

## MEMORANDUM

Date: December 4, 2009

To: Mike Taggart  
Analytical Environmental Services  
1801 7th Street, Suite 100  
Sacramento, CA 95811

From: Steve Abrams

Subject: Point Molate Casino/Resort DEIS/DEIR – Additional Traffic Analysis

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This memorandum summarizes the results of additional analysis conducted in response to comments received on the Point Molate Casino/Resort DEIS/DEIR.<sup>1</sup> This updated analysis was completed to provide information on the potential for impacts to additional roadway and freeway facilities that were not previously analyzed. The potential project impacts were analyzed under both background and cumulative conditions with the inclusion of traffic from the proposed Scotts Valley Casino Project.

### **Project Description and Alternatives**

This analysis compliments the transportation impact analysis prepared by DMJM Harris (DMJM Harris TIA)<sup>2</sup> and the Supplemental Traffic Impact Analysis (STIA)<sup>3</sup> prepared for the proposed project. This analysis was prepared based on guidelines set forth by Contra Costa County, Marin County, the City of Larkspur, and the California Department of Transportation's (Caltrans) Guide to the Preparation of Traffic Impact Studies.<sup>4</sup>

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<sup>1</sup> Point Molate Mixed-Used Tribal Destination Resort DEIR/DEIR, Analytical Environmental Services, Sacramento CA, July, 2009..

<sup>2</sup> Point Molate Casino/Resort Project Transportation Impact Analysis, DMJM Harris – AECOM, Oakland, CA, June, 2008.

<sup>3</sup> Point Molate Casino/Resort Supplemental TIA, Abrams Associates, Walnut Creek, CA, April, 2009.

<sup>4</sup> Guide for the Preparation of Traffic Impact Studies, Caltrans, Sacramento, CA, December, 2002.

The proposed project would be located on the shoreline in the City of Richmond just across the Richmond San Rafael Bridge from Marin County. Alternative A was considered the preferred buildout alternative and consists of casino, lodging, retail, entertainment facility, and office land use components. The alternatives are described in more detail in the DMJM Harris TIA and the Point Molate Casino/Resort DEIS/DEIR.

### **Additional Facilities Studied**

The additional facilities have been analyzed for the typical weekday morning peak hour (8:00 – 9:00 AM), the afternoon commute peak hour (5:00 – 6:00 PM) and the Saturday afternoon peak hour (4:00 – 5:00 PM). It should be noted that the analysis includes all of the signalized intersections on Sir Francis Drake Boulevard in Larkspur where more than 50 trips would be added. The proposed project's impacts were specifically analyzed for the following facilities:

#### State Route 4 Freeway Segments near Hercules

1. I-80 Ramps to Willow Avenue
2. Willow Avenue to Sycamore Avenue

#### Sir Francis Drake Boulevard Intersections in Larkspur

1. U.S. 101 southbound off-ramp/Sir Francis Drake Boulevard
2. U.S. 101 northbound on- and off-ramp/Sir Francis Drake Boulevard
3. Larkspur Landing Circle (west)/Sir Francis Drake Boulevard
4. Larkspur Landing Circle (east)/Sir Francis Drake Boulevard

### **Additional Review of Transportation Demand Management Reductions**

In response to comments on the Transportation Demand Management (TDM) assumptions some additional analysis and discussion of the effectiveness of the TDM measures was prepared. This is intended to provide justification for the 15% reduction in automobile traffic that was applied, but only to the trip generation from the casino portion of the project. Under Alternative A this equates to a reduction of approximately 200 trips during the critical PM peak hour. Please note that no TDM reductions were applied to the hotel or retail components of the project.

The TDM reduction is intended to account for patrons and employees who would utilize transit and shuttle busses to access the project site. This reduction would apply to patrons and employees who would utilize the various methods of transit to travel to Richmond and then transfer to a private shuttle bus or an extended AC Transit line. The TDM reduction also accounts for charter bus trips from outlying areas and employees who park in designated offsite employee parking lots and are shuttled to Point Molate. The following is a list of various factors that are pertinent to the effectiveness of the Point Molate TDM program.

*Effectiveness of Employee TDM Measures* - It is important to note that the project is proposing to provide economic incentives for employees to use transit. This is in addition to the other major provisions for transit including subsidizing public bus and ferry routes, providing shuttle buses to and from off-site employee parking areas and BART, and providing charter bus service for outlying areas.

The Institute of Traffic Engineers (ITE) Trip Generation Handbook contains a detailed summary of surveys and studied on the effects of TDM and transit on Trip Generation.<sup>5</sup> This is provided for overall project traffic and for traffic specifically from employees. Based on detailed surveys of various TDM programs the ITE Trip Generation Handbook has provided a summary of the benefits to transportation (both perceived and actual).

For employees the Trip Generation Handbook provides extensive data to support the effectiveness of various TDM measures. It is important to again note that the project is proposing all of the key components that are typically part of a successful TDM program (according to ITE) including support measures, economic incentives, and transportation services. Support measures include things like employee transportation coordinators, promotional activities, rideshare matching, on-site dependent care, and alternative work schedules. Economic incentives are any steps taken by an employer to provide a monetary incentive to use an alternate travel mode. Transportation services include employer based efforts such as van-pool programs, shuttle bus service to off-site transit stations, guaranteed ride home programs, and the provision of on-site showers and changing facilities.

According to ITE the combination of economic incentives with transportation services (such as those proposed by the project) produced an average reduction in commuter vehicles of 24 percent at the survey sites. At a typical employer that operates during normal business hours there can be up to 85% of the employees arriving and/or departing during the peak hour. However, at a casino resort with 24-hour operations there are normally three shifts per day so that the maximum number arriving during the peak hours would be no more than about a third of the employees. In addition, since most employees work a five day work week it was assumed that 2 sevenths of the employees would not be working on any given day. Also, the percent arriving would typically be reduced by another 10 percent to account for absences due to vacations, illness, etc.

The resort is estimated to have 4000 employees so assuming a vehicle occupancy rate for employees of 1.5 persons per vehicle (due to ridesharing) the above mentioned reductions equate to an estimated potential for 635 vehicle trips (due to employees) during the PM peak hour. This is based on a scenario where no transit service or TDM programs are provided. Based on the ITE surveys the

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<sup>5</sup> *Trip Generation Handbook, Second Edition*, Institute of Transportation Engineers, Washington, D.C, June, 2004.

24 percent reduction for the TDM measures should readily equate to a overall reduction to the casino traffic of about 150 PM peak hour trips. Information gathered at Cache Creek Casino Resort and Thunder Valley Casino indicates that the average occupancy of vehicles with resort patrons is about 2.4 persons per vehicle.

Therefore, based on this analysis the project's shuttle services and public bus transit subsidies would only need to serve about 120 resort patrons during the peak hour to meet the 15% TDM reduction assumed in the project trip generation. This would equate to about 7 percent of the resort patrons estimated to arrive during the PM peak hour. This was determined to be a reasonable assumption given the direct connection to BART and the effects of other transportation services such as charter buses.

*Overall Effectiveness of the TDM Measures on both Patrons and Employees* – The Institute of Traffic Engineers (ITE) Trip Generation Handbook also contains a detailed summary of surveys and studies on the overall effects of TDM and transit on the total traffic generation of a project. Since the proposed project would construct both a bus transit center and a ferry terminal the ITE survey results indicate these features should result in an overall reduction in vehicle trip generation of 20%.

Applying a 20 percent TDM reduction to the entire project is reasonable because employees from the hotels and the retail areas would also be provided incentives to use transit and they would certainly be expected to utilize the on-site transit options available to them. This reduction would therefore apply to the entire project which results in a estimated reduction of 270 peak hour trips. This is less than the 200 trip reduction assumed for the project and validates the assumptions used. This difference is largely due to the fact that the TDM reductions were only applied to the casino portion of the project.

### **Traffic Analysis Scenarios**

Five study scenarios have been addressed as part of this traffic analysis. Please note that the AM and PM peak hours were both analyzed for each of the scenarios listed below:

- 1) ***Existing Conditions*** - This scenario evaluates the level-of-service at the studied freeway segments and intersections for the existing conditions based on various EIR's referenced in this memo.
  
- 2) ***Background (Year 2010) Conditions*** - This scenario evaluates the background level-of-service at the studied freeway segments and intersections for the existing conditions with the addition of traffic from reasonably foreseeable projects in the area as summarized in the DMJM Harris TIA and the various EIR's referenced in this memo.

3) **Background Plus Project Conditions** - This scenario includes analyses of the effects of traffic from the proposed project and each of the alternatives on the 2013 traffic operations.

4) **Cumulative 2030 Conditions** - This scenario includes the analysis of build-out conditions in the area, projected for the Year 2030.

5) **Cumulative Plus Project Conditions** - this scenario includes the cumulative Year 2030 traffic volumes with traffic from the proposed project and each of the alternatives.

### **Intersection Analysis Methodology for Sir Francis Drake Boulevard**

The level of service (LOS) measurement is a qualitative description of traffic operating conditions for intersections and roadways. Levels of service describe these conditions in terms of such factors as speed, travel time, delays, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. Levels of service are given letter designations ranging from A to F, which are defined in Tables 1 and 2. The LOS measurement that is used to determine the significance of any impacts a project might have on traffic and circulation is an intersection's *overall* LOS.

The operating conditions at the signalized study intersections were evaluated using the 2000 *Highway Capacity Manual (HCM)* "Level of Service" methodology. The *HCM* methodology determines the capacity of each lane group approaching the intersection. The LOS is then based on average delay (in seconds per vehicle) for the various movements within the intersection. A combined weighted average delay and LOS are presented for the intersection. The LOS definitions for signalized intersections are included in Table 1.

### **Freeway Segment Analysis Methodology for SR 4**

For State Route 4 the freeway analysis was based on the 2000 Highway Capacity Manual (2000 HCM)<sup>6</sup> using the Highway Capacity Software (HCS)<sup>7</sup>. In the 2000 HCM the level of service is described as a quality measure describing operation conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. In the 2000 HCM six levels of service grades are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each Level of Service represents a range of operating

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<sup>6</sup> Highway Capacity Manual (HCM 2000 – Updated), Transportation Research Board, Washington, D.C., October 12, 2006.

<sup>7</sup> Highway Capacity Software Version 5.21, McTrans Center, University of Florida, Gainesville, FL, 2005.



conditions and the driver’s perception of those conditions. The Level of Service for a freeway segment is based on density given in units of passenger cars per mile per lane. The 2000 HCM freeway LOS thresholds are given in **Table 2** and these are all based on density.

**Table 2**  
**Level-of-Service for Basic Freeway Segments**

<b>Level of Service (LOS)</b>	<b>Density (pc/mi/ln)</b>	<b>Traffic Condition</b>
A	< 11	No Delay
B	>11 – 18	Short Delay
C	>18 – 26	Moderate Delay
D	>26 – 35	Long Delay
E	>35 – 45	Very Long Delay
F	>45	Volume>Capacity

Source: Exhibit 23-2 of the 2000 Highway Capacity Manual

### **Pt. Molate Casino/Resort Project Trip Generation and Trip Distribution**

An extensive review of the project trip generation from the previously referenced DMJM Harris Study has been conducted and that analysis concluded that the project trip generation estimates were accurate. However, based on our review of the San Francisco Bay Area Water Emergency Transportation Authority (WETA) plans for future ferry service in the area the reduction in project trips due to ferry service was reduced to 15 percent. As a result, we have revisited the distribution of gaming patrons from the San Francisco and northern San Mateo regions and increased the percent of project traffic added to Sir Francis Drake Boulevard from about 3 percent to 6.3 percent. As per the comments received this also reflects an adjustment to assume that 50 percent of this traffic would travel to the project via the Golden Gate Bridge and 50% would take the Bay Bridge. In addition, it should be noted that 10 percent of the employee trips are assumed to travel to the site via Sir Francis Drake Boulevard. Therefore, the analysis of potential impacts on the Sir Francis Drake Boulevard corridor and the intersections in Larkspur are based on these assumptions.

### **Description of Additional Transportation Facilities Being Studied as Part of this Analysis**

A brief description of the additional roadway facilities being studied in this analysis is provided below:

SR 4 extends from Interstate 80 (I-80) in Hercules east to SR 89 in the Sierra. In the vicinity of I-80, SR 4 is a freeway with full or partial interchanges at Willow Avenue and Sycamore Avenue.



### Analysis of Project Impacts on Sir Francis Drake Boulevard

Existing and cumulative traffic volumes for Sir Francis Drake Boulevard were determined from the analysis included in the Transportation Impact Analysis for the San Quentin State Prison Central Health Services Center Project DEIR<sup>11</sup> and also the Sonoma-Marín Area Rail Transit (SMART) project FEIR.<sup>12</sup>

The Cumulative scenario includes the background conditions traffic generated by approved and planned projects prior to completion of the proposed project (2010), plus anticipated traffic from the San Quentin State Prison Condemned Inmate Project. Planned and approved projects included in the Cumulative scenario are similar to those described previously in the Background conditions scenario. However, both the San Quentin State Prison Condemned Inmate Project and the Central Health Services Project are also included in the Cumulative scenario to illustrate the future operating conditions in the area, including potential traffic growth from San Quentin.

The FEIR from the SMART train project included an analysis of intersection #3 (Larkspur Landing Circle West and the Ferry Terminal Entrance at Sir Francis Drake Boulevard). This project was subsequently approved by the voters and a rail terminus in Larkspur is currently being studied. It is expected that this project will ultimately include some additional transit, pedestrian, and bicycle improvements. Project trips were distributed to using the trip distribution assumptions previously discussed which resulted in an estimated total of 114 PM peak hour project trips being added to Sir Francis Drake Boulevard in Larkspur.

Based on the City of Larkspur and Caltrans Standards a project would be considered to have a significant impact at these intersections if it would cause:

- 1) A roadway segment to degrade from LOS D or better to LOS E or F; or
- 2) The addition of the project's peak hour traffic causes an increase of traffic volumes on any intersection approach by more than ten vehicles or one percent of the existing volume, whichever is less.

As described in the Final Transportation Impact Analysis for the San Quentin State Prison CIC project there are two intersections in Larkspur that would exceed the City's LOS Standards under both the background plus project and cumulative plus project scenarios. These intersections include 1) Sir Francis Drake Boulevard at the U.S. 101 Northbound ramps and 2) Sir Francis Drake Boulevard at the Larkspur Ferry Terminal Entrance/Larkspur Landing Circle (west).

These intersections are part of a segment that has been "grandfathered" at LOS F by the Marin Congestion Management Program.<sup>13</sup> However, comments received from the Transportation Authority of Marin (TAM) included the following statements: "While a neighboring County would be excluded from

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<sup>11</sup> *San Quentin State Prison Central Health Services Center Project FEIR and Addendum*, EDAW, Sacramento, CA, June 26, 2009.

<sup>12</sup> *Sonoma-Marín Area Rail Transit FEIR*, Aspen Environmental Group, San Francisco, CA, June, 2006.

<sup>13</sup> *2009 Update to the Marin Congestion Management Program*, DKS Associates, Oakland, 2009.

addressing the County’s conformance requirements per enabling CMP legislation, the CMP monitoring data provides an indicator that the Point Molate project would most likely contribute to existing significant traffic congestion (on Sir Francis Drake Boulevard in Larkspur).<sup>14</sup> It was subsequently determined that the project would add more than ten vehicles to the approaches at the two intersections (listed above) that exceed the City’s LOS standards.. Therefore, based on the City of Larkspur’s significance criteria and the comments from TAM the project’s impacts at these intersections would be considered significant. The worst-case LOS at each of the project study intersections for both baseline plus project and cumulative plus project conditions are listed below:

1. U.S. 101 Southbound Off-Ramp at Sir Francis Drake Boulevard – LOS B or better
2. U.S. 101 Northbound Ramps at Sir Francis Drake Boulevard – **LOS F (PM peak hour)**
3. Larkspur Landing Circle (west) at Sir Francis Drake Boulevard – **LOS E (PM Peak Hour)**
4. Larkspur Landing Circle (east) at Sir Francis Drake Boulevard – LOS C or better

As noted above, the project is forecast to cause significant impacts to traffic operations on Sir Francis Drake Boulevard at two of the four project study intersections. As a result, payment of the Larkspur Traffic Impact Fee would be required as mitigation.

**Project Impact at the U.S. 101 Northbound On- and Off-Ramps at Sir Francis Drake Boulevard (Intersection #2):** During the PM peak hour the intersection of the U.S. 101 Northbound On- and Off-Ramps at Sir Francis Drake Boulevard (Intersections #2) is forecast to operate at LOS F during the PM peak hour under both the baseline and cumulative plus project conditions.

**Project Mitigation:** As mitigation for the impacts at this intersection the project shall be required to pay the Traffic Impact Fees established by the City of Larkspur. Finding D of Chapter 18.15.040.A (1) of the Larkspur Municipal Code required that a traffic impact fee be paid for any new use that exceeds the former use by ten or more trips. The fee provided for a proportionate share of funds necessary to construct transportation improvements as shown on the programmed transportation improvements list and would be considered as mitigation for the project’s impacts on the City of Larkspur’s primary circulation system. The fee is currently established at \$3,399 per PM peak hour trip increase (CC Resolution No. 39/92) which (at 114 PM peak hour trips) would equate to a fee of \$386,486.

Larkspur has a General Plan Policy (Policy M) that states that “Sir Francis Drake Boulevard shall not be widened to allow additional through traffic lanes.” Based on the Larkspur General Plan it is expected that the traffic impact fees would be utilized mainly to reduce trips in the area through transit, bicycle, and pedestrian improvements. The traffic impact fees may also ultimately be used for some roadway improvements along Sir Francis Drake Boulevard, as specified in the programmed transportation improvements list. However, it is expected that the project’s impacts will be mitigated primarily by building on the current plans for improving transit, pedestrian, and bicycle access in the area. Current plans for the area include the Central Marin Ferry Connection Project and the SMART Train Project. It should also be noted that a substantial improvement to bus transit in the area is expected to be

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<sup>14</sup> Letter from Karita Zimmerman, Planning Manager, Transportation Authority of Marin, San Rafael, October 21, 2009.

implemented as part of a shuttle system proposed for the SMART train project. The Marin County Transportation Plan (2035) has also identified a project to improve local access to US 101 (from Tamalpais Drive to just north of Sir Francis Drake Blvd). This project may also include improvements at this ramp intersection. This project has an overall estimated cost of 120.7 million and includes funding from Regional Measure 2. Implementation of this mitigation (payment of the Larkspur Traffic Impact Fees) would reduce the impact to a **less than significant level**.

**Project Impact at the Larkspur Landing Circle (west) and the Ferry Terminal Entrance at Sir Francis Drake Boulevard (Intersection #3):** During the PM peak hour the intersection of the Larkspur Landing Circle (west) and the Ferry Terminal Entrance at Sir Francis Drake Boulevard is forecast to operate at LOS E during the PM peak hour under baseline plus project conditions. In addition to this, according to the information in the SMART Train DEIR this intersection would operate at LOS F under cumulative plus project conditions. Please note that this assumes implementation of the planned SMART Train Project.

**Project Mitigation:** As mitigation for the impacts at this intersection the project shall be required to pay the Traffic Impact Fees established by the City of Larkspur. As described above, Finding D of Chapter 18.15.040.A (1) of the Larkspur Municipal Code required that a traffic impact fee be paid for any new use that exceeds the former use by ten or more trips. The fee provided for a proportionate share of funds necessary to construct transportation improvements as shown on the programmed transportation improvements list and would be considered as mitigation for the project's impacts on the City of Larkspur's primary circulation system. The fee is currently established at \$3,399 per PM peak hour trip increase (CC Resolution No. 39/92) which (at 114 PM peak hour trips) would equate to a fee of \$386,486.

Based on the Larkspur General Plan it is expected that the traffic impact fees would be utilized mainly to reduce trips in the area through transit, bicycle, and pedestrian improvements. The traffic impact fees may also ultimately be used for some roadway improvements along Sir Francis Drake Boulevard, as specified in the programmed transportation improvements list. However, it is expected that the project's impacts will be mitigated primarily by building on the current plans for improving transit, pedestrian, and bicycle access in the area. Current plans for the area include the Central Marin Ferry Connection Project and the SMART Train Project. It should also be noted that a substantial improvement to bus transit in the area is expected to be implemented as part of a shuttle system proposed for the SMART train project. Implementation of this mitigation (payment of the Larkspur Traffic Impact Fees) would reduce the impact to a **less than significant level**.

Please contact us if there are any questions or comments.

**Table 3**  
**State Route 4 Existing LOS Analysis - AM Peak Hour**

	Facility Type	Segment Limits		No Project Conditions			With Project Conditions			Percent Increase in Volume	Impact
		From	To	Volume	Density	LOS	Volume	Density	LOS		
Alt A	Segment	I-80 EB Off-Ramp	Willow Ave	1,696	14.5	B	1,718	14.7	B	1.3%	No
	Segment	Willow Ave	Sycamore Ave	1,696	14.5	B	1,718	14.7	B	1.3%	No
	Segment	Sycamore Ave	Willow Ave	1,682	14.4	B	1,724	14.8	B	2.5%	No
	Segment	Willow Ave	I-80 On-Ramps	1,209	10.4	A	1,251	10.7	A	3.5%	No
Alt B	Segment	I-80 EB Off-Ramp	Willow Ave	1,696	14.5	B	1,732	14.8	B	2.1%	No
	Segment	Willow Ave	Sycamore Ave	1,696	14.5	B	1,732	14.8	B	2.1%	No
	Segment	Sycamore Ave	Willow Ave	1,682	14.4	B	1,727	14.8	B	2.7%	No
	Segment	Willow Ave	I-80 On-Ramps	1,209	10.4	A	1,254	10.8	A	3.7%	No
Alt C	Segment	I-80 EB Off-Ramp	Willow Ave	1,696	14.5	B	1,710	14.7	B	0.8%	No
	Segment	Willow Ave	Sycamore Ave	1,696	14.5	B	1,710	14.7	B	0.8%	No
	Segment	Sycamore Ave	Willow Ave	1,682	14.4	B	1,710	14.6	B	1.7%	No
	Segment	Willow Ave	I-80 On-Ramps	1,209	10.4	A	1,237	10.6	A	2.3%	No
Alt D	Segment	I-80 EB Off-Ramp	Willow Ave	1,696	14.5	B	1,744	15.0	B	2.8%	No
	Segment	Willow Ave	Sycamore Ave	1,696	14.5	B	1,744	15.0	B	2.8%	No
	Segment	Sycamore Ave	Willow Ave	1,682	14.4	B	1,708	14.6	B	1.5%	No
	Segment	Willow Ave	I-80 On-Ramps	1,209	10.4	A	1,235	10.6	A	2.2%	No

Net total assignment to SR-4 Freeway of 10.9%

**Table 4**  
**State Route 4 Existing LOS Analysis - PM Peak Hour**

	Facility Type	Segment Limits		No Project Conditions			With Project Conditions			Percent Increase in Volume	Impact
		From	To	Volume	Density	LOS	Volume	Density	LOS		
Alt A	Segment	I-80 EB Off-Ramp	Willow Ave	2,079	17.8	B	2,151	18.4	C	3.5%	No
	Segment	Willow Ave	Sycamore Ave	2,079	17.8	B	2,151	18.4	C	3.5%	No
	Segment	Sycamore Ave	Willow Ave	2,454	21.0	C	2,529	21.7	C	3.1%	No
	Segment	Willow Ave	I-80 On-Ramps	1,424	12.2	B	1,499	12.8	B	5.3%	No
Alt B	Segment	I-80 EB Off-Ramp	Willow Ave	2,079	17.8	B	2,158	18.5	C	3.8%	No
	Segment	Willow Ave	Sycamore Ave	2,079	17.8	B	2,158	18.5	C	3.8%	No
	Segment	Sycamore Ave	Willow Ave	2,454	21.0	C	2,542	21.8	C	3.6%	No
	Segment	Willow Ave	I-80 On-Ramps	1,424	12.2	B	1,512	13.0	B	6.2%	No
Alt C	Segment	I-80 EB Off-Ramp	Willow Ave	2,079	17.8	B	2,123	18.2	C	2.1%	No
	Segment	Willow Ave	Sycamore Ave	2,079	17.8	B	2,123	18.2	C	2.1%	No
	Segment	Sycamore Ave	Willow Ave	2,454	21.0	C	2,503	21.4	C	2.0%	No
	Segment	Willow Ave	I-80 On-Ramps	1,424	12.2	B	1,473	12.6	B	3.4%	No
Alt D	Segment	I-80 EB Off-Ramp	Willow Ave	2,079	17.8	B	2,113	18.1	C	1.6%	No
	Segment	Willow Ave	Sycamore Ave	2,079	17.8	B	2,113	18.1	C	1.6%	No
	Segment	Sycamore Ave	Willow Ave	2,454	21.0	C	2,509	21.5	C	2.2%	No
	Segment	Willow Ave	I-80 On-Ramps	1,424	12.2	B	1,479	12.7	B	3.9%	No

Net total assignment to SR-4 Freeway of 10.9%

**Table 5**  
**State Route 4 Existing LOS Analysis - SAT Peak Hour**

	Facility Type	Segment Limits		No Project Conditions			With Project Conditions			Percent Increase in Volume	Impact
		From	To	Volume	Density	LOS	Volume	Density	LOS		
Alt A	Segment	I-80 EB Off-Ramp	Willow Ave	1,559	13.4	B	1,661	14.2	B	6.5%	No
	Segment	Willow Ave	Sycamore Ave	1,559	13.4	B	1,661	14.2	B	6.5%	No
	Segment	Sycamore Ave	Willow Ave	1,841	15.8	B	1,939	16.6	B	5.3%	No
	Segment	Willow Ave	I-80 On-Ramps	1,068	9.2	A	1,166	10.0	A	9.2%	No
Alt B	Segment	I-80 EB Off-Ramp	Willow Ave	1,559	13.4	B	1,669	14.3	B	7.1%	No
	Segment	Willow Ave	Sycamore Ave	1,559	13.4	B	1,669	14.3	B	7.1%	No
	Segment	Sycamore Ave	Willow Ave	1,841	15.8	B	1,949	16.7	B	5.9%	No
	Segment	Willow Ave	I-80 On-Ramps	1,068	9.2	A	1,176	10.1	A	10.1%	No
Alt C	Segment	I-80 EB Off-Ramp	Willow Ave	1,559	13.4	B	1,627	13.9	B	4.4%	No
	Segment	Willow Ave	Sycamore Ave	1,559	13.4	B	1,627	13.9	B	4.4%	No
	Segment	Sycamore Ave	Willow Ave	1,841	15.8	B	1,901	16.3	B	3.3%	No
	Segment	Willow Ave	I-80 On-Ramps	1,068	9.2	A	1,128	9.7	A	5.6%	No
Alt D	Segment	I-80 EB Off-Ramp	Willow Ave	1,559	13.4	B	1,604	13.8	B	2.9%	No
	Segment	Willow Ave	Sycamore Ave	1,559	13.4	B	1,604	13.8	B	2.9%	No
	Segment	Sycamore Ave	Willow Ave	1,841	15.8	B	1,905	16.3	B	3.5%	No
	Segment	Willow Ave	I-80 On-Ramps	1,068	9.2	A	1,132	9.7	A	6.0%	No

Net total assignment to SR-4 Freeway of 10.9%

**Table 6**  
**State Route 4 Background LOS Analysis - AM Peak Hour**

	Facility Type	Segment Limits		No Project Conditions			With Project Conditions			Percent Increase in Volume	Impact
		From	To	Volume	Density	LOS	Volume	Density	LOS		
Alt A	Weaving	I-80 EB Off-Ramp	Willow Ave	2,673	18.9	B	2,695	19.1	B	0.8%	No
	Segment	Willow Ave	Sycamore Ave	1,888	16.2	B	1,910	16.4	B	1.2%	No
	Segment	Sycamore Ave	Willow Ave	1,780	15.3	B	1,822	15.6	B	2.4%	No
	Segment	Willow Ave	I-80 On-Ramps	1,296	11.1	B	1,338	11.5	B	3.2%	No
Alt B	Weaving	I-80 EB Off-Ramp	Willow Ave	2,673	18.9	C	2,709	19.2	B	1.3%	No
	Segment	Willow Ave	Sycamore Ave	1,888	16.2	B	1,924	16.5	B	1.9%	No
	Segment	Sycamore Ave	Willow Ave	1,780	15.3	B	1,825	15.6	B	2.5%	No
	Segment	Willow Ave	I-80 On-Ramps	1,296	11.1	B	1,341	11.5	B	3.5%	No
Alt C	Weaving	I-80 EB Off-Ramp	Willow Ave	2,673	18.9	C	2,687	19.0	B	0.5%	No
	Segment	Willow Ave	Sycamore Ave	1,888	16.2	B	1,902	16.3	B	0.7%	No
	Segment	Sycamore Ave	Willow Ave	1,780	15.3	B	1,808	15.5	B	1.6%	No
	Segment	Willow Ave	I-80 On-Ramps	1,296	11.1	B	1,324	11.4	B	2.2%	No
Alt D	Weaving	I-80 EB Off-Ramp	Willow Ave	2,673	18.9	C	2,721	19.2	B	1.8%	No
	Segment	Willow Ave	Sycamore Ave	1,888	16.2	B	1,936	16.6	B	2.5%	No
	Segment	Sycamore Ave	Willow Ave	1,780	15.3	B	1,806	15.5	B	1.5%	No
	Segment	Willow Ave	I-80 On-Ramps	1,296	11.1	B	1,322	11.3	B	2.0%	No

Net total assignment to SR-4 Freeway of 10.9%

**Table 7**  
**State Route 4 Background LOS Analysis - PM Peak Hour**

	Facility Type	Segment Limits		No Project Conditions			With Project Conditions			Percent Increase in Volume	Impact
		From	To	Volume	Density	LOS	Volume	Density	LOS		
Alt A	Weaving	I-80 EB Off-Ramp	Willow Ave	3,304	24.7	C	3,376	25.2	C	2.2%	No
	Segment	Willow Ave	Sycamore Ave	2,202	18.9	C	2,274	19.5	C	3.3%	No
	Segment	Sycamore Ave	Willow Ave	2,590	22.2	C	2,665	22.8	C	2.9%	No
	Segment	Willow Ave	I-80 On-Ramps	1,534	13.2	B	1,609	13.8	B	4.9%	No
Alt B	Weaving	I-80 EB Off-Ramp	Willow Ave	3,304	24.7	C	3,383	25.3	C	2.4%	No
	Segment	Willow Ave	Sycamore Ave	2,202	18.9	C	2,281	19.6	C	3.6%	No
	Segment	Sycamore Ave	Willow Ave	2,590	22.2	C	2,678	23.0	C	3.4%	No
	Segment	Willow Ave	I-80 On-Ramps	1,534	13.2	B	1,622	13.9	B	5.7%	No
Alt C	Weaving	I-80 EB Off-Ramp	Willow Ave	3,304	24.7	C	3,348	25.0	C	1.3%	No
	Segment	Willow Ave	Sycamore Ave	2,202	18.9	C	2,246	19.2	C	2.0%	No
	Segment	Sycamore Ave	Willow Ave	2,590	22.2	C	2,639	22.6	C	1.9%	No
	Segment	Willow Ave	I-80 On-Ramps	1,534	13.2	B	1,583	13.6	B	3.2%	No
Alt D	Weaving	I-80 EB Off-Ramp	Willow Ave	3,304	24.7	C	3,338	25.0	C	1.0%	No
	Segment	Willow Ave	Sycamore Ave	2,202	18.9	C	2,236	19.2	C	1.5%	No
	Segment	Sycamore Ave	Willow Ave	2,590	22.2	C	2,645	22.7	C	2.1%	No
	Segment	Willow Ave	I-80 On-Ramps	1,534	13.2	B	1,589	13.6	B	3.6%	No

Net total assignment to SR-4 Freeway of 10.9%

**Table 8**  
**State Route 4 Background LOS Analysis - SAT Peak Hour**

	Facility Type	Segment Limits		No Project Conditions			With Project Conditions			Percent Increase in Volume	Impact
		From	To	Volume	Density	LOS	Volume	Density	LOS		
Alt A	Weaving	I-80 EB Off-Ramp	Willow Ave	2,478	17.4	B	2,580	18.0	B	4.1%	No
	Segment	Willow Ave	Sycamore Ave	1,652	14.2	B	1,754	15.0	B	6.2%	No
	Segment	Sycamore Ave	Willow Ave	1,943	16.6	B	2,041	17.5	B	5.0%	No
	Segment	Willow Ave	I-80 On-Ramps	1,151	9.9	A	1,249	10.7	A	8.5%	No
Alt B	Weaving	I-80 EB Off-Ramp	Willow Ave	2,478	17.4	B	2,588	18.1	B	4.4%	No
	Segment	Willow Ave	Sycamore Ave	1,652	14.2	B	1,762	15.1	B	6.7%	No
	Segment	Sycamore Ave	Willow Ave	1,943	16.6	B	2,051	17.6	B	5.6%	No
	Segment	Willow Ave	I-80 On-Ramps	1,151	9.9	A	1,259	10.8	A	9.4%	No
Alt C	Weaving	I-80 EB Off-Ramp	Willow Ave	2,478	17.4	B	2,546	17.8	B	2.7%	No
	Segment	Willow Ave	Sycamore Ave	1,652	14.2	B	1,720	14.7	B	4.1%	No
	Segment	Sycamore Ave	Willow Ave	1,943	16.6	B	2,003	17.2	B	3.1%	No
	Segment	Willow Ave	I-80 On-Ramps	1,151	9.9	A	1,211	10.4	A	5.2%	No
Alt D	Weaving	I-80 EB Off-Ramp	Willow Ave	2,478	17.4	B	2,523	17.6	B	1.8%	No
	Segment	Willow Ave	Sycamore Ave	1,652	14.2	B	1,697	14.5	B	2.7%	No
	Segment	Sycamore Ave	Willow Ave	1,943	16.6	B	2,007	17.2	B	3.3%	No
	Segment	Willow Ave	I-80 On-Ramps	1,151	9.9	A	1,215	10.4	A	5.6%	No

Net total assignment to SR-4 Freeway of 10.9%

**Table 9**  
**State Route 4 Cumulative LOS Analysis - AM Peak Hour**

	Facility Type	Segment Limits		No Project Conditions			With Project Conditions			Percent Increase in Volume	Impact
		From	To	Volume	Density	LOS	Volume	Density	LOS		
Alt A	Weaving	I-80 EB Off-Ramp	Willow Ave	2,850	20.4	C	2,872	20.6	C	0.8%	No
	Segment	Willow Ave	Sycamore Ave	2,150	18.4	C	2,172	18.6	C	1.0%	No
	Segment	Sycamore Ave	Willow Ave	2,290	19.6	C	2,332	20.0	C	1.8%	No
	Segment	Willow Ave	I-80 On-Ramps	1,340	11.5	B	1,382	11.8	B	3.1%	No
Alt B	Weaving	I-80 EB Off-Ramp	Willow Ave	2,850	20.4	C	2,886	20.7	C	1.3%	No
	Segment	Willow Ave	Sycamore Ave	2,150	18.4	C	2,186	18.7	C	1.7%	No
	Segment	Sycamore Ave	Willow Ave	2,290	19.6	C	2,335	20.0	C	2.0%	No
	Segment	Willow Ave	I-80 On-Ramps	1,340	11.5	B	1,385	11.9	B	3.4%	No
Alt C	Weaving	I-80 EB Off-Ramp	Willow Ave	2,850	20.4	C	2,864	20.5	C	0.5%	No
	Segment	Willow Ave	Sycamore Ave	2,150	18.4	C	2,164	18.5	C	0.7%	No
	Segment	Sycamore Ave	Willow Ave	2,290	19.6	C	2,318	19.9	C	1.2%	No
	Segment	Willow Ave	I-80 On-Ramps	1,340	11.5	B	1,368	11.7	B	2.1%	No
Alt D	Weaving	I-80 EB Off-Ramp	Willow Ave	2,850	20.4	C	2,898	20.7	C	1.7%	No
	Segment	Willow Ave	Sycamore Ave	2,150	18.4	C	2,198	18.8	C	2.2%	No
	Segment	Sycamore Ave	Willow Ave	2,290	19.6	C	2,316	19.8	C	1.1%	No
	Segment	Willow Ave	I-80 On-Ramps	1,340	11.5	B	1,366	11.7	B	1.9%	No

Net total assignment to SR-4 Freeway of 10.9%

**Table 10**  
**State Route 4 Cumulative LOS Analysis - PM Peak Hour**

	Facility Type	Segment Limits		No Project Conditions			With Project Conditions			Percent Increase in Volume	Impact
		From	To	Volume	Density	LOS	Volume	Density	LOS		
Alt A	Weaving	I-80 EB Off-Ramp	Willow Ave	4,670	38.6	E	4,742	39.1	E	1.5%	No
	Segment	Willow Ave	Sycamore Ave	3,020	26.0	C	3,092	26.7	D	2.4%	No
	Segment	Sycamore Ave	Willow Ave	2,920	25.1	C	2,995	25.8	C	2.6%	No
	Segment	Willow Ave	I-80 On-Ramps	2,104	18.0	B	2,179	18.7	C	3.6%	No
Alt B	Weaving	I-80 EB Off-Ramp	Willow Ave	4,670	38.6	E	4,749	39.1	E	1.7%	No
	Segment	Willow Ave	Sycamore Ave	3,020	26.0	C	3,099	26.8	D	2.6%	No
	Segment	Sycamore Ave	Willow Ave	2,920	25.1	C	3,008	25.9	C	3.0%	No
	Segment	Willow Ave	I-80 On-Ramps	2,104	18.0	B	2,192	18.8	C	4.2%	No
Alt C	Weaving	I-80 EB Off-Ramp	Willow Ave	4,670	38.6	E	4,714	38.9	E	0.9%	No
	Segment	Willow Ave	Sycamore Ave	3,020	26.0	C	3,064	26.5	D	1.5%	No
	Segment	Sycamore Ave	Willow Ave	2,920	25.1	C	2,969	25.6	C	1.7%	No
	Segment	Willow Ave	I-80 On-Ramps	2,104	18.0	B	2,153	18.4	C	2.3%	No
Alt D	Weaving	I-80 EB Off-Ramp	Willow Ave	4,670	38.6	E	4,704	38.8	E	0.7%	No
	Segment	Willow Ave	Sycamore Ave	3,020	26.0	C	3,054	26.4	D	1.1%	No
	Segment	Sycamore Ave	Willow Ave	2,920	25.1	C	2,975	25.6	C	1.9%	No
	Segment	Willow Ave	I-80 On-Ramps	2,104	18.0	B	2,159	18.5	C	2.6%	No

Net total assignment to SR-4 Freeway of 10.9%

**Table 11**  
**State Route 4 Cumulative LOS Analysis - SAT Peak Hour**

	Facility Type	Segment Limits		No Project Conditions			With Project Conditions			Percent Increase in Volume	Impact
		From	To	Volume	Density	LOS	Volume	Density	LOS		
Alt A	Weaving	I-80 EB Off-Ramp	Willow Ave	3,503	26.7	C	3,605	27.4	C	2.9%	No
	Segment	Willow Ave	Sycamore Ave	2,265	19.4	C	2,367	20.3	C	4.5%	No
	Segment	Sycamore Ave	Willow Ave	2,190	18.8	C	2,288	19.6	C	4.5%	No
	Segment	Willow Ave	I-80 On-Ramps	1,578	13.5	B	1,676	14.4	B	6.2%	No
Alt B	Weaving	I-80 EB Off-Ramp	Willow Ave	3,503	26.7	D	3,613	27.5	C	3.1%	No
	Segment	Willow Ave	Sycamore Ave	2,265	19.4	C	2,375	20.4	C	4.9%	No
	Segment	Sycamore Ave	Willow Ave	2,190	18.8	C	2,298	19.7	C	4.9%	No
	Segment	Willow Ave	I-80 On-Ramps	1,578	13.5	B	1,686	14.4	B	6.8%	No
Alt C	Weaving	I-80 EB Off-Ramp	Willow Ave	3,503	26.7	D	3,571	27.2	C	1.9%	No
	Segment	Willow Ave	Sycamore Ave	2,265	19.4	C	2,333	20.0	C	3.0%	No
	Segment	Sycamore Ave	Willow Ave	2,190	18.8	C	2,250	19.3	C	2.7%	No
	Segment	Willow Ave	I-80 On-Ramps	1,578	13.5	B	1,638	14.0	B	3.8%	No
Alt D	Weaving	I-80 EB Off-Ramp	Willow Ave	3,503	26.7	D	3,548	27.0	C	1.3%	No
	Segment	Willow Ave	Sycamore Ave	2,265	19.4	C	2,310	19.8	C	2.0%	No
	Segment	Sycamore Ave	Willow Ave	2,190	18.8	C	2,254	19.3	C	2.9%	No
	Segment	Willow Ave	I-80 On-Ramps	1,578	13.5	B	1,642	14.1	B	4.1%	No

Net total assignment to SR-4 Freeway of 10.9%