2	EBT	EBR	WBL	WBR	WBR2	NBT	NBR	NBR2	SBL	SBT	SBR
Lane Configurations	 	 					  			 	 	
Traffic Volume (vph)	475	195	112	200	380	300	1057	581	125	380	1172	350
Future Volume (vph)	475	195	112	200	380	300	1057	581	125	380	1172	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1	4.1	3.7	3.7	4.0	5.7	5.7	5.7	4.1	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	1583	1583	5085	1583	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	1583	1583	5085	1583	1583	3433	3539	1583
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	475	195	112	200	380	300	1057	581	125	380	1172	350
RTOR Reduction (vph)	0	0	88	0	0	0	0	0	75	0	0	150
Lane Group Flow (vph)	475	195	24	200	380	300	1057	581	50	380	1172	200
Turn Type	Prot	NA	Perm	Prot	pt+ov	Free	NA	Perm	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8 1		2			1	6	
Permitted Phases			4			Free		2	2			6
Actuated Green, G (s)	17.2	17.3	17.3	14.4	31.9	105.4	42.4	42.4	42.4	13.7	60.2	60.2
Effective Green, g (s)	17.2	17.3	17.3	14.4	31.9	105.4	42.4	42.4	42.4	13.7	60.2	60.2
Actuated g/C Ratio	0.16	0.16	0.16	0.14	0.30	1.00	0.40	0.40	0.40	0.13	0.57	0.57
Clearance Time (s)	4.1	4.1	4.1	3.7			5.7	5.7	5.7	4.1	5.7	5.7
Vehicle Extension (s)	2.5	1.0	1.0	1.0			1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	560	580	259	241	479	1583	2045	636	636	446	2021	904
v/s Ratio Prot	c0.14	0.06		0.11	c0.24		0.21			0.11	0.33	
v/s Ratio Perm			0.02			c0.19		c0.37	0.03			0.13
v/c Ratio	0.85	0.34	0.09	0.83	0.79	0.19	0.52	0.91	0.08	0.85	0.58	0.22
Uniform Delay, d1	42.8	39.0	37.4	44.3	33.7	0.0	23.8	29.8	19.4	44.9	14.5	11.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.3	0.1	0.1	19.6	8.2	0.3	0.1	17.3	0.0	14.0	0.3	0.0
Delay (s)	54.1	39.1	37.5	63.9	41.9	0.3	23.9	47.1	19.5	58.9	14.7	11.1
Level of Service	D	D	D	E	D	A	C	D	B	E	B	B
Approach Delay (s)		48.0					31.2				22.9	
Approach LOS		D					C				C	

Intersection Summary		
HCM 2000 Control Delay	31.0	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.89	
Actuated Cycle Length (s)	105.4	Sum of lost time (s) 17.6
Intersection Capacity Utilization	69.0%	ICU Level of Service C
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 7: Sierra College Blvd & Commons Dr/I-80 WB Ramps

Cumulative Plus Project Conditions
 PM Peak Hour



Movement	EBL	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	225	105	591	5	115	270	285	1321	306	1086	400
Future Volume (vph)	75	225	105	591	5	115	270	285	1321	306	1086	400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.1		4.4	4.8	4.8	4.8	4.2	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00		0.95	0.95	0.95	0.95	1.00	0.91	1.00	0.95	1.00
Frt	1.00	0.85		1.00	1.00	0.94	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1736	1562		1649	1649	1624	1475	1736	4988	1553	3471	1583
Flt Permitted	0.95	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1736	1562		1649	1649	1624	1475	1736	4988	1553	3471	1583
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	75	225	105	591	5	115	270	285	1321	306	1086	400
RTOR Reduction (vph)	0	87	0	0	0	27	94	0	0	131	0	0
Lane Group Flow (vph)	75	243	0	295	301	174	90	285	1321	175	1086	400
Heavy Vehicles (%)	4%	4%	2%	4%	2%	4%	4%	4%	4%	4%	4%	2%
Turn Type	Prot	pt+ov		Prot	Perm	NA	Perm	Prot	NA	Perm	NA	Perm
Protected Phases	7	4 5		3		8		5	2		6	
Permitted Phases					8		8			2		6
Actuated Green, G (s)	4.2	28.4		18.3	21.1	21.1	21.1	16.9	53.0	53.0	31.9	31.9
Effective Green, g (s)	4.2	28.4		18.3	21.1	21.1	21.1	16.9	53.0	53.0	31.9	31.9
Actuated g/C Ratio	0.05	0.31		0.20	0.23	0.23	0.23	0.18	0.57	0.57	0.34	0.34
Clearance Time (s)	4.1			4.4	4.8	4.8	4.8	4.2	5.7	5.7	5.7	5.7
Vehicle Extension (s)	1.0			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	78	477		324	374	368	335	315	2845	885	1191	543
v/s Ratio Prot	0.04	0.16		c0.18		0.11		c0.16	0.26		c0.31	
v/s Ratio Perm					c0.18		0.06			0.11		0.25
v/c Ratio	0.96	0.51		0.91	0.80	0.47	0.27	0.90	0.46	0.20	0.91	0.74
Uniform Delay, d1	44.3	26.5		36.5	34.0	31.1	29.5	37.2	11.7	9.7	29.2	26.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	88.0	0.3		28.0	11.3	0.4	0.2	27.2	0.0	0.0	10.4	4.5
Delay (s)	132.3	26.8		64.5	45.2	31.4	29.7	64.4	11.7	9.7	39.5	31.3
Level of Service	F	C		E	D	C	C	E	B	A	D	C
Approach Delay (s)						45.3			19.2		36.0	
Approach LOS						D			B		D	

Intersection Summary		
HCM 2000 Control Delay	32.2	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.92	
Actuated Cycle Length (s)	92.9	Sum of lost time (s) 18.8
Intersection Capacity Utilization	79.1%	ICU Level of Service D
Analysis Period (min)	15	
c Critical Lane Group		

Movement	SBR2
Lane Configurations	
Traffic Volume (vph)	126
Future Volume (vph)	126
Ideal Flow (vphpl)	1900
Total Lost time (s)	5.7
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1553
Flt Permitted	1.00
Satd. Flow (perm)	1553
Peak-hour factor, PHF	1.00
Adj. Flow (vph)	126
RTOR Reduction (vph)	83
Lane Group Flow (vph)	43
Heavy Vehicles (%)	4%
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Actuated Green, G (s)	31.9
Effective Green, g (s)	31.9
Actuated g/C Ratio	0.34
Clearance Time (s)	5.7
Vehicle Extension (s)	1.0
Lane Grp Cap (vph)	533
v/s Ratio Prot	
v/s Ratio Perm	0.03
v/c Ratio	0.08
Uniform Delay, d1	20.6
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	20.6
Level of Service	C
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCS Worksheets

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4013	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1090	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1519	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1519	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.8	mi/h
Number of lanes, N	3	
Density, D	23.4	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4013	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	1432	vph	
Length of first accel/decel lane	1050	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4013	1432		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1090	381		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4558	1539	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.575 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3276$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4558	7050	No
$v_{FO} = v_F - v_R$	3019	7050	No
v_R	1539	2000	No
v_3 or v_{av34}	1282 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3276$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3276	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 23.0$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.567	
Space mean speed in ramp influence area,	S _R = 52.0	mph
Space mean speed in outer lanes,	S ₀ = 70.2	mph
Space mean speed for all vehicles,	S = 56.1	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
Agency/Co.: Omni-Means
Date performed: 6/8/2016
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: I-80 Eastbound
Junction: Rocklin Road On Ramp
Jurisdiction: Caltrans
Analysis Year: Existing
Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2581	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	211	vph	
Length of first accel/decel lane	360	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2581	211		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	701	56		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2932	227	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.588 Using Equation 3

FM

v = v (P) = 1723 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	3159	7050	No
FO			
v or v	1209 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1723	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	1950	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 18.3 pc/mi/ln

R R 12 A B

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.323	
	S	
Space mean speed in ramp influence area,	S = 57.6	mph
	R	
Space mean speed in outer lanes,	S = 62.4	mph
	0	
Space mean speed for all vehicles,	S = 59.3	mph

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4009	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	282	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4009	282		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1089	75		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00	%	0.00	%
Length	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4554	303	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.632 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 2991$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v = v_{Fi}$	4554	7050	No
$v = v_{FO} - v_R$	4251	7050	No
v_R	303	2000	No
v_3 or v_{av34}	1563 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2991$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2991	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 28.6$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.455	
Space mean speed in ramp influence area,	S _R = 54.5	mph
Space mean speed in outer lanes,	S ₀ = 69.1	mph
Space mean speed for all vehicles,	S = 58.8	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3727	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	776	vph	
Length of first accel/decel lane	750	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3727	776		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1013	206		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4233	834	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.599 Using Equation 3

FM

v = v (P) = 2533 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	5067	7050	No
FO			
v or v	1700 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2533	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3367	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 26.7$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.382	
	S	
Space mean speed in ramp influence area,	S = 56.2	mph
	R	
Space mean speed in outer lanes,	S = 60.7	mph
	0	
Space mean speed for all vehicles,	S = 57.6	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4503	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1224	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1705	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1705	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	63.7	mi/h
Number of lanes, N	3	
Density, D	26.8	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-80 Eastbound
 From/To: Rocklin Rd/Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	2792	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	759	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1057	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1057	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	16.3	pc/mi/ln
Level of service, LOS	B	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2792	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	539	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	183	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2792	539	183	vph
Peak-hour factor, PHF	0.92	0.89	0.90	
Peak 15-min volume, v15	759	151	51	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3171	618	207	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.652 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 2283$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3171	7050	No
$v_{FO} = v_F - v_R$	2553	7050	No
v_R	618	2000	No
v_3 or v_{av34}	888 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2283$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2283	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 22.5$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.484	
Space mean speed in ramp influence area,	S _R = 53.9	mph
Space mean speed in outer lanes,	S ₀ = 71.3	mph
Space mean speed for all vehicles,	S = 57.8	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2253	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	183	vph	
Length of first accel/decel lane	800	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	403	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2253	183	403	vph
Peak-hour factor, PHF	0.92	0.89	0.89	
Peak 15-min volume, v15	612	51	113	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2559	210	462	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.600 Using Equation 3

FM

v = v (P) = 1535 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	2769	7050	No
FO			
v or v	1024 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1535	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	1745	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 14.0 pc/mi/ln

R R 12 A B

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.303	
	S	
Space mean speed in ramp influence area,	S = 58.0	mph
	R	
Space mean speed in outer lanes,	S = 63.1	mph
	0	
Space mean speed for all vehicles,	S = 59.8	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2436	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	403	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	183	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2436	403	183	vph
Peak-hour factor, PHF	0.92	0.89	0.89	
Peak 15-min volume, v15	662	113	51	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	%
Length	mi	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2767	462	210	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 1652 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	3229	7050	No
FO			
v or v	1115 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1652	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2114	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.4 pc/mi/ln

R R 12 A B

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.304	
	S	
Space mean speed in ramp influence area,	S = 58.0	mph
	R	
Space mean speed in outer lanes,	S = 62.8	mph
	0	
Space mean speed for all vehicles,	S = 59.6	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	2839	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	771	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1075	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1075	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	16.5	pc/mi/ln
Level of service, LOS	B	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4456	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1211	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1687	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1687	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	63.8	mi/h
Number of lanes, N	3	
Density, D	26.4	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4456	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	879	vph	
Length of first accel/decel lane	650	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	111	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1650	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4456	879	111	vph
Peak-hour factor, PHF	0.92	0.84	0.84	
Peak 15-min volume, v15	1211	262	33	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5061	1067	135	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.584 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3401$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5061	7050	No
$v_{FO} = v_F - v_R$	3994	7050	No
v_R	1067	2000	No
v_3 or v_{av34}	1660 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3401$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3401	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 27.7$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.524	
Space mean speed in ramp influence area,	S _R = 52.9	mph
Space mean speed in outer lanes,	S ₀ = 68.7	mph
Space mean speed for all vehicles,	S = 57.3	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3577	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	111	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	321	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3577	111	321	vph
Peak-hour factor, PHF	0.92	0.84	0.84	
Peak 15-min volume, v15	972	33	96	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4063	135	390	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2426 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4198	7050	No
FO			
v or v	1637 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2426	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2561	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 21.0 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.337	
	S	
Space mean speed in ramp influence area,	S = 57.3	mph
	R	
Space mean speed in outer lanes,	S = 60.9	mph
	0	
Space mean speed for all vehicles,	S = 58.6	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3688	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	321	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	111	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3688	321	111	vph
Peak-hour factor, PHF	0.92	0.84	0.84	
Peak 15-min volume, v15	1002	96	33	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4189	390	135	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2501 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4579	7050	No
FO			
v or v	1688 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2501	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2891	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.5 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.342	
	S	
Space mean speed in ramp influence area,	S = 57.1	mph
	R	
Space mean speed in outer lanes,	S = 60.7	mph
	0	
Space mean speed for all vehicles,	S = 58.4	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: Sierra College Blvd/Rocklin Rd
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4009	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1089	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1518	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1518	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.8	mi/h
Number of lanes, N	3	
Density, D	23.4	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	5027	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1366	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1903	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1903	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	61.4	mi/h
Number of lanes, N	3	
Density, D	31.0	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	5027	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	1028	vph	
Length of first accel/decel lane	892	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5027	1028		vph
Peak-hour factor, PHF	0.92	0.96		
Peak 15-min volume, v15	1366	268		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5710	1082	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.567 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3708$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{12} = v_{12}$	5710	7050	No
$v_{FO} = v_F - v_R$	4628	7050	No
v_R	1082	2000	No
v_3 or v_{av34}	2002 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3708$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3708	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 28.1$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.525	
Space mean speed in ramp influence area,	S _R = 52.9	mph
Space mean speed in outer lanes,	S ₀ = 67.4	mph
Space mean speed for all vehicles,	S = 57.2	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3999	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	260	vph	
Length of first accel/decel lane	360	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3999	260		vph
Peak-hour factor, PHF	0.92	0.96		
Peak 15-min volume, v15	1087	68		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4542	274	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.588 Using Equation 3

FM

v = v (P) = 2669 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4816	7050	No
FO			
v or v	1873 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2669	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2943	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 26.0 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.370	
	S	
Space mean speed in ramp influence area,	S = 56.5	mph
	R	
Space mean speed in outer lanes,	S = 60.1	mph
	0	
Space mean speed for all vehicles,	S = 57.8	mph

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3436	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	340	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3436	340		vph
Peak-hour factor, PHF	0.92	0.99		
Peak 15-min volume, v15	934	86		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3903	347	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.646 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 2646$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3903	7050	No
$v_{FO} = v_F - v_R$	3556	7050	No
v_R	347	2000	No
v_3 or v_{av34}	1257 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2646$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2646	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 25.7$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.459	
Space mean speed in ramp influence area,	S _R = 54.4	mph
Space mean speed in outer lanes,	S ₀ = 70.3	mph
Space mean speed for all vehicles,	S = 58.7	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3096	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	1170	vph	
Length of first accel/decel lane	760	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3096	1170		vph
Peak-hour factor, PHF	0.92	0.99		
Peak 15-min volume, v15	841	295		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3517	1194	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.599 Using Equation 3

FM

v = v (P) = 2106 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4711	7050	No
FO			
v or v	1411 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2106	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3300	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 25.9 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.374	
	S	
Space mean speed in ramp influence area,	S = 56.4	mph
	R	
Space mean speed in outer lanes,	S = 61.7	mph
	0	
Space mean speed for all vehicles,	S = 57.9	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4266	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1159	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1615	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1615	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.3	mi/h
Number of lanes, N	3	
Density, D	25.1	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: Rocklin Rd/Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4259	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1157	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1613	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1613	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.4	mi/h
Number of lanes, N	3	
Density, D	25.1	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4259	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	575	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	343	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4259	575	343	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1157	151	90	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4838	614	366	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.611 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3194$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v = v_{Fi}$	4838	7050	No
$v = v_{FO} - v_R$	4224	7050	No
v_R	614	2000	No
v_3 or v_{av34}	1644 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3194$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3194	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 30.4$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.483	
Space mean speed in ramp influence area,	S _R = 53.9	mph
Space mean speed in outer lanes,	S ₀ = 68.8	mph
Space mean speed for all vehicles,	S = 58.2	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3684	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	343	vph	
Length of first accel/decel lane	800	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	748	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3684	343	748	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1001	90	197	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4185	366	799	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.600 Using Equation 3

FM

v = v (P) = 2511 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4551	7050	No
FO			
v or v	1674 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2511	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2877	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.7 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.350	
	S	
Space mean speed in ramp influence area,	S = 56.9	mph
	R	
Space mean speed in outer lanes,	S = 60.8	mph
	0	
Space mean speed for all vehicles,	S = 58.3	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4027	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	748	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	343	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4027	748	343	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1094	197	90	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4574	799	366	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2731 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	5373	7050	No
FO			
v or v	1843 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2731	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3530	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.3 pc/mi/ln

R R 12 A

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.405	
	S	
Space mean speed in ramp influence area,	S = 55.7	mph
	R	
Space mean speed in outer lanes,	S = 60.2	mph
	0	
Space mean speed for all vehicles,	S = 57.1	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4775	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1298	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1808	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1808	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	62.6	mi/h
Number of lanes, N	3	
Density, D	28.9	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	3544	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	963	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1342	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1342	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	20.6	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3544	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	724	vph	
Length of first accel/decel lane	650	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	234	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1650	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3544	724	234	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	963	191	62	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4026	774	250	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.624 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 2802 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4026	7050	No
$v_{FO} = v_F - v_R$	3252	7050	No
v_R	774	2000	No
$v_3 \text{ or } v_{av34}$	1224 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2802$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2802	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 22.5 \text{ pc/mi/ln}$

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.498	
Space mean speed in ramp influence area,	S _R = 53.6	mph
Space mean speed in outer lanes,	S ₀ = 70.4	mph
Space mean speed for all vehicles,	S = 57.8	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2820	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	234	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	382	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2820	234	382	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	766	62	101	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3203	250	408	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 1913 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	3453	7050	No
FO			
v or v	1290 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1913	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2163	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.8 pc/mi/ln

R R 12 A B

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.320	
	S	
Space mean speed in ramp influence area,	S = 57.6	mph
	R	
Space mean speed in outer lanes,	S = 62.2	mph
	0	
Space mean speed for all vehicles,	S = 59.2	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra Collge Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3054	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	382	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	234	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3054	382	234	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	830	101	62	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3469	408	250	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2071 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	3877	7050	No
FO			
v or v	1398 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2071	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2479	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.2 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.319	
	S	
Space mean speed in ramp influence area,	S = 57.7	mph
	R	
Space mean speed in outer lanes,	S = 61.8	mph
	0	
Space mean speed for all vehicles,	S = 59.1	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: Sierra College Blvd/Rocklin Rd
 Jurisdiction: Caltrans
 Analysis Year: Existing
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	3436	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	934	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1301	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1301	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	20.0	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4017	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1092	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1521	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1521	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.8	mi/h
Number of lanes, N	3	
Density, D	23.5	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4017	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	1435	vph	
Length of first accel/decel lane	1050	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4017	1435		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1092	382		v
Trucks and buses	9	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4563	1549	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.575 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3281$ pc/h

12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{12} = v_{12}$	4563	7050	No
$v_{FO} = v_F - v_R$	3014	7050	No
v_R	1549	2000	No
v_3 or v_{av34}	1282 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3281$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3281	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 23.0$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.567	
Space mean speed in ramp influence area,	S = 51.9	mph
Space mean speed in outer lanes,	S = 70.2	mph
Space mean speed for all vehicles,	S = 56.0	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2582	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	213	vph	
Length of first accel/decel lane	360	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2582	213		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	702	57		v
Trucks and buses	9	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2933	230	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.588 Using Equation 3

FM

v = v (P) = 1723 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	3163	7050	No
FO			
v or v	1210 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1723	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	1953	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 18.3 pc/mi/ln

R R 12 A B

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.323	
	S	
Space mean speed in ramp influence area,	S = 57.6	mph
	R	
Space mean speed in outer lanes,	S = 62.4	mph
	0	
Space mean speed for all vehicles,	S = 59.3	mph

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4012	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	283	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4012	283		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1090	75		v
Trucks and buses	9	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00	%	0.00	%
Length	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4557	306	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.632 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 2993$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4557	7050	No
$v_{FO} = v_F - v_R$	4251	7050	No
v_R	306	2000	No
v_3 or v_{av34}	1564 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2993$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2993	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 28.6$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.456	
Space mean speed in ramp influence area,	S _R = 54.5	mph
Space mean speed in outer lanes,	S ₀ = 69.1	mph
Space mean speed for all vehicles,	S = 58.8	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3729	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	789	vph	
Length of first accel/decel lane	750	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3729	789		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1013	210		v
Trucks and buses	9	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4236	852	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.599 Using Equation 3

FM

v = v (P) = 2535 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	5088	7050	No
FO			
v or v	1701 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2535	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3387	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 26.8$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.384	
Space mean speed in ramp influence area,	S = 56.2	mph
Space mean speed in outer lanes,	S = 60.7	mph
Space mean speed for all vehicles,	S = 57.6	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4518	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1228	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1711	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1711	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	63.6	mi/h
Number of lanes, N	3	
Density, D	26.9	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
Agency or Company: Omni-Means
Date Performed: 6/8/2016
Analysis Time Period: AM Peak Hour
Freeway/Direction: I-80 Eastbound
From/To: Rocklin Rd/Sierra College Blvd
Jurisdiction: Caltrans
Analysis Year: Existing+Project
Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	2795	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	760	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1058	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1058	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	16.3	pc/mi/ln
Level of service, LOS	B	

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2795	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	540	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	183	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2795	540	183	vph
Peak-hour factor, PHF	0.92	0.89	0.89	
Peak 15-min volume, v15	760	152	51	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3175	619	210	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.652 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 2286$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3175	7050	No
$v_{FO} = v_F - v_R$	2556	7050	No
v_R	619	2000	No
v_3 or v_{av34}	889 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2286$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2286	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 22.6$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.484	
Space mean speed in ramp influence area,	S _R = 53.9	mph
Space mean speed in outer lanes,	S ₀ = 71.3	mph
Space mean speed for all vehicles,	S = 57.8	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2255	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	183	vph	
Length of first accel/decel lane	800	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	414	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2255	183	414	vph
Peak-hour factor, PHF	0.92	0.89	0.89	
Peak 15-min volume, v15	613	51	116	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2561	210	474	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.600 Using Equation 3

FM

v = v (P) = 1536 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	2771	7050	No
FO			
v or v	1025 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1536	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	1746	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 14.0 pc/mi/ln

R R 12 A

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.303	
	S	
Space mean speed in ramp influence area,	S = 58.0	mph
	R	
Space mean speed in outer lanes,	S = 63.1	mph
	0	
Space mean speed for all vehicles,	S = 59.8	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2438	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	414	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	183	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2438	414	183	vph
Peak-hour factor, PHF	0.92	0.89	0.89	
Peak 15-min volume, v15	662	116	51	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2769	474	210	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 1653 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	3243	7050	No
FO			
v or v	1116 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1653	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2127	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.5 pc/mi/ln

R R 12 A B

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.305	
	S	
Space mean speed in ramp influence area,	S = 58.0	mph
	R	
Space mean speed in outer lanes,	S = 62.8	mph
	0	
Space mean speed for all vehicles,	S = 59.6	mph

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	2852	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	775	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1080	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1080	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	16.6	pc/mi/ln
Level of service, LOS	B	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4460	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1212	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1689	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1689	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	63.8	mi/h
Number of lanes, N	3	
Density, D	26.5	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4460	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	882	vph	
Length of first accel/decel lane	650	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	113	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1650	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4460	882	113	vph
Peak-hour factor, PHF	0.92	0.93	0.93	
Peak 15-min volume, v15	1212	237	30	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5066	967	124	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.589 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3381$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5066	7050	No
$v_{FO} = v_F - v_R$	4099	7050	No
v_R	967	2000	No
v_3 or v_{av34}	1685 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3381$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3381	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 27.5$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.515	
Space mean speed in ramp influence area,	S _R = 53.2	mph
Space mean speed in outer lanes,	S ₀ = 68.6	mph
Space mean speed for all vehicles,	S = 57.5	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3578	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	113	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	321	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3578	113	321	vph
Peak-hour factor, PHF	0.92	0.93	0.93	
Peak 15-min volume, v15	972	30	86	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4064	124	352	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2427 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4188	7050	No
FO			
v or v	1637 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2427	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2551	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.9 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.336	
	S	
Space mean speed in ramp influence area,	S = 57.3	mph
	R	
Space mean speed in outer lanes,	S = 60.9	mph
	0	
Space mean speed for all vehicles,	S = 58.6	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3691	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	321	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	113	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3691	321	113	vph
Peak-hour factor, PHF	0.92	0.93	0.93	
Peak 15-min volume, v15	1003	86	30	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4192	352	124	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2503 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4544	7050	No
FO			
v or v	1689 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2503	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2855	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.2 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.340	
	S	
Space mean speed in ramp influence area,	S = 57.2	mph
	R	
Space mean speed in outer lanes,	S = 60.7	mph
	0	
Space mean speed for all vehicles,	S = 58.5	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: Sierra College Blvd/Rocklin Rd
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4012	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1090	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1519	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1519	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.8	mi/h
Number of lanes, N	3	
Density, D	23.4	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	5041	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1370	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1909	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1909	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	61.3	mi/h
Number of lanes, N	3	
Density, D	31.1	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

Freeway Data

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	5041	vph	

Off Ramp Data

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	1040	vph	
Length of first accel/decel lane	892	ft	
Length of second accel/decel lane		ft	

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5041	1040		vph
Peak-hour factor, PHF	0.92	0.96		
Peak 15-min volume, v15	1370	271		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5726	1094	pcph

Estimation of V12 Diverge Areas

L = (Equation 13-12 or 13-13)
EQ
P = 0.567 Using Equation 9
FD
 $v_{12} = v_R + (v_F - v_R) P = 3718 \text{ pc/h}$
FD

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5726	7050	No
$v_{FO} = v_F - v_R$	4632	7050	No
v_R	1094	2000	No
$v_3 \text{ or } v_{av34}$	2008 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3718$		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3718	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D = 28.2 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D = 0.526	
Space mean speed in ramp influence area,	S _R = 52.9	mph
Space mean speed in outer lanes,	S ₀ = 67.4	mph
Space mean speed for all vehicles,	S = 57.2	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
Agency/Co.: Omni-Means
Date performed: 6/8/2016
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: I-80 Eastbound
Junction: Rocklin Road On Ramp
Jurisdiction: Caltrans
Analysis Year: Existing+Project
Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4001	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	261	vph	
Length of first accel/decel lane	360	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4001	261		vph
Peak-hour factor, PHF	0.92	0.96		
Peak 15-min volume, v15	1087	68		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4545	275	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.588 Using Equation 3

FM

v = v (P) = 2671 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4820	7050	No
FO			
v or v	1874 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2671	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2946	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 26.1 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.370	
	S	
Space mean speed in ramp influence area,	S = 56.5	mph
	R	
Space mean speed in outer lanes,	S = 60.1	mph
	0	
Space mean speed for all vehicles,	S = 57.8	mph

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3439	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	342	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3439	342		vph
Peak-hour factor, PHF	0.92	0.99		
Peak 15-min volume, v15	935	86		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00	%	0.00	%
Length	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3906	349	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.646 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 2648$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3906	7050	No
$v_{FO} = v_F - v_R$	3557	7050	No
v_R	349	2000	No
v_3 or v_{av34}	1258 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2648$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2648	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 25.7$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.459	
Space mean speed in ramp influence area,	S _R = 54.4	mph
Space mean speed in outer lanes,	S ₀ = 70.3	mph
Space mean speed for all vehicles,	S = 58.7	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3097	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	1177	vph	
Length of first accel/decel lane	760	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3097	1177		vph
Peak-hour factor, PHF	0.92	0.99		
Peak 15-min volume, v15	842	297		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3518	1201	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.599 Using Equation 3

FM

v = v (P) = 2107 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4719	7050	No
FO			
v or v	1411 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2107	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3308	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 26.0 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.374	
	S	
Space mean speed in ramp influence area,	S = 56.4	mph
	R	
Space mean speed in outer lanes,	S = 61.7	mph
	0	
Space mean speed for all vehicles,	S = 57.9	mph

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4274	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1161	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1618	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1618	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.3	mi/h
Number of lanes, N	3	
Density, D	25.2	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: Rocklin Rd/Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4262	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1158	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1614	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1614	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.4	mi/h
Number of lanes, N	3	
Density, D	25.1	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4262	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	577	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	343	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4262	577	343	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1158	152	90	v
Trucks and buses	9	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4841	613	365	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.611 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3195$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4841	7050	No
$v_{FO} = v_F - v_R$	4228	7050	No
v_R	613	2000	No
v_3 or v_{av34}	1646 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3195$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3195	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 30.4$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.483	
Space mean speed in ramp influence area,	S _R = 53.9	mph
Space mean speed in outer lanes,	S ₀ = 68.8	mph
Space mean speed for all vehicles,	S = 58.2	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3685	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	343	vph	
Length of first accel/decel lane	800	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	754	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3685	343	754	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1001	90	198	v
Trucks and buses	9	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4186	365	802	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.600 Using Equation 3

FM

v = v (P) = 2511 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4551	7050	No
FO			
v or v	1675 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2511	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2876	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.7 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.350	
	S	
Space mean speed in ramp influence area,	S = 56.9	mph
	R	
Space mean speed in outer lanes,	S = 60.8	mph
	0	
Space mean speed for all vehicles,	S = 58.3	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4028	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	754	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	343	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4028	754	343	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1095	198	90	v
Trucks and buses	9	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4575	802	365	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2732 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	5377	7050	No
FO			
v or v	1843 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2732	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3534	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.3 pc/mi/ln

R R 12 A

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.406	
	S	
Space mean speed in ramp influence area,	S = 55.7	mph
	R	
Space mean speed in outer lanes,	S = 60.2	mph
	0	
Space mean speed for all vehicles,	S = 57.1	mph

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4782	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1299	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1811	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1811	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	62.6	mi/h
Number of lanes, N	3	
Density, D	28.9	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	3557	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	967	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1347	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1347	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	20.7	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3557	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	735	vph	
Length of first accel/decel lane	650	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	235	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1650	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3557	735	235	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	967	193	62	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4040	789	252	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.623 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 2813$ pc/h
 12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{12} = v_{12}$	4040	7050	No
$v_{FO} = v_F - v_R$	3251	7050	No
v_R	789	2000	No
v_3 or v_{av34}	1227 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2813$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2813	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 22.6$ pc/mi/ln
 R 12 D
 Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.499	
Space mean speed in ramp influence area,	S = 53.5	mph
Space mean speed in outer lanes,	S = 70.4	mph
Space mean speed for all vehicles,	S = 57.7	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2822	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	235	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	382	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2822	235	382	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	767	62	101	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3205	252	410	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 1914 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	3457	7050	No
FO			
v or v	1291 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1914	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2166	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.9 pc/mi/ln

R R 12 A B

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.320	
	S	
Space mean speed in ramp influence area,	S = 57.6	mph
	R	
Space mean speed in outer lanes,	S = 62.2	mph
	0	
Space mean speed for all vehicles,	S = 59.2	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra Collge Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3057	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	382	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	235	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3057	382	235	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	831	101	62	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3472	410	252	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2073 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	3882	7050	No
FO			
v or v	1399 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2073	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2483	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.3 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.319	
	S	
Space mean speed in ramp influence area,	S = 57.7	mph
	R	
Space mean speed in outer lanes,	S = 61.8	mph
	0	
Space mean speed for all vehicles,	S = 59.1	mph

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: Sierra College Blvd/Rocklin Rd
 Jurisdiction: Caltrans
 Analysis Year: Existing+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	3439	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	935	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1302	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1302	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	20.0	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

Operational Analysis

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

Flow Inputs and Adjustments

Volume, V	4161	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1131	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1575	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	1575	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.6	mi/h
Number of lanes, N	3	
Density, D	24.4	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
 E-mail:

_____Diverge Analysis_____

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

_____Freeway Data_____

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	4161	vph

_____Off Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1498	vph
Length of first accel/decel lane	1050	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4161	1498		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1131	398		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00	%	0.00	%
Length	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4726	1610	pcph

Estimation of V12 Diverge Areas

L = (Equation 13-12 or 13-13)
EQ
P = 0.568 Using Equation 9
FD
 $v_{12} = v_R + (v_F - v_R) P = 3379 \text{ pc/h}$
FD

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4726	7050	No
$v_{FO} = v_F - v_R$	3116	7050	No
v_R	1610	2000	No
$v_3 \text{ or } v_{av34}$	1347 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3379$		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3379	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D = 23.9 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D = 0.573	
Space mean speed in ramp influence area,	S _R = 51.8	mph
Space mean speed in outer lanes,	S ₀ = 70.0	mph
Space mean speed for all vehicles,	S = 56.0	mph

Phone: Fax:
 E-mail:

_____Merge Analysis_____

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

_____Freeway Data_____

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2663	vph

_____On Ramp Data_____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	221	vph
Length of first accel/decel lane	360	ft
Length of second accel/decel lane		ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2663	221		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	724	59		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	%
Length	mi	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3025	237	pcph

Estimation of V12 Merge Areas

L = (Equation 13-6 or 13-7)
EQ
P = 0.588 Using Equation 3
FM
 $v_{12} = v_{F \text{ FM}} = 1777 \text{ pc/h}$

Capacity Checks

	Actual	Maximum	LOS F?
v _{FO}	3262	7050	No
v ₃ or v _{av34}	1248 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		Yes	
If yes, v _{12A} = 1777		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v _{12A}	2014	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 18.8 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M = 0.325	
Space mean speed in ramp influence area,	S _R = 57.5	mph
Space mean speed in outer lanes,	S ₀ = 62.3	mph
Space mean speed for all vehicles,	S = 59.3	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

Freeway Data

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4046	vph	

Off Ramp Data

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	291	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4046	291		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1099	77		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00	%	0.00	%
Length	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4596	313	pcph

Estimation of V12 Diverge Areas

L = (Equation 13-12 or 13-13)

EQ

P = 0.631 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3014$ pc/h

12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v_{12} = v_{Fi}$	4596	7050	No
$v_{FO} = v_F - v_R$	4283	7050	No
v_R	313	2000	No
v_3 or v_{av34}	1582 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3014$		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3014	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D = 28.8$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D = 0.456	
Space mean speed in ramp influence area,	S = 54.5	mph
Space mean speed in outer lanes,	S = 69.0	mph
Space mean speed for all vehicles,	S = 58.8	mph

Phone: Fax:
 E-mail:

_____Merge Analysis_____

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

_____Freeway Data_____

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3755	vph	

_____On Ramp Data_____

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	830	vph	
Length of first accel/decel lane	750	ft	
Length of second accel/decel lane		ft	

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3755	830		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1020	221		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4265	892	pcph

Estimation of V12 Merge Areas

L = (Equation 13-6 or 13-7)
EQ
P = 0.599 Using Equation 3
FM
 $v_{12} = v_{F \text{ FM}} = 2553 \text{ pc/h}$

Capacity Checks

	Actual	Maximum	LOS F?
v _{FO}	5157	7050	No
v ₃ or v _{av34}	1712 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		Yes	
If yes, v _{12A} = 2553		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v _{12A}	3445	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 27.2 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M = 0.391	
Space mean speed in ramp influence area,	S _R = 56.0	mph
Space mean speed in outer lanes,	S ₀ = 60.6	mph
Space mean speed for all vehicles,	S = 57.5	mph

Phone: Fax:
E-mail:

Operational Analysis

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

Flow Inputs and Adjustments

Volume, V	4585	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1246	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1736	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	1736	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	63.4	mi/h
Number of lanes, N	3	
Density, D	27.4	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-80 Eastbound
 From/To: Rocklin Rd/Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	2884	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	784	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1092	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1092	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	16.8	pc/mi/ln
Level of service, LOS	B	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2884	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	680	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	185	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2884	680	185	vph
Peak-hour factor, PHF	0.92	0.89	0.90	
Peak 15-min volume, v15	784	191	51	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3276	779	210	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.642 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 2383$ pc/h
 12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{12} = v_{12}$	3276	7050	No
$v_{FO} = v_F - v_R$	2497	7050	No
v_R	779	2000	No
v_3 or v_{av34}	893 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2383$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2383	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 23.4$ pc/mi/ln
 Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.498	
Space mean speed in ramp influence area,	S _R = 53.5	mph
Space mean speed in outer lanes,	S ₀ = 71.3	mph
Space mean speed for all vehicles,	S = 57.4	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2204	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	185	vph	
Length of first accel/decel lane	800	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	450	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2204	185	450	vph
Peak-hour factor, PHF	0.92	0.89	0.89	
Peak 15-min volume, v15	599	52	126	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2503	212	516	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.600 Using Equation 3

FM

v = v (P) = 1502 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	2715	7050	No
FO			
v or v	1001 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1502	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	1714	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 13.7 pc/mi/ln

R R 12 A

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.303	
	S	
Space mean speed in ramp influence area,	S = 58.0	mph
	R	
Space mean speed in outer lanes,	S = 63.2	mph
	0	
Space mean speed for all vehicles,	S = 59.8	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2389	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	450	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	185	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2389	450	185	vph
Peak-hour factor, PHF	0.92	0.89	0.89	
Peak 15-min volume, v15	649	126	52	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2714	516	212	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 1621 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	3230	7050	No
FO			
v or v	1093 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1621	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2137	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.5 pc/mi/ln

R R 12 A B

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.305	
	S	
Space mean speed in ramp influence area,	S = 58.0	mph
	R	
Space mean speed in outer lanes,	S = 62.9	mph
	0	
Space mean speed for all vehicles,	S = 59.5	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	2839	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	771	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1075	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1075	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	16.5	pc/mi/ln
Level of service, LOS	B	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4456	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1211	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1687	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1687	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	63.8	mi/h
Number of lanes, N	3	
Density, D	26.4	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4456	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	900	vph	
Length of first accel/decel lane	650	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	150	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1650	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4456	900	150	vph
Peak-hour factor, PHF	0.92	0.84	0.84	
Peak 15-min volume, v15	1211	268	45	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5061	1093	182	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.583 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3407$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5061	7050	No
$v_{FO} = v_F - v_R$	3968	7050	No
v_R	1093	2000	No
v_3 or v_{av34}	1654 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3407$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3407	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 27.7$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.526	
Space mean speed in ramp influence area,	S _R = 52.9	mph
Space mean speed in outer lanes,	S ₀ = 68.8	mph
Space mean speed for all vehicles,	S = 57.2	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3556	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	150	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	340	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3556	150	340	vph
Peak-hour factor, PHF	0.92	0.84	0.84	
Peak 15-min volume, v15	966	45	101	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4039	182	413	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2412 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4221	7050	No
FO			
v or v	1627 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2412	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2594	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 21.2 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.338	
	S	
Space mean speed in ramp influence area,	S = 57.2	mph
	R	
Space mean speed in outer lanes,	S = 60.9	mph
	0	
Space mean speed for all vehicles,	S = 58.6	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3706	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	340	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	150	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3706	340	150	vph
Peak-hour factor, PHF	0.92	0.84	0.84	
Peak 15-min volume, v15	1007	101	45	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4210	413	182	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2514 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4623	7050	No
FO			
v or v	1696 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2514	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2927	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.7 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.345	
	S	
Space mean speed in ramp influence area,	S = 57.1	mph
	R	
Space mean speed in outer lanes,	S = 60.7	mph
	0	
Space mean speed for all vehicles,	S = 58.3	mph

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: Sierra College Blvd/Rocklin Rd
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4046	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1099	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1532	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1532	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.8	mi/h
Number of lanes, N	3	
Density, D	23.7	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

Operational Analysis

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

Flow Inputs and Adjustments

Volume, V	5005	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1360	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1895	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	1895	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	61.5	mi/h
Number of lanes, N	3	
Density, D	30.8	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

Freeway Data

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	5005	vph	

Off Ramp Data

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	1082	vph	
Length of first accel/decel lane	892	ft	
Length of second accel/decel lane		ft	

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5005	1082		vph
Peak-hour factor, PHF	0.92	0.96		
Peak 15-min volume, v15	1360	282		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5685	1138	pcph

Estimation of V12 Diverge Areas

L = (Equation 13-12 or 13-13)

EQ

P = 0.566 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3709$ pc/h

12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v_{12} = v_{Fi}$	5685	7050	No
$v_{FO} = v_F - v_R$	4547	7050	No
v_R	1138	2000	No
v_3 or v_{av34}	1976 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3709$		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3709	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D = 28.1$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D = 0.530	
Space mean speed in ramp influence area,	S = 52.8	mph
Space mean speed in outer lanes,	S = 67.5	mph
Space mean speed for all vehicles,	S = 57.1	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

Freeway Data

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3923	vph	

On Ramp Data

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	282	vph	
Length of first accel/decel lane	360	ft	
Length of second accel/decel lane		ft	

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3923	282		vph
Peak-hour factor, PHF	0.92	0.96		
Peak 15-min volume, v15	1066	73		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	%
Length	mi	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4456	297	pcph

Estimation of V12 Merge Areas

L = (Equation 13-6 or 13-7)
EQ
P = 0.588 Using Equation 3
FM
 $v_{12} = v_{F \text{ FM}} = 2618 \text{ pc/h}$

Capacity Checks

	Actual	Maximum	LOS F?
v _{FO}	4753	7050	No
v ₃ or v _{av34}	1838 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		Yes	
If yes, v _{12A} = 2618		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v _{12A}	2915	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 25.8 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M = 0.368	
Space mean speed in ramp influence area,	S _R = 56.5	mph
Space mean speed in outer lanes,	S ₀ = 60.2	mph
Space mean speed for all vehicles,	S = 57.9	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

Freeway Data

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3504	vph	

Off Ramp Data

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	363	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3504	363		vph
Peak-hour factor, PHF	0.92	0.99		
Peak 15-min volume, v15	952	92		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00	%	0.00	%
Length	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3980	370	pcph

Estimation of V12 Diverge Areas

L = (Equation 13-12 or 13-13)
EQ
P = 0.643 Using Equation 9
FD
 $v_{12} = v_R + (v_F - v_R) P = 2693$ pc/h
FD

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3980	7050	No
$v_{FO} = v_F - v_R$	3610	7050	No
v_R	370	2000	No
v_3 or v_{av34}	1287 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2693$		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2693	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D = 26.1$ pc/mi/ln
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D = 0.461	
Space mean speed in ramp influence area,	S _R = 54.4	mph
Space mean speed in outer lanes,	S ₀ = 70.2	mph
Space mean speed for all vehicles,	S = 58.7	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

Freeway Data

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3141	vph	

On Ramp Data

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	1203	vph	
Length of first accel/decel lane	760	ft	
Length of second accel/decel lane		ft	

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3141	1203		vph
Peak-hour factor, PHF	0.92	0.99		
Peak 15-min volume, v15	854	304		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	%
Length	mi	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3568	1227	pcph

Estimation of V12 Merge Areas

L = (Equation 13-6 or 13-7)
EQ
P = 0.599 Using Equation 3
FM
 $v_{12} = v_{F \text{ FM}} = 2136 \text{ pc/h}$

Capacity Checks

	Actual	Maximum	LOS F?
v _{FO}	4795	7050	No
v ₃ or v _{av34}	1432 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		Yes	
If yes, v _{12A} = 2136		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v _{12A}	3363	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 26.4 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M = 0.380	
Space mean speed in ramp influence area,	S _R = 56.3	mph
Space mean speed in outer lanes,	S ₀ = 61.6	mph
Space mean speed for all vehicles,	S = 57.8	mph

Phone: Fax:
E-mail:

Operational Analysis

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

Flow Inputs and Adjustments

Volume, V	4344	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1180	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1645	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	1645	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.1	mi/h
Number of lanes, N	3	
Density, D	25.6	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: Rocklin Rd/Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4205	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1143	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1592	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1592	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.5	mi/h
Number of lanes, N	3	
Density, D	24.7	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4205	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	615	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	345	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4205	615	345	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1143	162	91	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4776	657	369	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.610 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3171$ pc/h
 12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v = v_{12}$	4776	7050	No
$v_{Fi} = v_F - v_R$	4119	7050	No
v_R	657	2000	No
v_3 or v_{av34}	1605 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3171$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3171	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 30.2$ pc/mi/ln
 Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.487	
Space mean speed in ramp influence area,	S _R = 53.8	mph
Space mean speed in outer lanes,	S ₀ = 68.9	mph
Space mean speed for all vehicles,	S = 58.1	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3590	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	345	vph	
Length of first accel/decel lane	800	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	840	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3590	345	840	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	976	91	221	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4078	369	897	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.600 Using Equation 3

FM

v = v (P) = 2446 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4447	7050	No
FO			
v or v	1632 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2446	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2815	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.2 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.346	
	S	
Space mean speed in ramp influence area,	S = 57.0	mph
	R	
Space mean speed in outer lanes,	S = 60.9	mph
	0	
Space mean speed for all vehicles,	S = 58.4	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3935	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	840	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	345	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3935	840	345	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1069	221	91	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4470	897	369	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2669 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	5367	7050	No
FO			
v or v	1801 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2669	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3566	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.5 pc/mi/ln

R R 12 A

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.410	
	S	
Space mean speed in ramp influence area,	S = 55.6	mph
	R	
Space mean speed in outer lanes,	S = 60.3	mph
	0	
Space mean speed for all vehicles,	S = 57.1	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4775	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1298	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1808	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1808	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	62.6	mi/h
Number of lanes, N	3	
Density, D	28.9	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	3544	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	963	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1342	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1342	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	20.6	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3544	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	745	vph	
Length of first accel/decel lane	650	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	295	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1650	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3544	745	295	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	963	196	78	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4026	796	315	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.623 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 2807 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4026	7050	No
$v_{FO} = v_F - v_R$	3230	7050	No
v_R	796	2000	No
$v_3 \text{ or } v_{av34}$	1219 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2807$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2807	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 22.5 \text{ pc/mi/ln}$

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.500	
Space mean speed in ramp influence area,	S _R = 53.5	mph
Space mean speed in outer lanes,	S ₀ = 70.5	mph
Space mean speed for all vehicles,	S = 57.7	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2799	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	295	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	410	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2799	295	410	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	761	78	108	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3179	315	438	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 1898 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	3494	7050	No
FO			
v or v	1281 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1898	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2213	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 18.2 pc/mi/ln

R R 12 A B

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.322	
	S	
Space mean speed in ramp influence area,	S = 57.6	mph
	R	
Space mean speed in outer lanes,	S = 62.2	mph
	0	
Space mean speed for all vehicles,	S = 59.2	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra Collge Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing Plus Approved Pending
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3094	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	410	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	295	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3094	410	295	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	841	108	78	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3514	438	315	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2098 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	3952	7050	No
FO			
v or v	1416 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2098	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2536	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.7 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.321	
	S	
Space mean speed in ramp influence area,	S = 57.6	mph
	R	
Space mean speed in outer lanes,	S = 61.7	mph
	0	
Space mean speed for all vehicles,	S = 59.0	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
Agency or Company: Omni-Means
Date Performed: 6/8/2016
Analysis Time Period: PM Peak Hour
Freeway/Direction: I-80 Westbound
From/To: Sierra College Blvd/Rocklin Rd
Jurisdiction: Caltrans
Analysis Year: Existing Plus Approved Pending
Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	3504	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	952	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1327	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1327	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	20.4	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

Operational Analysis

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

Flow Inputs and Adjustments

Volume, V	4102	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1115	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1553	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	1553	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.7	mi/h
Number of lanes, N	3	
Density, D	24.0	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

Freeway Data

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4102	vph	

Off Ramp Data

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	1501	vph	
Length of first accel/decel lane	1050	ft	
Length of second accel/decel lane		ft	

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4102	1501		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1115	399		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00	%	0.00	%
Length	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4659	1613	pcph

Estimation of V12 Diverge Areas

$$L = \text{EQ} \quad (\text{Equation 13-12 or 13-13})$$

$$P = 0.569 \quad \text{Using Equation 9}$$

$$v_{12} = v_R + (v_F - v_R) P = 3347 \text{ pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{12} = v_F$	4659	7050	No
$v_{FO} = v_F - v_R$	3046	7050	No
v_R	1613	2000	No
v_3 or v_{av34}	1312 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3347$		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3347	4400	No

Level of Service Determination (if not F)

$$\text{Density, } D = 4.252 + 0.0086 v_R - 0.009 L_D = 23.6 \text{ pc/mi/ln}$$

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	$D = 0.573$	
Space mean speed in ramp influence area,	$S_R = 51.8$	mph
Space mean speed in outer lanes,	$S_0 = 70.1$	mph
Space mean speed for all vehicles,	$S = 55.9$	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

Freeway Data

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2601	vph	

On Ramp Data

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	223	vph	
Length of first accel/decel lane	360	ft	
Length of second accel/decel lane		ft	

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2601	223		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	707	59		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	%
Length	mi	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2954	240	pcph

Estimation of V12 Merge Areas

L = (Equation 13-6 or 13-7)

EQ

P = 0.588 Using Equation 3

FM

$v_{12} = v_{F, FM} = 1736$ pc/h

12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v _{FO}	3194	7050	No
v ₃ or v _{av34}	1218 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		Yes	
If yes, v _{12A} = 1736		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v _{12A}	1976	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 18.5$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M = 0.324	
Space mean speed in ramp influence area,	S _R = 57.5	mph
Space mean speed in outer lanes,	S ₀ = 62.4	mph
Space mean speed for all vehicles,	S = 59.3	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	4049	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	292	vph
Length of first accel/decel lane	150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4049	292		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1100	78		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4599	314	pcph

Estimation of V12 Diverge Areas

$$L = \text{EQ} \quad (\text{Equation 13-12 or 13-13})$$

$$P = 0.631 \quad \text{Using Equation 9}$$

$$v_{12} = v_R + (v_F - v_R) P = 3016 \text{ pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{12} = v_F$	4599	7050	No
$v_{FO} = v_F - v_R$	4285	7050	No
v_R	314	2000	No
v_3 or v_{av34}	1583 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3016$		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3016	4400	No

Level of Service Determination (if not F)

$$\text{Density, } D = 4.252 + 0.0086 v_R - 0.009 L_D = 28.8 \text{ pc/mi/ln}$$

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	$D = 0.456$	
Space mean speed in ramp influence area,	$S_R = 54.5$	mph
Space mean speed in outer lanes,	$S_0 = 69.0$	mph
Space mean speed for all vehicles,	$S = 58.8$	mph

Phone: Fax:
 E-mail:

Merge Analysis

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3757	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	842	vph
Length of first accel/decel lane	750	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3757	842		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1021	224		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	%
Length	mi	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4267	905	pcph

Estimation of V12 Merge Areas

L = (Equation 13-6 or 13-7)

EQ

P = 0.599 Using Equation 3

FM

$v_{12} = v_{F \text{ FM}} = 2554 \text{ pc/h}$

12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	5172	7050	No
FO			
v ₃ or v _{3 av34}	1713 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{3 av34} > 2700 pc/h?		No	
Is v ₃ or v _{3 av34} > 1.5 v ₁₂ / 2		Yes	
If yes, v _{12A} = 2554		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v _{12A}	3459	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 27.3 \text{ pc/mi/ln}$

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M = 0.392	
Space mean speed in ramp influence area,	S _R = 56.0	mph
Space mean speed in outer lanes,	S ₀ = 60.6	mph
Space mean speed for all vehicles,	S = 57.4	mph

Phone: Fax:
E-mail:

Operational Analysis

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

Flow Inputs and Adjustments

Volume, V	4599	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1250	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1741	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	1741	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	63.4	mi/h
Number of lanes, N	3	
Density, D	27.5	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-80 Eastbound
 From/To: Rocklin Rd/Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	2824	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	767	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1069	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1069	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	16.4	pc/mi/ln
Level of service, LOS	B	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2824	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	681	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	185	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2824	681	185	vph
Peak-hour factor, PHF	0.92	0.89	0.90	
Peak 15-min volume, v15	767	191	51	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3208	780	210	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.644 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 2343$ pc/h
 12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{12} = v_{12}$	3208	7050	No
$v_{FO} = v_F - v_R$	2428	7050	No
v_R	780	2000	No
v_3 or v_{av34}	865 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2343$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2343	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 23.1$ pc/mi/ln
 Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.498	
Space mean speed in ramp influence area,	S _R = 53.5	mph
Space mean speed in outer lanes,	S ₀ = 71.3	mph
Space mean speed for all vehicles,	S = 57.4	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2143	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	185	vph	
Length of first accel/decel lane	800	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	524	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2143	185	524	vph
Peak-hour factor, PHF	0.92	0.89	0.89	
Peak 15-min volume, v15	582	52	147	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2434	212	601	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.600 Using Equation 3

FM

v = v (P) = 1460 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	2646	7050	No
FO			
v or v	974 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1460	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	1672	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 13.4 pc/mi/ln

R R 12 A B

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.302	
	S	
Space mean speed in ramp influence area,	S = 58.1	mph
	R	
Space mean speed in outer lanes,	S = 63.3	mph
	0	
Space mean speed for all vehicles,	S = 59.9	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2328	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	524	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	185	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2328	524	185	vph
Peak-hour factor, PHF	0.92	0.89	0.89	
Peak 15-min volume, v15	633	147	52	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2644	601	212	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 1579 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	3245	7050	No
FO			
v or v	1065 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1579	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2180	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.8 pc/mi/ln

R R 12 A B

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.307	
	S	
Space mean speed in ramp influence area,	S = 58.0	mph
	R	
Space mean speed in outer lanes,	S = 63.0	mph
	0	
Space mean speed for all vehicles,	S = 59.5	mph

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	2852	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	775	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1080	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1080	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	16.6	pc/mi/ln
Level of service, LOS	B	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4460	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1212	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1689	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1689	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	63.8	mi/h
Number of lanes, N	3	
Density, D	26.5	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4460	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	903	vph	
Length of first accel/decel lane	650	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	152	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1650	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4460	903	152	vph
Peak-hour factor, PHF	0.92	0.84	0.84	
Peak 15-min volume, v15	1212	269	45	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5066	1097	185	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.583 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3410$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5066	7050	No
$v_{FO} = v_F - v_R$	3969	7050	No
v_R	1097	2000	No
v_3 or v_{av34}	1656 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3410$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3410	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 27.7$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.527	
Space mean speed in ramp influence area,	S _R = 52.9	mph
Space mean speed in outer lanes,	S ₀ = 68.7	mph
Space mean speed for all vehicles,	S = 57.2	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3557	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	152	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	340	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3557	152	340	vph
Peak-hour factor, PHF	0.92	0.84	0.84	
Peak 15-min volume, v15	967	45	101	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4040	185	413	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2412 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4225	7050	No
FO			
v or v	1628 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2412	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2597	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 21.3 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.338	
	S	
Space mean speed in ramp influence area,	S = 57.2	mph
	R	
Space mean speed in outer lanes,	S = 60.9	mph
	0	
Space mean speed for all vehicles,	S = 58.6	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3709	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	340	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	152	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3709	340	152	vph
Peak-hour factor, PHF	0.92	0.84	0.84	
Peak 15-min volume, v15	1008	101	45	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4213	413	185	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2516 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4626	7050	No
FO			
v or v	1697 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2516	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2929	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.7 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.345	
	S	
Space mean speed in ramp influence area,	S = 57.1	mph
	R	
Space mean speed in outer lanes,	S = 60.7	mph
	0	
Space mean speed for all vehicles,	S = 58.3	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: Sierra College Blvd/Rocklin Rd
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4049	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1100	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1533	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1533	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.7	mi/h
Number of lanes, N	3	
Density, D	23.7	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

Operational Analysis

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

Flow Inputs and Adjustments

Volume, V	5019	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1364	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1900	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	1900	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	61.5	mi/h
Number of lanes, N	3	
Density, D	30.9	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

Freeway Data

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	5019	vph	

Off Ramp Data

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	1074	vph	
Length of first accel/decel lane	892	ft	
Length of second accel/decel lane		ft	

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5019	1074		vph
Peak-hour factor, PHF	0.92	0.96		
Peak 15-min volume, v15	1364	280		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5701	1130	pcph

Estimation of V12 Diverge Areas

$$L = \text{EQ} \quad (\text{Equation 13-12 or 13-13})$$

$$P = 0.565 \quad \text{Using Equation 9}$$

$$v_{12} = v_R + (v_F - v_R) P = 3715 \text{ pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{12} = v_F$	5701	7050	No
$v_{FO} = v_F - v_R$	4571	7050	No
v_R	1130	2000	No
v_3 or v_{av34}	1986 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3715$		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3715	4400	No

Level of Service Determination (if not F)

$$\text{Density, } D = 4.252 + 0.0086 v_R - 0.009 L_D = 28.2 \text{ pc/mi/ln}$$

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	$D = 0.530$	
Space mean speed in ramp influence area,	$S_R = 52.8$	mph
Space mean speed in outer lanes,	$S_0 = 67.5$	mph
Space mean speed for all vehicles,	$S = 57.1$	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3925	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	283	vph
Length of first accel/decel lane	360	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3925	283		vph
Peak-hour factor, PHF	0.92	0.96		
Peak 15-min volume, v15	1067	74		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	%
Length	mi	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4458	298	pcph

Estimation of V12 Merge Areas

L = (Equation 13-6 or 13-7)

EQ

P = 0.588 Using Equation 3

FM

$v_{12} = v_{F \text{ FM}} = 2619 \text{ pc/h}$

12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v _{FO}	4756	7050	No
v ₃ or v _{3 av34}	1839 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{3 av34} > 2700 pc/h?		No	
Is v ₃ or v _{3 av34} > 1.5 v ₁₂ / 2		Yes	
If yes, v _{12A} = 2619		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v _{12A}	2917	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 25.8 \text{ pc/mi/ln}$

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M = 0.368	
Space mean speed in ramp influence area,	S _R = 56.5	mph
Space mean speed in outer lanes,	S ₀ = 60.2	mph
Space mean speed for all vehicles,	S = 57.9	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

Freeway Data

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3507	vph	

Off Ramp Data

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	365	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3507	365		vph
Peak-hour factor, PHF	0.92	0.99		
Peak 15-min volume, v15	953	92		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00	%	0.00	%
Length	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3983	372	pcph

Estimation of V12 Diverge Areas

$$L = \text{EQ} \quad (\text{Equation 13-12 or 13-13})$$

$$P = 0.643 \quad \text{Using Equation 9}$$

$$v_{12} = v_R + (v_F - v_R) P = 2695 \text{ pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3983	7050	No
$v_{FO} = v_F - v_R$	3611	7050	No
v_R	372	2000	No
v_3 or v_{av34}	1288 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2695$		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2695	4400	No

Level of Service Determination (if not F)

$$\text{Density, } D = 4.252 + 0.0086 v_R - 0.009 L_D = 26.1 \text{ pc/mi/ln}$$

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	$D = 0.461$	
Space mean speed in ramp influence area,	$S_R = 54.4$	mph
Space mean speed in outer lanes,	$S_0 = 70.2$	mph
Space mean speed for all vehicles,	$S = 58.7$	mph

Phone: Fax:
 E-mail:

_____Merge Analysis_____

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

_____Freeway Data_____

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3142	vph	

_____On Ramp Data_____

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	1210	vph	
Length of first accel/decel lane	760	ft	
Length of second accel/decel lane		ft	

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3142	1210		vph
Peak-hour factor, PHF	0.92	0.99		
Peak 15-min volume, v15	854	306		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	%
Length	mi	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3569	1234	pcph

Estimation of V12 Merge Areas

L = (Equation 13-6 or 13-7)

EQ

P = 0.599 Using Equation 3

FM

$v_{12} = v_{F \text{ FM}} = 2137 \text{ pc/h}$

12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	4803	7050	No
FO			
v ₃ or v _{av34}	1432 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		Yes	
If yes, v _{12A} = 2137		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v _{12A}	3371	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 26.4 \text{ pc/mi/ln}$

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M = 0.381	
Space mean speed in ramp influence area,	S _R = 56.2	mph
Space mean speed in outer lanes,	S ₀ = 61.6	mph
Space mean speed for all vehicles,	S = 57.7	mph

Phone: Fax:
E-mail:

Operational Analysis

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

Flow Inputs and Adjustments

Volume, V	4352	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1183	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1648	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	1648	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.1	mi/h
Number of lanes, N	3	
Density, D	25.7	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: Rocklin Rd/Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4208	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1143	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1593	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1593	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.5	mi/h
Number of lanes, N	3	
Density, D	24.7	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4208	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	617	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	345	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4208	617	345	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1143	162	91	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4780	659	369	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.610 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3174$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4780	7050	No
$v_{FO} = v_F - v_R$	4121	7050	No
v_R	659	2000	No
v_3 or v_{av34}	1606 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3174$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3174	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 30.2$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.487	
Space mean speed in ramp influence area,	S _R = 53.8	mph
Space mean speed in outer lanes,	S ₀ = 68.9	mph
Space mean speed for all vehicles,	S = 58.1	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3591	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	345	vph	
Length of first accel/decel lane	800	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	846	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3591	345	846	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	976	91	223	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4079	369	904	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.600 Using Equation 3

FM

v = v (P) = 2447 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4448	7050	No
FO			
v or v	1632 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2447	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2816	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.3 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.346	
	S	
Space mean speed in ramp influence area,	S = 57.0	mph
	R	
Space mean speed in outer lanes,	S = 60.9	mph
	0	
Space mean speed for all vehicles,	S = 58.4	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3936	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	846	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	345	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3936	846	345	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1070	223	91	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4471	904	369	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2670 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	5375	7050	No
FO			
v or v	1801 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2670	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3574	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.5 pc/mi/ln

R R 12 A

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.411	
	S	
Space mean speed in ramp influence area,	S = 55.5	mph
	R	
Space mean speed in outer lanes,	S = 60.3	mph
	0	
Space mean speed for all vehicles,	S = 57.1	mph

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4872	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1324	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1845	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1845	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	62.2	mi/h
Number of lanes, N	3	
Density, D	29.7	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	3557	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	967	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1347	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1347	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	20.7	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3557	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	756	vph	
Length of first accel/decel lane	650	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	296	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1650	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3557	756	296	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	967	199	78	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4040	808	316	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.622 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 2818 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v = v_{12}$	4040	7050	No
$v_{FO} = v_F - v_R$	3232	7050	No
v_R	808	2000	No
$v_3 \text{ or } v_{av34}$	1222 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2818$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2818	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 22.6 \text{ pc/mi/ln}$

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.501	
Space mean speed in ramp influence area,	S _R = 53.5	mph
Space mean speed in outer lanes,	S ₀ = 70.4	mph
Space mean speed for all vehicles,	S = 57.7	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
Agency/Co.: Omni-Means
Date performed: 6/8/2016
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: I-80 Westbound
Junction: Sierra College Blvd On Loop
Jurisdiction: Caltrans
Analysis Year: Existing + AP + Project
Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2801	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	296	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	410	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2801	296	410	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	761	78	108	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3182	316	438	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 1900 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	3498	7050	No
FO			
v or v	1282 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1900	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2216	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 18.2 pc/mi/ln

R R 12 A B

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.322	
	S	
Space mean speed in ramp influence area,	S = 57.6	mph
	R	
Space mean speed in outer lanes,	S = 62.2	mph
	0	
Space mean speed for all vehicles,	S = 59.2	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/8/2016
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra Collge Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3097	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	410	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	410	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3097	410	410	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	842	108	108	v
Trucks and buses	9	3	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.985	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3518	438	438	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2101 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	3956	7050	No
FO			
v or v	1417 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2101	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2539	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.7 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.321	
	S	
Space mean speed in ramp influence area,	S = 57.6	mph
	R	
Space mean speed in outer lanes,	S = 61.7	mph
	0	
Space mean speed for all vehicles,	S = 59.0	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/8/2016
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: Sierra College Blvd/Rocklin Rd
 Jurisdiction: Caltrans
 Analysis Year: Existing + AP + Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	3507	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	953	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1328	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1328	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	20.4	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	5516	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1499	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2088	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2088	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	58.3	mi/h
Number of lanes, N	3	
Density, D	35.8	pc/mi/ln
Level of service, LOS	E	

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	5516	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	1810	vph	
Length of first accel/decel lane	1050	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5516	1810		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1499	481		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6265	1945	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.514 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 4165 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6265	7050	No
$v_{FO} = v_F - v_R$	4320	7050	No
v_R	1945	2000	No
$v_3 \text{ or } v_{av34}$	2100 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 4165$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	4165	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 30.6 \text{ pc/mi/ln}$

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.603	
Space mean speed in ramp influence area,	S _R = 51.1	mph
Space mean speed in outer lanes,	S ₀ = 67.0	mph
Space mean speed for all vehicles,	S = 55.5	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3706	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	355	vph	
Length of first accel/decel lane	360	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3706	355		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1007	94		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4210	381	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.588 Using Equation 3

FM

v = v (P) = 2474 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4591	7050	No
FO			
v or v	1736 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2474	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2855	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 25.3 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.364	
	S	
Space mean speed in ramp influence area,	S = 56.6	mph
	R	
Space mean speed in outer lanes,	S = 60.6	mph
	0	
Space mean speed for all vehicles,	S = 58.1	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	5420	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	635	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5420	635		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1473	169		v
Trucks and buses	9	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00	%	0.00	%
Length	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6156	686	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.575 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3829$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v = v_{12}$	6156	7050	No
$v_{FO} = v_F - v_R$	5470	7050	No
v_R	686	2000	No
v_3 or v_{av34}	2327 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3829$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3829	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 35.8$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

----- Speed Estimation -----

Intermediate speed variable,	D = 0.490	
Space mean speed in ramp influence area,	S _R = 53.7	mph
Space mean speed in outer lanes,	S ₀ = 66.1	mph
Space mean speed for all vehicles,	S = 57.8	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4785	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	970	vph	
Length of first accel/decel lane	750	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4785	970		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1300	258		v
Trucks and buses	9	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5435	1047	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.599 Using Equation 3

FM

v = v (P) = 3253 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	6482	7050	No
FO			
v or v	2182 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 3253	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	4300	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 33.8$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.556	
Space mean speed in ramp influence area,	S = 52.2	mph
Space mean speed in outer lanes,	S = 58.9	mph
Space mean speed for all vehicles,	S = 54.3	mph

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	5755	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1564	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2179	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2179	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	56.4	mi/h
Number of lanes, N	3	
Density, D	38.6	pc/mi/ln
Level of service, LOS	E	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
Agency or Company: Omni-Means
Date Performed: 6/14/16
Analysis Time Period: AM Peak Hour
Freeway/Direction: I-80 Eastbound
From/To: Rocklin Rd/Sierra College Blvd
Jurisdiction: Caltrans
Analysis Year: Cumulative
Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4061	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1104	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1538	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1538	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.7	mi/h
Number of lanes, N	3	
Density, D	23.8	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4061	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	1650	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	195	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4061	1650	195	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1104	448	53	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4613	1829	216	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.561 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3390$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4613	7050	No
$v_{FO} = v_F - v_R$	2784	7050	No
v_R	1829	2000	No
v_3 or v_{av34}	1223 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3390$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3390	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 32.1$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.593	
Space mean speed in ramp influence area,	S _R = 51.4	mph
Space mean speed in outer lanes,	S ₀ = 70.4	mph
Space mean speed for all vehicles,	S = 55.3	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2411	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	195	vph	
Length of first accel/decel lane	800	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	560	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2411	195	560	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	655	53	152	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2739	216	621	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.600 Using Equation 3

FM

v = v (P) = 1643 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	2955	7050	No
FO			
v or v	1096 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1643	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	1859	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 14.9 pc/mi/ln

R R 12 A B

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.306	
	S	
Space mean speed in ramp influence area,	S = 58.0	mph
	R	
Space mean speed in outer lanes,	S = 62.9	mph
	0	
Space mean speed for all vehicles,	S = 59.7	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2606	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	560	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	195	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2606	560	195	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	708	152	53	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2960	621	216	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 1767 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	3581	7050	No
FO			
v or v	1193 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1767	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2388	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 19.4 pc/mi/ln

R R 12 A B

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.314	
	S	
Space mean speed in ramp influence area,	S = 57.8	mph
	R	
Space mean speed in outer lanes,	S = 62.5	mph
	0	
Space mean speed for all vehicles,	S = 59.3	mph

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	3166	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	860	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1199	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1199	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	18.4	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	6070	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1649	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2298	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2298	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	53.6	mi/h
Number of lanes, N	3	
Density, D	42.9	pc/mi/ln
Level of service, LOS	E	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	6070	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	1485	vph	
Length of first accel/decel lane	650	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	150	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1650	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6070	1485	150	vph
Peak-hour factor, PHF	0.92	0.93	0.93	
Peak 15-min volume, v15	1649	399	40	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6895	1629	165	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.513 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 4329$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6895	7050	No
$v_{FO} = v_F - v_R$	5266	7050	No
v_R	1629	2000	No
v_3 or v_{av34}	2566 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 4329$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	4329	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 35.6$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

----- Speed Estimation -----

Intermediate speed variable,	D = 0.575	
Space mean speed in ramp influence area,	S _R = 51.8	mph
Space mean speed in outer lanes,	S ₀ = 65.2	mph
Space mean speed for all vehicles,	S = 56.1	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4735	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	150	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	685	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4735	150	685	vph
Peak-hour factor, PHF	0.92	0.94	0.94	
Peak 15-min volume, v15	1287	40	182	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5378	163	743	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 3211 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	5541	7050	No
FO			
v or v	2167 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 3211	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3374	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 27.3 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.400	
	S	
Space mean speed in ramp influence area,	S = 55.8	mph
	R	
Space mean speed in outer lanes,	S = 59.0	mph
	0	
Space mean speed for all vehicles,	S = 57.0	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4735	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	685	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	150	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4735	685	150	vph
Peak-hour factor, PHF	0.92	0.94	0.94	
Peak 15-min volume, v15	1287	182	40	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5378	743	163	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 3211 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	6121	7050	No
FO			
v or v	2167 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 3211	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3954	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 31.6 pc/mi/ln

R R 12 A

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.475	
	S	
Space mean speed in ramp influence area,	S = 54.1	mph
	R	
Space mean speed in outer lanes,	S = 59.0	mph
	0	
Space mean speed for all vehicles,	S = 55.7	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: Sierra College Blvd/Rocklin Rd
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	5420	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1473	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2052	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2052	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	59.0	mi/h
Number of lanes, N	3	
Density, D	34.8	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	6033	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1639	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2284	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2284	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	53.9	mi/h
Number of lanes, N	3	
Density, D	42.4	pc/mi/ln
Level of service, LOS	E	

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	6033	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	1195	vph	
Length of first accel/decel lane	1050	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6033	1195		vph
Peak-hour factor, PHF	0.92	0.96		
Peak 15-min volume, v15	1639	311		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6853	1257	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.531 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 4228$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6853	7050	No
$v_{FO} = v_F - v_R$	5596	7050	No
v_R	1257	2000	No
v_3 or v_{av34}	2625 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 4228$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	4228	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 31.2$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.541	
Space mean speed in ramp influence area,	S _R = 52.6	mph
Space mean speed in outer lanes,	S ₀ = 65.0	mph
Space mean speed for all vehicles,	S = 56.7	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4838	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	640	vph	
Length of first accel/decel lane	360	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4838	640		vph
Peak-hour factor, PHF	0.92	0.96		
Peak 15-min volume, v15	1315	167		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5495	673	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.588 Using Equation 3

FM

v = v (P) = 3229 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	6168	7050	No
FO			
v or v	2266 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 3229	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3902	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 33.3$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.489	
	S	
Space mean speed in ramp influence area,	S = 53.8	mph
	R	
Space mean speed in outer lanes,	S = 58.6	mph
	0	
Space mean speed for all vehicles,	S = 55.5	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4844	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	535	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4844	535		vph
Peak-hour factor, PHF	0.92	0.99		
Peak 15-min volume, v15	1316	135		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5502	546	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.597 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3506$ pc/h

12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{12} = v_{12}$	5502	7050	No
$v_{FO} = v_F - v_R$	4956	7050	No
v_R	546	2000	No
v_3 or v_{av34}	1996 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3506$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3506	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 33.1$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.477	
Space mean speed in ramp influence area,	S = 54.0	mph
Space mean speed in outer lanes,	S = 67.4	mph
Space mean speed for all vehicles,	S = 58.2	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	4309	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1375	vph
Length of first accel/decel lane	760	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4309	1375		vph
Peak-hour factor, PHF	0.92	0.99		
Peak 15-min volume, v15	1171	347		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4894	1403	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.599 Using Equation 3

FM

v = v (P) = 2930 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	6297	7050	No
FO			
v or v	1964 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2930	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	4333	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 33.9$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.565	
	S	
Space mean speed in ramp influence area,	S = 52.0	mph
	R	
Space mean speed in outer lanes,	S = 59.7	mph
	0	
Space mean speed for all vehicles,	S = 54.2	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	5684	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1545	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2152	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2152	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	57.0	mi/h
Number of lanes, N	3	
Density, D	37.8	pc/mi/ln
Level of service, LOS	E	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: Rocklin Rd/Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	5478	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1489	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2074	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2074	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	58.6	mi/h
Number of lanes, N	3	
Density, D	35.4	pc/mi/ln
Level of service, LOS	E	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/15
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	5478	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	780	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	350	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5478	780	350	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1489	205	92	v
Trucks and buses	9	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6222	829	372	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.566 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3883 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6222	7050	No
$v_{FO} = v_F - v_R$	5393	7050	No
v_R	829	2000	No
$v_3 \text{ or } v_{av34}$	2339 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3883$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3883	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 36.3 \text{ pc/mi/ln}$

Level of service for ramp-freeway junction areas of influence E

----- Speed Estimation -----

Intermediate speed variable,	D = 0.503	
Space mean speed in ramp influence area,	S _R = 53.4	mph
Space mean speed in outer lanes,	S ₀ = 66.1	mph
Space mean speed for all vehicles,	S = 57.6	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4698	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	350	vph	
Length of first accel/decel lane	800	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	875	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4698	350	875	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1277	92	230	v
Trucks and buses	9	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5336	372	930	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.600 Using Equation 3

FM

v = v (P) = 3201 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	5708	7050	No
FO			
v or v	2135 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 3201	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3573	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.2 pc/mi/ln

R R 12 A

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.420	
	S	
Space mean speed in ramp influence area,	S = 55.3	mph
	R	
Space mean speed in outer lanes,	S = 59.1	mph
	0	
Space mean speed for all vehicles,	S = 56.7	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	5048	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	875	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	350	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5048	875	350	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1372	230	92	v
Trucks and buses	9	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5734	930	372	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 3424 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	6664	7050	No
FO			
v or v	2310 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 3424	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	4354	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 34.6 pc/mi/ln

R R 12 A

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.575	
	S	
Space mean speed in ramp influence area,	S = 51.8	mph
	R	
Space mean speed in outer lanes,	S = 58.4	mph
	0	
Space mean speed for all vehicles,	S = 53.9	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
Agency or Company: Omni-Means
Date Performed: 6/14/16
Analysis Time Period: PM Peak Hour
Freeway/Direction: I-80 Eastbound
From/To: North of Sierra College Blvd
Jurisdiction: Caltrans
Analysis Year: Cumulative
Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	5923	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1610	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2243	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2243	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	54.9	mi/h
Number of lanes, N	3	
Density, D	40.8	pc/mi/ln
Level of service, LOS	E	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4999	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1358	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1893	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1893	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	61.6	mi/h
Number of lanes, N	3	
Density, D	30.8	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4999	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	970	vph	
Length of first accel/decel lane	650	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	305	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1650	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4999	970	305	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1358	255	80	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5678	1041	327	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.570 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3685$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5678	7050	No
$v_{FO} = v_F - v_R$	4637	7050	No
v_R	1041	2000	No
v_3 or v_{av34}	1993 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3685$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3685	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 30.1$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.522	
Space mean speed in ramp influence area,	S _R = 53.0	mph
Space mean speed in outer lanes,	S ₀ = 67.4	mph
Space mean speed for all vehicles,	S = 57.3	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4029	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	305	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	510	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4029	305	510	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1095	80	134	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4576	327	548	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2732 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4903	7050	No
FO			
v or v	1844 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2732	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3059	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 24.8 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.369	
	S	
Space mean speed in ramp influence area,	S = 56.5	mph
	R	
Space mean speed in outer lanes,	S = 60.2	mph
	0	
Space mean speed for all vehicles,	S = 57.8	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra Collge Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4334	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	510	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	305	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4334	510	305	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1178	134	80	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4923	548	327	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2940 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	5471	7050	No
FO			
v or v	1983 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2940	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3488	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.0+ pc/mi/ln

R R 12 A D

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.400	
	S	
Space mean speed in ramp influence area,	S = 55.8	mph
	R	
Space mean speed in outer lanes,	S = 59.7	mph
	0	
Space mean speed for all vehicles,	S = 57.1	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: Sierra College Blvd/Rocklin Rd
 Jurisdiction: Caltrans
 Analysis Year: Cumulative
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4844	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1316	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1834	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1834	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	62.3	mi/h
Number of lanes, N	3	
Density, D	29.4	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	5439	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1478	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2059	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2059	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	58.8	mi/h
Number of lanes, N	3	
Density, D	35.0-	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	5439	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	1813	vph	
Length of first accel/decel lane	1050	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5439	1813		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1478	482		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6178	1948	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.516 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 4130$ pc/h
FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6178	7050	No
$v_{FO} = v_F - v_R$	4230	7050	No
v_R	1948	2000	No
v_3 or v_{av34}	2048 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 4130$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	4130	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 30.3$ pc/mi/ln
Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.603	
Space mean speed in ramp influence area,	S _R = 51.1	mph
Space mean speed in outer lanes,	S ₀ = 67.2	mph
Space mean speed for all vehicles,	S = 55.5	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3626	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	362	vph	
Length of first accel/decel lane	360	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3626	362		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	985	96		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4119	389	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.588 Using Equation 3

FM

v = v (P) = 2420 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4508	7050	No
FO			
v or v	1699 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2420	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2809	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 24.9 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.361	
	S	
Space mean speed in ramp influence area,	S = 56.7	mph
	R	
Space mean speed in outer lanes,	S = 60.7	mph
	0	
Space mean speed for all vehicles,	S = 58.1	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: 6/14/16
 Date performed: 9/17/2015
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Sierra Gateway Apartments TIS
 Description: Sierra College Facilities Master Plan TIAR

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	5419	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	636	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5419	636		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1473	169		v
Trucks and buses	9	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6155	687	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.575 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3828$ pc/h
 12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6155	7050	No
$v_{FO} = v_F - v_R$	5468	7050	No
v_R	687	2000	No
v_3 or v_{av34}	2327 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3828$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3828	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 35.8$ pc/mi/ln
 Level of service for ramp-freeway junction areas of influence E

----- Speed Estimation -----

Intermediate speed variable,	D = 0.490	
Space mean speed in ramp influence area,	S _R = 53.7	mph
Space mean speed in outer lanes,	S ₀ = 66.1	mph
Space mean speed for all vehicles,	S = 57.8	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4783	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	982	vph	
Length of first accel/decel lane	750	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4783	982		vph
Peak-hour factor, PHF	0.92	0.94		
Peak 15-min volume, v15	1300	261		v
Trucks and buses	9	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5433	1060	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.599 Using Equation 3

FM

v = v (P) = 3252 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	6493	7050	No
FO			
v or v	2181 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 3252	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	4312	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 33.9$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.559	
	S	
Space mean speed in ramp influence area,	S = 52.1	mph
	R	
Space mean speed in outer lanes,	S = 58.9	mph
	0	
Space mean speed for all vehicles,	S = 54.2	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	5765	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1567	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2183	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2183	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	56.3	mi/h
Number of lanes, N	3	
Density, D	38.8	pc/mi/ln
Level of service, LOS	E	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: Rocklin Rd/Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	3988	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1084	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1510	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1510	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.8	mi/h
Number of lanes, N	3	
Density, D	23.3	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Kenneth Isenhower III
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	3988	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	1651	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	195	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3988	1651	195	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1084	449	53	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4530	1830	216	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.563 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3349$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4530	7050	No
$v_{FO} = v_F - v_R$	2700	7050	No
v_R	1830	2000	No
v_3 or v_{av34}	1181 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3349$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3349	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 31.7$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.593	
Space mean speed in ramp influence area,	S _R = 51.4	mph
Space mean speed in outer lanes,	S ₀ = 70.6	mph
Space mean speed for all vehicles,	S = 55.3	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2337	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	195	vph
Length of first accel/decel lane	800	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	634	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1420	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2337	195	634	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	635	53	172	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2655	216	703	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.600 Using Equation 3

FM

v = v (P) = 1593 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	2871	7050	No
FO			
v or v	1062 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1593	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	1809	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 14.5 pc/mi/ln

R R 12 A B

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.305	
	S	
Space mean speed in ramp influence area,	S = 58.0	mph
	R	
Space mean speed in outer lanes,	S = 63.0	mph
	0	
Space mean speed for all vehicles,	S = 59.7	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	2532	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	634	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	195	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2532	634	195	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	688	172	53	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2876	703	216	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 1717 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	3579	7050	No
FO			
v or v	1159 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 1717	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	2420	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 19.6 pc/mi/ln

R R 12 A B

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.316	
	S	
Space mean speed in ramp influence area,	S = 57.7	mph
	R	
Space mean speed in outer lanes,	S = 62.6	mph
	0	
Space mean speed for all vehicles,	S = 59.2	mph

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	3166	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	860	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1199	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1199	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	18.4	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	6070	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1649	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2298	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2298	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	53.6	mi/h
Number of lanes, N	3	
Density, D	42.9	pc/mi/ln
Level of service, LOS	E	

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	6070	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	1488	vph	
Length of first accel/decel lane	650	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	152	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1650	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6070	1488	152	vph
Peak-hour factor, PHF	0.92	0.93	0.93	
Peak 15-min volume, v15	1649	400	41	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6895	1632	167	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.513 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 4330$ pc/h

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6895	7050	No
$v_{FO} = v_F - v_R$	5263	7050	No
v_R	1632	2000	No
v_3 or v_{av34}	2565 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 4330$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	4330	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D = 35.6$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

----- Speed Estimation -----

Intermediate speed variable,	D = 0.575	
Space mean speed in ramp influence area,	S _R = 51.8	mph
Space mean speed in outer lanes,	S ₀ = 65.2	mph
Space mean speed for all vehicles,	S = 56.1	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4582	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	152	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	685	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4582	152	685	vph
Peak-hour factor, PHF	0.92	0.93	0.93	
Peak 15-min volume, v15	1245	41	184	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5205	167	751	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 3108 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	5372	7050	No
FO			
v or v	2097 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 3108	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3275	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 26.6 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.389	
	S	
Space mean speed in ramp influence area,	S = 56.1	mph
	R	
Space mean speed in outer lanes,	S = 59.3	mph
	0	
Space mean speed for all vehicles,	S = 57.3	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4734	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	685	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	152	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4734	685	152	vph
Peak-hour factor, PHF	0.92	0.93	0.93	
Peak 15-min volume, v15	1286	184	41	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5377	751	167	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 3211 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	6128	7050	No
FO			
v or v	2166 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 3211	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3962	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 31.6 pc/mi/ln

R R 12 A

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.477	
	S	
Space mean speed in ramp influence area,	S = 54.0	mph
	R	
Space mean speed in outer lanes,	S = 59.0	mph
	0	
Space mean speed for all vehicles,	S = 55.7	mph

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: AM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: Sierra College Blvd/Rocklin Rd
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	5419	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1473	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2052	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2052	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	59.0	mi/h
Number of lanes, N	3	
Density, D	34.8	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	5479	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1489	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2074	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2074	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	58.6	mi/h
Number of lanes, N	3	
Density, D	35.4	pc/mi/ln
Level of service, LOS	E	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	5479	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	646	vph	
Length of first accel/decel lane	1050	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5479	646		vph
Peak-hour factor, PHF	0.92	0.96		
Peak 15-min volume, v15	1489	168		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00	%	0.00	%
Length	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6223	680	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.573 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3857$ pc/h

12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6223	7050	No
$v_{FO} = v_F - v_R$	5543	7050	No
v_R	680	2000	No
v_3 or v_{av34}	2366 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3857$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3857	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 28.0-$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.489	
Space mean speed in ramp influence area,	S _R = 53.7	mph
Space mean speed in outer lanes,	S ₀ = 66.0	mph
Space mean speed for all vehicles,	S = 57.8	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4833	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	641	vph	
Length of first accel/decel lane	360	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4833	641		vph
Peak-hour factor, PHF	0.92	0.96		
Peak 15-min volume, v15	1313	167		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5490	674	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.588 Using Equation 3

FM

v = v (P) = 3226 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	6164	7050	No
FO			
v or v	2264 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 3226	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3900	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 33.3 pc/mi/ln

R R 12 A

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.488	
	S	
Space mean speed in ramp influence area,	S = 53.8	mph
	R	
Space mean speed in outer lanes,	S = 58.6	mph
	0	
Space mean speed for all vehicles,	S = 55.5	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4834	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	537	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent ramp		vph	
Position of adjacent ramp			
Type of adjacent ramp			
Distance to adjacent ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4834	537		vph
Peak-hour factor, PHF	0.92	0.99		
Peak 15-min volume, v15	1314	136		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5491	548	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.598 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3502 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5491	7050	No
$v_{FO} = v_F - v_R$	4943	7050	No
v_R	548	2000	No
$v_3 \text{ or } v_{av34}$	1989 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3502$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3502	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 33.0 \text{ pc/mi/ln}$

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.477	
Space mean speed in ramp influence area,	S _R = 54.0	mph
Space mean speed in outer lanes,	S ₀ = 67.4	mph
Space mean speed for all vehicles,	S = 58.2	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Rocklin Road On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4297	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	1382	vph	
Length of first accel/decel lane	760	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	No		
Volume on adjacent Ramp		vph	
Position of adjacent Ramp			
Type of adjacent Ramp			
Distance to adjacent Ramp		ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4297	1382		vph
Peak-hour factor, PHF	0.92	0.99		
Peak 15-min volume, v15	1168	349		v
Trucks and buses	9	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4881	1410	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.599 Using Equation 3

FM

v = v (P) = 2923 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	6291	7050	No
FO			
v or v	1958 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2923	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	4333	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 33.9 pc/mi/ln

R R 12 A

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.565	
	S	
Space mean speed in ramp influence area,	S = 52.0	mph
	R	
Space mean speed in outer lanes,	S = 59.8	mph
	0	
Space mean speed for all vehicles,	S = 54.2	mph

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: South of Rocklin Road
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	5679	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1543	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2150	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2150	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	57.0	mi/h
Number of lanes, N	3	
Density, D	37.7	pc/mi/ln
Level of service, LOS	E	

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: Rocklin Rd/Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	5474	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1487	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2073	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2073	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	58.6	mi/h
Number of lanes, N	3	
Density, D	35.4	pc/mi/ln
Level of service, LOS	E	

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	5474	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	782	vph	
Length of first accel/decel lane	150	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	350	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5474	782	350	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1487	206	92	v
Trucks and buses	9	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6218	831	372	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.566 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3882 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6218	7050	No
$v_{FO} = v_F - v_R$	5387	7050	No
v_R	831	2000	No
$v_3 \text{ or } v_{av34}$	2336 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3882$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3882	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 36.3 \text{ pc/mi/ln}$

Level of service for ramp-freeway junction areas of influence E

----- Speed Estimation -----

Intermediate speed variable,	D = 0.503	
Space mean speed in ramp influence area,	S _R = 53.4	mph
Space mean speed in outer lanes,	S ₀ = 66.1	mph
Space mean speed for all vehicles,	S = 57.6	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4692	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	350	vph	
Length of first accel/decel lane	800	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	881	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4692	350	881	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1275	92	232	v
Trucks and buses	9	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5329	372	937	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.600 Using Equation 3

FM

v = v (P) = 3197 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	5701	7050	No
FO			
v or v	2132 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 3197	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3569	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.1 pc/mi/ln

R R 12 A

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.419	
	S	
Space mean speed in ramp influence area,	S = 55.4	mph
	R	
Space mean speed in outer lanes,	S = 59.1	mph
	0	
Space mean speed for all vehicles,	S = 56.7	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Eastbound
 Junction: Sierra College Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	5042	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	881	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	350	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1420	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5042	881	350	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1370	232	92	v
Trucks and buses	9	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5727	937	372	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 3420 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	6664	7050	No
FO			
v or v	2307 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 3420	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	4357	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 34.6 pc/mi/ln

R R 12 A

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	M = 0.576	
	S	
Space mean speed in ramp influence area,	S = 51.7	mph
	R	
Space mean speed in outer lanes,	S = 58.4	mph
	0	
Space mean speed for all vehicles,	S = 53.9	mph

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Eastbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	5923	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1610	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2243	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2243	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	54.9	mi/h
Number of lanes, N	3	
Density, D	40.8	pc/mi/ln
Level of service, LOS	E	

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: North of Sierra College Blvd
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4999	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1358	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1893	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1893	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	61.6	mi/h
Number of lanes, N	3	
Density, D	30.8	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd Off Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4999	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	35.0	mph	
Volume on ramp	981	vph	
Length of first accel/decel lane	650	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	306	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1650	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4999	981	306	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1358	258	81	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5678	1053	329	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 0.570 Using Equation 9

FD

$v_{12} = v_R + (v_F - v_R) P = 3687 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5678	7050	No
$v_{FO} = v_F - v_R$	4625	7050	No
v_R	1053	2000	No
$v_3 \text{ or } v_{av34}$	1991 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3687$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3687	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 30.1 \text{ pc/mi/ln}$

Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.523	
Space mean speed in ramp influence area,	S _R = 53.0	mph
Space mean speed in outer lanes,	S ₀ = 67.4	mph
Space mean speed for all vehicles,	S = 57.3	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra College Blvd On Loop
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4018	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	25.0	mph	
Volume on ramp	306	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	510	vph	
Position of adjacent Ramp	Downstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4018	306	510	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1092	81	134	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4564	329	548	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2725 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	4893	7050	No
FO			
v or v	1839 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2725	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3054	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 24.8 pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.369	
	S	
Space mean speed in ramp influence area,	S = 56.5	mph
	R	
Space mean speed in outer lanes,	S = 60.2	mph
	0	
Space mean speed for all vehicles,	S = 57.8	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: Makinzie Clark
 Agency/Co.: Omni-Means
 Date performed: 6/14/16
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: I-80 Westbound
 Junction: Sierra Collge Blvd On Ramp
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Freeway Data-----

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	65.0	mph	
Volume on freeway	4324	vph	

-----On Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-flow speed on ramp	35.0	mph	
Volume on ramp	510	vph	
Length of first accel/decel lane	700	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent Ramp	306	vph	
Position of adjacent Ramp	Upstream		
Type of adjacent Ramp	On		
Distance to adjacent Ramp	1560	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4324	510	306	vph
Peak-hour factor, PHF	0.92	0.95	0.95	
Peak 15-min volume, v15	1175	134	81	v
Trucks and buses	9	4	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.980	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4911	548	329	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)

EQ

P = 0.597 Using Equation 3

FM

v = v (P) = 2932 pc/h

12 F FM

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v	5459	7050	No
FO			
v or v	1979 pc/h	(Equation 13-14 or 13-17)	
3 av34			
Is v or v	> 2700 pc/h?	No	
3 av34			
Is v or v	> 1.5 v /2	Yes	
3 av34	12		
If yes, v	= 2932	(Equation 13-15, 13-16, 13-18, or 13-19)	
12A			

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v	3480	4600	No
12A			

----- Level of Service Determination (if not F) -----

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.0- pc/mi/ln

R R 12 A C

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.399	
	S	
Space mean speed in ramp influence area,	S = 55.8	mph
	R	
Space mean speed in outer lanes,	S = 59.7	mph
	0	
Space mean speed for all vehicles,	S = 57.2	mph

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: Makinzie Clark
 Agency or Company: Omni-Means
 Date Performed: 6/14/16
 Analysis Time Period: PM Peak Hour
 Freeway/Direction: I-80 Westbound
 From/To: Sierra College Blvd/Rocklin Rd
 Jurisdiction: Caltrans
 Analysis Year: Cumulative+Project
 Description: Sierra Gateway Apartments TIS

-----Flow Inputs and Adjustments-----

Volume, V	4834	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1314	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1830	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1830	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	62.4	mi/h
Number of lanes, N	3	
Density, D	29.3	pc/mi/ln
Level of service, LOS	D	

Memorandum

To:	The Ezralow Company	Date:	February 27, 2017
Attn:	Sid Paul	Project:	Sierra Gateway Apartments
From:	Kamesh Vedula, P.E., T.E. Kenneth Isenhower III, E.I.T.	Job No.:	25-7185-01
Re:	Analysis of Reduced Density Alternative	File No.:	C1783MEM002.DOCX
CC:			

Introduction

This technical memorandum has been prepared to present the evaluation of a Reduced Density Alternative for proposed project of Sierra Gateway Apartments. Sierra Gateway Apartments is a proposed development on the southeast corner of Sierra College Boulevard and Rocklin Road in Rocklin, Ca. The project as proposed is anticipated to construct an apartment complex with approximately 195 dwelling units.

The Transportation Impact Report (October 2016) prepared in support of the environmental clearance for the project indicated that the project will not create a significant impact for Existing Plus Project and Short Term Plus Project conditions at the study locations. With full build-out of the project, the proposed project is projected to have significant and unavoidable impacts at the intersections of Rocklin Road/I-80 WB Ramps and Rocklin Road/I-80 EB Ramps under Cumulative conditions.

The purpose of this memorandum is to assess if the Reduced Density Alternative (at 170 units) will result in less than significant impacts. As noted previously, full build-out of the project resulted in significant impacts at the intersections of Rocklin Road/I-80 WB Ramps and Rocklin Road/I-80 EB Ramps under Cumulative conditions. Therefore, this analysis will focus on impacts at these two intersections for Cumulative conditions.

At 170 units, the Reduced Density Alternative is expected to generate 87 AM peak hour trips and 111 PM peak hour trips. Since the PM peak hour generates higher trips this analysis focused on the PM peak hour operations. When compared to the full build-out of the project, this represents a trip reduction of 12 AM peak hour trips and 14 PM peak hour trips.

Table 1 provides a comparison of the Cumulative No Project and Cumulative Plus Project with the Reduced Density Alternative level of service at the Rocklin Road interchange intersections.

**TABLE 1
CUMULATIVE NO PROJECT VS CUMULATIVE PLUS PROJECT WITH REDUCED DENSITY
ALTERNATIVE**

#	Intersection	Control Type ^{1,2}	Target LOS	No Project		Plus Project - Reduced		
				Delay or V/C	LOS	Delay or V/C	LOS	Impact ?
4	Rocklin Road & I-80 WB Ramps	Signal	C	70.5	E	79.8	E	Yes
5	Rocklin Road & I-80 EB Ramps	Signal	C	102.7	F	110.5	F	Yes

Notes:

1. Delay based on average of all approaches for Signal
2. The Rocklin Rd interchange intersections were analyzed using HCM methodologies instead of Circular 212

As shown in Table 1, the Rocklin Road interchange intersections are projected to operate at LOS E/F conditions. The addition of project traffic from the Reduced Density Alternative is expected to increase the delay by more than 5 seconds when compared to the Cumulative No Project conditions.

Conclusion

The Reduced Density Alternative is expected to create significant impacts at the intersections of Rocklin Road/I-80 WB Ramps and Rocklin Road/I-80 EB Ramps.



Memorandum

To: The Ezralow Company
Attn: Sid Paul
From: Kamesh Vedula
Re: Improvement Options for the IC
CC: Scott Robertson

Date: February 27, 2017
Project: Sierra Gateway Apartments
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Introduction

During the course of assessing the traffic impacts associated with the Sierra Gateway Apartments project, Omni-Means determined that the existing conditions at the I-80 eastbound and westbound ramps at the respective intersections with Rocklin Road are operating at Level of Service (LOS) D during the PM peak hour rather than the LOS C specified in the Rocklin General Plan. In addition, Omni-Means concluded that these interchange intersections are expected to continue to operate at LOS D or worse conditions with the build-out of development projects that have already been approved or may reasonably be expected to be approved, a scenario identified in the traffic analysis as the Short Term No Project condition.

This technical memorandum was prepared at the City's request to present interim improvement options that will provide LOS C or better conditions at these interchange intersections. With implementation of the improvements suggested below to alleviate Existing conditions and achieve the LOS C standard called for in the General Plan, the project traffic associated with the Sierra Gateway Apartments will not trigger significant impacts under the Existing Plus Project or Short Term Plus Project conditions. Although the project traffic will result in increased delay at the specified interchange intersections the project also does not currently trigger significant impacts in the Existing Plus Project and Short Term Plus Project conditions prior to implementation of the suggested improvements. The LOS C standard, once regained, will be retained even after consideration of the traffic associated with the Sierra Gateway Apartments project.

Improvements

I-80 WB Ramps/Rocklin Road intersection: The following improvements will yield acceptable LOS C operations for Existing and Existing Plus Project conditions:

1. Relocate the existing cross walk from the eastside of the intersection to the west side of the intersection, *and*
2. Restripe/reconstruct the off-ramp to provide a shared left-through lane and a right turn pocket. Currently, there is a left lane and a shared through-right turn pocket.

To provide acceptable operations for Short Term No Project and Short Term Plus Project, in addition to the cross walk relocation noted above, the off-ramp geometry will require a shared left-through-right lane and a right turn pocket. This improvement may potentially require

reconstruction to minimize the skew for traffic getting off the freeway and getting back on to the freeway and provide a better location for the proposed crosswalk with respect to the sight distance for the vehicles making a right turn off the ramp as they enter Rocklin Road. It appears that this improvement could be constructed within the existing city/state ROW. Engineering drawings will need to be prepared to assess feasibility of this improvement and the ROW needs.

I-80 EB Ramps/Rocklin Road intersection: The following improvements will yield acceptable LOS C operations for Existing, Existing Plus Project, Short Term No Project and Short Term Plus Project conditions:

1. Reconstruct the off-ramp to provide a left, a shared left-through and two right turn lanes. Currently, there is a left, a shared left-through and a right turn lane.

Adding the second right turn lane could potentially require additional ramp widening in order to accommodate the required shoulder width and reconstruction of the curb, gutter, sidewalk and drain inlet at the corner next to the AM/PM. This improvement may also necessitate reconstruction of the AM/PM driveway adjacent to the EB off-ramp. Engineering drawings will need to be prepared to assess the extent of the improvements needed to implement this improvement and the ROW needs.

The PM peak hour LOS works sheets can be found in appendix A.



Appendix A



4: I-80 WB On Ramp/I-80 WB Off Ramp & Rocklin Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBR	All
Denied Delay (hr)	0.4	0.7	0.0	0.0	0.0	0.0	1.2
Denied Del/Veh (s)	2.2	4.4	0.2	0.0	0.1	0.3	1.3
Total Delay (hr)	11.6	4.5	7.0	2.6	0.6	4.5	30.8
Total Del/Veh (s)	59.4	29.0	41.2	8.3	45.6	53.3	33.1
Vehicles Entered	681	557	608	1114	44	296	3300
Vehicles Exited	685	557	606	1114	44	297	3303
Hourly Exit Rate	685	557	606	1114	44	297	3303
Input Volume	689	555	622	1111	42	300	3319
% of Volume	99	100	97	100	104	99	100

5: I-80 EB Off Ramp/I-80 EB On Ramp & Rocklin Rd Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Delay (hr)	0.0	0.0	8.6	0.5	0.3	0.0	0.5	10.0
Denied Del/Veh (s)	0.1	0.0	25.1	26.2	2.1	1.9	3.4	11.6
Total Delay (hr)	3.6	0.9	10.6	0.3	5.6	0.0	2.5	23.6
Total Del/Veh (s)	68.2	6.2	30.8	15.5	41.1	35.2	15.7	27.2
Vehicles Entered	188	553	1222	72	482	2	568	3087
Vehicles Exited	188	552	1220	72	483	2	568	3085
Hourly Exit Rate	188	552	1220	72	483	2	568	3085
Input Volume	191	549	1237	70	475	2	563	3087
% of Volume	98	101	99	102	102	100	101	100

Total Network Performance

Denied Delay (hr)	11.1
Denied Del/Veh (s)	10.1
Total Delay (hr)	55.4
Total Del/Veh (s)	49.3
Vehicles Entered	3954
Vehicles Exited	3954
Hourly Exit Rate	3954
Input Volume	10340
% of Volume	38

Intersection: 4: I-80 WB On Ramp/I-80 WB Off Ramp & Rocklin Rd

Phase	1	2	4	6
Movement(s) Served	WBL	EBT	SBTL	WBT
Maximum Green (s)	37.4	21.9	22.9	64.9
Minimum Green (s)	10.0	6.0	5.0	6.0
Recall	Max	C-Min	None	C-Min
Avg. Green (s)	47.2	27.1	15.4	81.6
g/C Ratio	-0.01	-0.01	-0.01	-0.01
Cycles Skipped (%)	6	6	6	6
Cycles @ Minimum (%)	0	0	3	0
Cycles Maxed Out (%)	94	94	26	94
Cycles with Peds (%)	0	20	29	3

Controller Summary

Average Cycle Length (s): NA
Number of Complete Cycles : 0

Intersection: 5: I-80 EB Off Ramp/I-80 EB On Ramp & Rocklin Rd

Phase	2	5	6	8
Movement(s) Served	EBT	EBL	WBT	NBTL
Maximum Green (s)	69.4	17.5	48.4	21.9
Minimum Green (s)	6.0	4.0	6.0	2.0
Recall	C-Min	None	C-Min	None
Avg. Green (s)	67.8	13.5	50.8	24.1
g/C Ratio	NA	-0.01	NA	NA
Cycles Skipped (%)	0	13	0	0
Cycles @ Minimum (%)	0	5	0	0
Cycles Maxed Out (%)	100	10	100	23
Cycles with Peds (%)	40	0	0	0

Controller Summary

Average Cycle Length (s): NA
Number of Complete Cycles : 0

4: I-80 WB On Ramp/I-80 WB Off Ramp & Rocklin Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBR	All
Denied Delay (hr)	0.2	0.4	0.2	0.1	0.0	0.0	0.9
Denied Del/Veh (s)	0.7	2.7	1.0	0.3	0.3	0.1	0.9
Total Delay (hr)	12.1	3.7	6.9	2.8	0.6	3.3	29.3
Total Del/Veh (s)	54.5	23.4	38.6	8.5	52.7	36.4	29.8
Vehicles Entered	775	560	636	1162	44	323	3500
Vehicles Exited	785	564	635	1162	44	322	3512
Hourly Exit Rate	785	564	635	1162	44	322	3512
Input Volume	781	555	655	1179	45	320	3534
% of Volume	101	102	97	99	97	101	99

5: I-80 EB Off Ramp/I-80 EB On Ramp & Rocklin Rd Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Delay (hr)	0.0	0.0	17.4	1.1	0.3	0.0	0.6	19.4
Denied Del/Veh (s)	0.0	0.0	46.9	56.5	2.1	2.4	3.4	21.0
Total Delay (hr)	4.3	1.1	11.7	0.3	5.8	0.0	3.2	26.4
Total Del/Veh (s)	71.5	6.1	31.9	15.7	43.8	47.0	18.7	28.6
Vehicles Entered	212	626	1311	72	468	2	602	3293
Vehicles Exited	213	615	1306	72	470	2	603	3281
Hourly Exit Rate	213	615	1306	72	470	2	603	3281
Input Volume	210	625	1336	73	475	2	617	3338
% of Volume	102	98	98	98	99	100	98	98

Total Network Performance

Denied Delay (hr)	20.2
Denied Del/Veh (s)	17.3
Total Delay (hr)	56.8
Total Del/Veh (s)	47.7
Vehicles Entered	4189
Vehicles Exited	4191
Hourly Exit Rate	4191
Input Volume	11076
% of Volume	38

Intersection: 4: I-80 WB On Ramp/I-80 WB Off Ramp & Rocklin Rd

Phase	1	2	4	6
Movement(s) Served	WBL	EBT	SBTL	WBT
Maximum Green (s)	35.4	28.9	22.9	69.9
Minimum Green (s)	10.0	6.0	5.0	6.0
Recall	Max	C-Min	None	C-Min
Avg. Green (s)	47.4	28.3	14.2	84.4
g/C Ratio	NA	NA	-0.01	-0.01
Cycles Skipped (%)	0	0	3	3
Cycles @ Minimum (%)	0	0	0	0
Cycles Maxed Out (%)	100	100	15	97
Cycles with Peds (%)	0	18	24	3

Controller Summary

Average Cycle Length (s): NA
Number of Complete Cycles : 0

Intersection: 5: I-80 EB Off Ramp/I-80 EB On Ramp & Rocklin Rd

Phase	2	5	6	8
Movement(s) Served	EBT	EBL	WBT	NBTL
Maximum Green (s)	75.4	18.5	53.4	20.9
Minimum Green (s)	6.0	4.0	6.0	2.0
Recall	C-Min	None	C-Min	None
Avg. Green (s)	73.7	15.0	53.7	24.1
g/C Ratio	NA	-0.01	NA	NA
Cycles Skipped (%)	0	13	0	0
Cycles @ Minimum (%)	0	3	0	0
Cycles Maxed Out (%)	100	18	100	29
Cycles with Peds (%)	44	0	0	0

Controller Summary

Average Cycle Length (s): NA
Number of Complete Cycles : 0