

# STATE OF CALIFORNIA

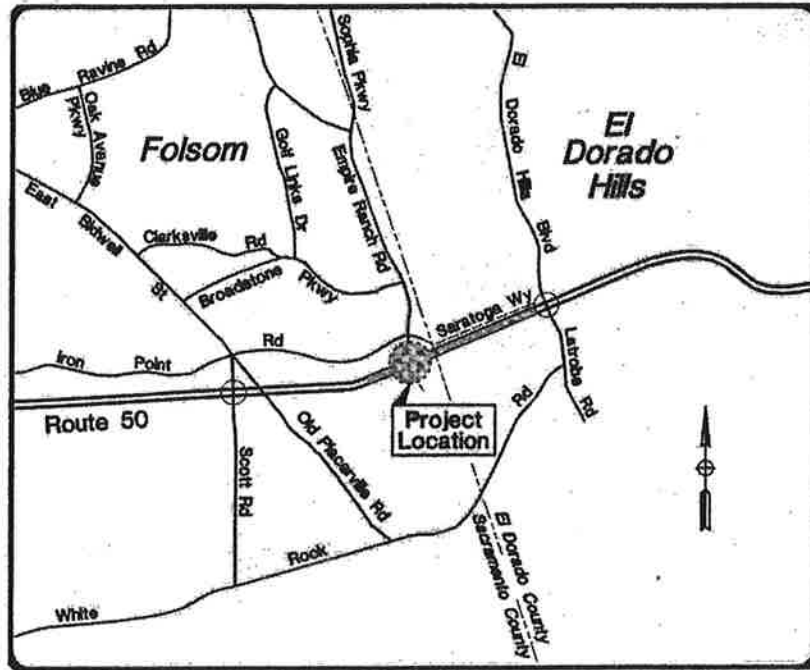
Business, Transportation and Housing Agency  
Department of Transportation, District 3

Date: January 2006  
03-Sac-50 KP 36.1/37.2  
03-ED-50 KP 0.0/1.4  
03198-1C9500

To: Jody Jones  
District Director, District 3

## DRAFT PROJECT REPORT

On Route 50 at Empire Ranch Road between the East Bidwell Street/Scott Road Interchange and the El Dorado Hills Blvd/Latrobe Road Interchange



*I have reviewed the right of way information contained in this Draft Project Report and the R/W Data Sheet attached hereto, and find the data to be complete, current, and accurate:*

LINDY K. LEE, Chief, North Region  
Right of Way

Date

### APPROVAL RECOMMENDED:

CLARK A. PERI, Project Manager  
Special Funded Projects

Date

### APPROVED:

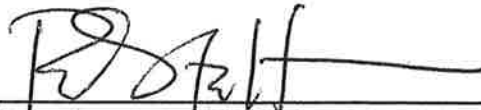
JODY JONES  
District Director

Date



Date: January 2006  
03-Sac-50 KP 36.1/37.2  
03-ED-50 KP 0.0/1.4  
Empire Ranch Road/  
Route 50 Interchange  
03198-1C9500

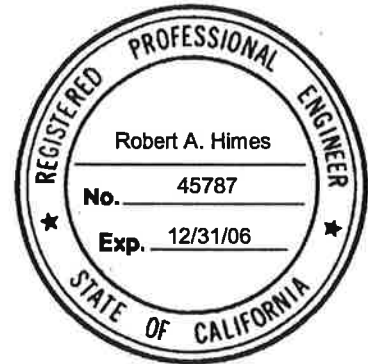
This Draft Project Report has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.



1-31-06

Robert A. Himes  
Registered Professional Engineer  
Mark Thomas & Company, Inc.

Date



# TABLE OF CONTENTS

1. INTRODUCTION
2. RECOMMENDATIONS
3. BACKGROUND
  - Project History
  - Community Interaction
  - Existing Facility
4. NEED and PURPOSE
  - A. Problem, Deficiencies, Justification
  - B. Regional & System Planning
  - C. Traffic
5. ALTERNATIVES
  - A. Viable Alternatives
  - B. Analysis of Proposal
  - C. Alternatives Considered but Rejected
6. CONSIDERATIONS REQUIRING DISCUSSION
  - A. Hazardous Waste
  - B. Value Analysis
  - C. Resource Conservation
  - D. Right of Way Issues
  - E. Environmental Issues
  - F. Air Quality Conformity
7. OTHER CONSIDERATIONS AS APPROPRIATE
  - Public Hearing Process
  - Route Matters
  - Permits
  - Cooperative Agreements
  - Other Agreements
  - Transportation Management Plan for Use During Construction
  - Stage Construction
  - Accommodation of Oversize Loads
8. PROGRAMMING
9. PROJECT REVIEWS
10. PROJECT PERSONNEL

**11. LIST OF ATTACHMENTS**

- A. Location Map**
- B. Project Geometrics**
- C. Alternatives Considered but Rejected**
- D. Advanced Planning Study**
- E. Project Cost Estimate**
- F. Traffic Operations Report**
- G. Right of Way Data Sheet / Utility Information Sheet**
- H. Draft Environmental Impact Report (under separate cover)**

## Draft Project Report

### 1. Introduction

This project will construct a new interchange on Route 50 in Folsom near the Sacramento/El Dorado County line. The interchange will connect Empire Ranch Road, which is a City of Folsom arterial roadway, linking new development in Folsom to Route 50. The project will also provide a connection to Route 50 from Green Valley Road, a major arterial facility in El Dorado County, via Empire Ranch Road/Sophia Parkway. The construction of the interchange will not provide a connection to the undeveloped lands south of Route 50; access control will be maintained along the south side of the interchange and Empire Ranch Road will be terminated in a cul-de-sac. The viable interchange alternative as presented herein is a Type L-2/Type L-7 configuration, which has been designed to allow for the expansion of the interchange to a Type L-9 partial cloverleaf interchange if future traffic volumes exceed the capacity of the initially constructed interchange. Construction of the new interchange connection to Route 50 would require mainline improvements, including auxiliary lanes in both directions between the Empire Ranch Road interchange and the El Dorado Hills Blvd/Latrobe Road interchange, which are included in this project.

Related projects that will need to be coordinated with the construction of the interchange and auxiliary lane include the extension of the HOV lanes on Route 50 from the El Dorado Hills Blvd/Latrobe Road interchange to the Bass Lake Grade truck climbing lane. To accommodate the extension of the HOV lanes, the undercrossing structures over El Dorado Hills Blvd (Latrobe Road UC, Bridge No. 25-0071L/R) will need to be replaced. This structure replacement is already planned as part of the Phase 3 improvements to the El Dorado Hills Blvd/Latrobe Road interchange. The Clarksville Road Undercrossing (Bridge No. 25-0072L/R) on Route 50 would also need to be widened to accommodate the extension of the HOV lanes. A new interchange is proposed on Route 50 at Silva Valley Parkway, 1.3 km (0.8 miles) east of El Dorado Hills Blvd. The previously approved environmental document and project report are being updated for this interchange. Silva Valley Parkway is proposed to cross over Route 50, which may allow for the removal of the existing undercrossing structures at Clarksville Road, rather than widening the structures with the extension of the HOV lanes.

The total estimated capital cost for the interchange varies from \$26.3 to \$28.8 million. The proposed improvements to Route 50 are estimated to cost between \$6.2 million and \$8.5 million. These estimates exclude project development costs. This project will be funded using a combination of local and state (STIP) funds. This is a Category 3 project; the project will require a revised freeway agreement for a new connection to Route 50.

### 2. Recommendations

It is recommended that the Draft Environmental Document be approved for public circulation. As CEQA Lead Agency, the City of Folsom plans to coordinate circulation, plus hold a public hearing on this project with assistance and input from Caltrans.

### 3. Background

- Existing Facility

The existing facility is a divided freeway, constructed in 1965, and widened in 2000/02. The facility is six through lanes (four mixed flow, and two HOV lanes) from Folsom Boulevard to El Dorado Hills Boulevard. The HOV lanes on Route 50 were constructed in 2002, beginning at Sunrise Boulevard and ending near El Dorado Hills Boulevard. From this point, Route 50 is made up of two eastbound and two westbound lanes to the Bass Lake grade, approximately 1.2 km east of El Dorado Hills Blvd. Within the project area, there are two existing and two planned interchanges. These consist of (1) a Type L-9 partial cloverleaf interchange at Scott Road/East Bidwell Street, (2) this proposed interchange at Empire Ranch Road, (3) modified L-1/L-8 interchange at El Dorado Hills Boulevard, and (4) a future interchange at Silva Valley Parkway, approximately 1.3 km east of El Dorado Hills Blvd.

Route 50 lane widths west of El Dorado Hills Blvd are 3.6 m, with inside and outside shoulder widths of 3.0 m. The median width is 13.8 m west of El Dorado Hills Blvd. There is an eastbound truck-climbing lane east of the Scott Road Interchange for slow trucks on the 7% mainline grade. This truck lane terminates at the approximate location of the proposed Empire Ranch Road interchange. East of El Dorado Hills Blvd, lane widths are 3.6 m, with an inside shoulder width of 1.5 m and an outside shoulder width of 2.4 m. The median width from east of El Dorado Hills Blvd to the Bass Lake grade is 21.3 m.

An additional eastbound truck climbing lane was constructed by widening within the median of Route 50 in 2001 beginning just east of the Clarksville Rd undercrossing, approximately 1.2 km east of El Dorado Hills Blvd, extending east to the Bass Lake Road interchange.

- Project History

The City of Folsom and western El Dorado County have been experiencing rapid growth. Between 1993 and 2000, traffic volumes on Route 50 within the project limits have increased by an average of 5.4% per year. This increased traffic growth has resulted in peak hour congestion on Route 50 and several local arterials in the area.

In the early 1990's several land use proposals were developed for the Folsom "East Area". Projects in the "East Area" included Empire Ranch (then know as Russell Ranch), Broadstone Master Plan, The Parkway, and The Promontory (in El Dorado County). As part of the preliminary planning process for these proposals, the City of Folsom prepared the Route 50 Corridor Plan (1993 by Fehr & Peers Associates), which identified the need for improvements to Folsom Boulevard, Prairie City Road, and Scott/East Bidwell Interchanges, plus the construction of two new interchanges at Oak Avenue and Empire Ranch Road (then known as Russell Ranch Road). Also as part of the study, there were recommendations for major City arterial facilities parallel to Route 50. Of these projects, the interchange improvements at Folsom Boulevard,

Prairie City Road, and Scott/East Bidwell Street have been completed; additionally, Iron Point Road, ultimately a six lane arterial, has been constructed from Folsom Boulevard to Empire Ranch Road, with four lanes minimum, providing parallel capacity to Route 50 for local trips.

Empire Ranch (formerly known as Russell Ranch) is a 1738 acre community, primarily residential use, located immediately west of the El Dorado county line, and north of Route 50; this development was part of the overall East Area planning effort for the City of Folsom referenced above. The Empire Ranch Specific plan was approved in 2000. The East Area Facilities Plan, which identifies infrastructure necessary for buildout of the various developments noted above, included this Empire Ranch Road interchange at Route 50. A Project Study Report (Project Development Support) was prepared for the Empire Ranch Road interchange, and approved by Caltrans on April 2, 2002.

- Other Related Projects

As noted above, the 1993 Route 50 Corridor Plan identified the need for improving existing interchanges in Folsom, in addition to new interchange access to Route 50. The City of Folsom and Caltrans have worked cooperatively in major interchange modifications projects to Folsom Boulevard interchange (completed in 2000), Prairie City Road interchange (completed in 1999), and Scott Road/East Bidwell Street (completed in 2001).

Recognizing the planned development in Folsom and western El Dorado County, and associated transportation demands, the Sacramento Area Council of Governments (SACOG), working cooperatively with the City of Folsom and El Dorado County Transportation Commission (EDTC), completed a Route 50 Major Investment Study (MIS) in 1997. The study recommended construction of HOV lanes on Route 50, improved transit including light rail extension to Folsom, and improvements to parallel facilities.

*Route 50 HOV Lanes:* Following the Route 50 MIS effort, the EDTC prepared a Project Study Report and Subsequent Project Report/Environmental Document for construction of HOV lanes on Route 50 from Sunrise Blvd in Sacramento County to El Dorado Hills Boulevard; these planning documents included an assumed connection to Route 50 at Empire Ranch Road. These improvements were constructed and open for traffic in 2002, as noted above in "existing facilities".

*Light Rail Extension:* Sacramento Regional Transit, in cooperation with the City of Folsom, is currently constructing the light rail extension from the easterly system terminus near Sunrise Boulevard to Folsom Boulevard and ultimately "old Folsom". The track construction is complete, with construction of stations, park-N-ride, and electrical systems underway; light rail service is scheduled to begin in 2006.

*Route 50 HOV Lane extension:* Also as a follow-up to the Route 50 MIS effort, Caltrans has begun planning for extension of Route 50 HOV lanes east of El Dorado Hills Boulevard. The lanes would be accommodated within the median; the project planning is considering extending

the lanes from El Dorado Hills Boulevard to South Shingle Road/Ponderosa Road, although the lanes could be built in segments, from west to east. Construction is funding dependent (combination of state and local funds), anticipated no earlier than 2006. A Project Report and Environmental Document has been completed for this project.

*El Dorado Hills Blvd Interchange Improvements:* El Dorado County has been working with Caltrans for improvements at this interchange, a Draft Project Report was approved in 2002, a Notice of Determination (NOD) was posted on May 24, 2000 and a Finding of No Significant Impact (FONSI) was approved on August 23, 2000. The baseline configuration for this interchange is a Type L-1 compact diamond for westbound movements (north side), and a Type L-8 partial cloverleaf for eastbound movements (south side). A series of phased improvements is proposed to accommodate increased traffic generated by existing and planned development. The phased improvements are briefly described as follows:

- Phase "0": Construct eastbound diagonal off-ramp (completed in 2001)
- Phase "1": Realign Saratoga Way, including construction of sound walls. Replace westbound diagonal ramps with loop off-ramp and relocated diagonal on-ramp, aligned opposite the Raley's Commercial Center. Relocate/widen eastbound diagonal on-ramp. Include ramp metering on the improved on-ramps. Construction anticipated in 2004/2005.
- Phase "2": Widen El Dorado Hills Blvd within interchange (requires replacement of the Latrobe Road Undercrossings) and provide additional turn lane capacity. Replace eastbound loop off-ramp. Construction anticipated after 2010.

*Silva Valley Parkway Interchange:* This is a proposed new interchange on Route 50 between El Dorado Hills Boulevard and Bass Lake Road interchange, which is intended to accommodate traffic generated from approved development in El Dorado Hills. The project would include a partial cloverleaf interchange approximately 1.5 km east of El Dorado Hills Boulevard, plus auxiliary lanes between the two interchanges. A Project Report for this interchange was approved in 1991. Construction of this interchange is not anticipated to occur earlier than 2007.

- Community Interaction

A public workshop/scoping meeting was held at City of Folsom City Hall on September 3, 2003. The meeting was a map display/drop-in format. A total of fourteen members of the public attended. These individuals represented property owners/residents in the northwest quadrant of El Dorado Hill Blvd, and property owners south of Route 50. There were no objections raised to the project or related improvements, although comments were made regarding need to study air quality impacts, plus accident data (particularly for eastbound Route 50).



## 4. Need and Purpose

### A. Problems, Deficiencies, and Justification

A new interchange is needed at this location to accommodate approved growth, per the City of Folsom's General Plan as adopted in 1993, within the east City Limits area of Folsom. Without the proposed interchange, the current circulation system for commuting traffic will go through residential neighborhood streets.

Included with the construction of the proposed interchange are operational improvements to Route 50. These include the extension of the eastbound truck climbing lane from its current terminus approximately 415 meters (1360 feet) to the east, where it merges into an auxiliary lane added with the eastbound loop on-ramp. The auxiliary lane continues approximately 965 meters (3165 feet) to the off-ramp to southbound Latrobe Road. The project will also include the construction of an 1135 meter (3725 foot) long westbound auxiliary lane from the on-ramp from El Dorado Hills Blvd to the Empire Ranch Road off-ramp. The extension of the truck climbing lane, and the construction of the auxiliary lanes, are needed to accommodate merge/diverge movements on Route 50.

Although not constructed with the Empire Ranch Road interchange, the HOV lanes on Route 50 will be extended from their current terminus from just west of El Dorado Hills Blvd to the base of the Bass Lake grade, approximately 1.5 km (0.9 miles) east of El Dorado Hills Blvd. This extension needs to occur prior to the construction of the Empire Ranch Road interchange. In order to extend the HOV lanes, the existing Latrobe Road undercrossings on Route 50 will need to be replaced; this replacement is planned with the reconstruction of the El Dorado Hills Blvd/Latrobe Road interchange.

### B. Regional and System Planning

Route 50 is listed as a high priority route in the 1992 District 3 System Management Plan. The Route 50 Transportation Concept Report (approved April 1998) reflects the proposed Empire Ranch interchange, and shows the mainline concept facility as follows:

- Hazel Avenue to Sacramento/El Dorado County Line: Concept of six lanes, including HOV lanes, with ultimate of 8 lanes including HOV lanes. The Concept Level of Service is "E", although the Transportation Concept Report acknowledges that route concept as described may not provide the desired level of service.
- Sacramento County Line to east of the project limits: six lane freeway with consideration of HOV to Silva Valley IC. Ultimate facility is 8 lanes with HOV to west of Placerville, to be implemented concurrent with demand. The Concept Level of Service is "E" within this project area, although the Transportation Concept Report acknowledges that route concept as described may not provide the desired level of service.

The Empire Ranch Road interchange project is included in the most recent 2025 Sacramento

Metropolitan Transportation Plan (MTP), and the 2003/05 Metropolitan Transportation Improvement Program (MTIP). These plans were approved by the Sacramento Area Council of Governments (SACOG) board on July 18, 2002.

As noted above, construction of the Empire Ranch Road Interchange is consistent with the 1993 City of Folsom General Plan, as well as the US 50 Corridor Major Investment Study (adopted in 1997), and the Empire Ranch Specific Plan (adopted in 2000).

### C. Traffic

This interchange project is intended to improve accessibility to planned development in eastern Folsom and western El Dorado Hills and to reduce congestion at other nearby Route 50 interchanges. Therefore, this project is expected to provide circulation benefits both regionally and locally. One quantitative measure of the area-wide benefits of a new interchange is the change in total travel distance and travel time. The table below summarizes the percent change in Year 2026 vehicle miles of travel (VMT) and vehicle hours of travel (VHT) at a local-area, sub-regional, and regional level. The boundaries for these areas are described below:

- *Local-Area* – includes the area bounded by Riley Street (in Folsom) and Serrano Parkway (in El Dorado Hills) to the north, Route 50 to the south, Silva Valley Road to the east, and Oak Avenue Parkway to the west.
- *Sub-Regional* – includes the area bounded by Natoma Street and Green Valley Road to the north, White Rock Road to the south, Silva Valley Road to the east, and Folsom Boulevard to the west.
- *Regional* – includes portions of El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba counties (essentially the entire area covered in the 2002 version of the 2025 SACMET travel demand forecasting model).

TABLE 1 PERCENT CHANGE IN VMT AND VHT – DESIGN YEAR (2026) CONDITIONS NO BUILD AND BUILD ALTERNATIVES			
Performance Measure	No Build	Build Alternative	Percent Difference
<b>Local-Area</b>			
VMT	1,048,600	1,057,100	0.81%
VHT	28,860	28,770	-0.30%
<b>Sub-Regional</b>			
VMT	2,457,200	2,466,500	0.38%
VHT	72,700	72,710	0%
<b>Regional</b>			
VMT	65,666,100	65,715,300	0.07%
VHT	1,842,650	1,841,980	-0.04%
Notes: VMT – Vehicle Miles of Travel VHT – Vehicle Hours of Travel Source: <i>Fehr &amp; Peers, 2004.</i>			

As shown, the proposed project will slightly increase the total VMT at the local-area level, while the total VHT reduces. This indicates that the project may result in travel routes with a slightly longer distance; however, the project will provide time savings as these routes will have quicker travel times.

The proposed project will result in a smaller reduction in total VHT on a regional scale compared to the local-area scale. The slight change in regional VMT indicates that the proposed project is only a small part of the regional network (i.e., the six-county area). However, the reduction in VHT is measurable even on a regional scale, suggesting that this relatively minor connection (compared to total regional lane miles) is being located in a significantly congested location, and that this connection is providing regional benefits.

### ***Existing Traffic***

The traffic analysis was conducted based on traffic flow, geometric roadway, and accident data. The following data was collected to complete the existing conditions analysis.

- The existing a.m. (7:00-9:00) and p.m. (4:00-6:00) peak period traffic volumes and lane configurations were collected on Route 50 between East Bidwell Street and El Dorado Hills Blvd by Fehr & Peers in June 2003.
- The a.m. and p.m. peak hour traffic volumes at the East Bidwell Street on- and off-ramps were collected by Fehr & Peers in June 2002.
- The a.m. and p.m. peak hour traffic volumes at the El Dorado Hills Blvd on- and off-ramps were collected by Prism Engineering in 2003.
- The most recent three year accident data available (July 2000 – June 2003) was provided for Route 50 between East Bidwell Street and El Dorado Hills Blvd by Caltrans.

TABLE 2 FREEWAY MAINLINE LOS - EXISTING CONDITIONS				
Freeway Mainline Segment	AM Peak		PM Peak	
	V/C <sup>1</sup>	LOS <sup>2</sup>	V/C <sup>1</sup>	LOS <sup>2</sup>
Route 50 Eastbound: E. East Bidwell Street to El Dorado Hills Blvd.	0.51	C	<b><u>F</u></b> <sup>3</sup>	
Route 50 Eastbound: El Dorado Hills Blvd. to Bass Lake Road	0.38	B	<b><u>&gt;1.00</u></b>	<b><u>F</u></b>
Route 50 Westbound: Bass Lake Road. To El Dorado Hills Blvd.	<b><u>F</u></b> <sup>3</sup>		0.46	B
Route 50 Westbound: El Dorado Hills Blvd to E. East Bidwell Street	<b><u>F</u></b> <sup>3</sup>		0.47	B
Notes: <sup>1</sup> V/C is the volume to capacity ratio. <sup>2</sup> LOS based on the El Dorado County General Plan. <sup>3</sup> LOS F was identified at these locations based on the 2002 Congestion Report (Caltrans District 3, December 2002). <b><u>Bold and underlined</u></b> font indicates unacceptable operations. Source: <i>Fehr &amp; Peers</i> , 2003.				

As shown in Table 2, the Route 50 mainline segments between East Bidwell Street/Scott Road and Bass Lake Road operate unacceptably at LOS F in the peak directions (i.e. the westbound direction during the a.m. peak hour and the eastbound direction during the p.m. peak hour).

***Forecasted Traffic Volumes (Year 2006 & Year 2026)***

The traffic volume forecasts were generated using a modified version of the 2002 Metropolitan Transportation Plan (MTP) version of the 2025 SACMET model that is maintained by the Sacramento Area Council of Governments (SACOG). This is the latest approved version of the model. The modifications to the model included land use updates to reflect approved projects and roadway network refinements to be consistent with Tier 1 roadway improvements contained in the 2025 MTP. A summary of key modifications is provided below.

- Split Traffic Analysis Zones (TAZs) - SACMET TAZs in the vicinity of the proposed project were refined to provide more land use detail in the study area.
- Adjust Base Year Land Uses - The SACMET Base Year land uses were modified based on a review of detailed aerial photography and field visits.
- Modify Roadway Networks - The SACMET roadway network was modified to include the proposed project, to match the existing and planned roadway systems and to maintain consistency with the Tier 1 roadway improvements contained in the MTP.

After making these modifications, Year 2025 a.m. and p.m. peak hour traffic volume forecasts were generated and adjusted to account for model error. A technical memorandum (see Appendix A) presenting the preliminary travel demand forecasts based on the roadway network and land use modifications for Year 2025 was submitted to the PDT for review. PDT comments are reflected in the final forecasts contained in this report and used in the traffic operations analysis.

Because the design year for this project is 2026, the 2025 forecasts were factored up to account for an extra year of growth. Ramp volumes were increased by four percent and the mainline Route 50 volumes were increased by two percent. These growth factors are based on the overall projected growth rates between 2002 and 2025 for the study area. A final adjustment to the 2026 forecasts was made by Caltrans after reviewing the projected traffic loadings between the El Dorado Hills Blvd, Empire Ranch Road, and East Bidwell Street interchanges. Some peak hour traffic was shifted from the adjacent interchanges to the Empire Ranch Road interchange to reflect more balanced traffic loading among the interchanges; presumably this adjustment was made as an assumption that this proposed new interchange would offer an attractive alternative point of connection when compared to adjacent heavily-used interchanges (i.e. El Dorado Hills and E. East Bidwell Street).

Construction year (2006) peak hour forecasts were developed by applying a linear growth rate between existing and 2025 conditions. An average annual growth rate of two percent was used for all locations except for the Route 50 westbound on-ramp at El Dorado Hills Blvd during the a.m. peak hour. For this location, it was assumed that the existing bottleneck on Route 50 at the on-ramp discourages some travelers from using the on-ramp during the a.m. peak hour. The planned elimination of the bottleneck as part of the El Dorado Hills Blvd interchange reconstruction (Phase 1 improvements are assumed to be completed by 2006) is likely to cause an increase in peak hour trips in addition to new trips from population and employment growth. These induced trips would occur from travelers adjusting their departure times, diverting from an alternative route, or shifting from another mode. Therefore, 30 percent of the traffic growth anticipated between existing and 2025 conditions was assumed to occur by 2006 although only 15 percent of the time has passed. For the planned facilities such as Empire Ranch Road and Iron Point Road, where the interpolation methodology was not applicable, the 2006 traffic forecasts were developed by factoring the 2026 forecasts after reviewing existing traffic counts and 2005 traffic forecasts developed using the regional SACMET model.

The construction year peak hour traffic forecasts were developed assuming that Iron Point Road would extend to the county line but would not connect to Saratoga Way by 2006. However, the construction year analysis includes traffic conditions both with and without a connection between Iron Point Road and Saratoga Way to compare the distribution of traffic between these two scenarios.

### ***Traffic Operations***

A traffic operations analysis was completed for the freeway mainline and freeway ramp junctions. Analysis methodologies and key assumptions are listed below.

#### ***Analysis Methodology***

- All operations analyses were conducted using procedures and methodologies contained in the *Highway Capacity Manual 2000* (HCM 2000), Transportation Research Board, 2000.
- Freeway mainline segments and ramp junctions were analyzed using the thresholds contained in the El Dorado County General Plan. These LOS thresholds are based on the methodologies contained in the HCM 2000.
- Freeway ramp junctions were analyzed using the Highway Capacity Software (HCS), which applies the HCM 2000 procedures.

The construction year analysis presents the physical and operational characteristics of the roadway system under 2006 conditions. The design year analysis presents the physical and operational characteristics of the roadway system under 2026 conditions.

The construction year (2006) traffic operations analysis was conducted for the initial transportation network. The design year (2026) traffic operations analysis was conducted for the no project and proposed ultimate project improvements. Figures displaying the peak hour traffic volumes, lane configurations, and traffic controls for both the interim and ultimate design years can be seen in Attachment F.

#### ***Freeway Operations (Construction Year Analysis – 2006)***

Traffic operations for the freeway mainline segments and ramp junctions are shown in Table 3.

**TABLE 3  
 FREEWAY MAINLINE AND RAMP JUNCTION LOS – CONSTRUCTION YEAR (2006)  
 PROPOSED PROJECT CONDITIONS**

Freeway Sections	AM Peak		PM Peak	
	V/C <sup>1</sup>	LOS <sup>2</sup>	V/C <sup>1</sup>	LOS <sup>2</sup>
<b><i>Freeway Mainline</i></b>				
Eastbound Route 50: East Bidwell Street to Empire Ranch Road.	0.36	B	0.64	D
Eastbound Route 50: Empire Ranch Road to El Dorado Hills Blvd.	0.52	C	0.86	D
Eastbound Route 50: El Dorado Hills Blvd to Bass Lake Road.	0.39	B	0.87	D
Westbound Route 50: Bass Lake Road to El Dorado Hills Blvd.	<b>1.05</b>	<b>F</b>	0.51	C
Westbound Route 50: El Dorado Hills Blvd to Empire Ranch Road.	<b>0.88</b>	<b>D</b>	0.47	B
Westbound Route 50: Empire Ranch Road to East Bidwell Street	<b>0.99</b>	<b>E/F</b>	0.52	C
<b><i>Freeway Ramp Junctions - all interchange alternatives</i></b>				
	Density <sup>3</sup>	LOS <sup>2</sup>	Density <sup>3</sup>	LOS <sup>2</sup>
Route 50 Eastbound off-ramp to Empire Ranch Road	19	B	30	D
Route 50 Eastbound on-ramp from Empire Ranch Road	13	B	23	C
Route 50 Westbound off-ramp to Empire Ranch Road	<b>&gt;43</b>	<b>F</b>	16	B
Route 50 Westbound on-ramp from Empire Ranch Road	<b>37</b>	<b>E</b>	21	C
Notes:				
<sup>1</sup> V/C is the volume to capacity ratio.				
<sup>2</sup> LOS calculations for mainline operations based on the El Dorado County General Plan. LOS calculations for ramp junctions based on the HCM 2000 procedures.				
<sup>3</sup> Density in passenger cars per mile per lane.				
<b>Bold and underlined</b> font indicates unacceptable operations.				
<b>Shading</b> denotes that the expected LOS would be worse than the calculated LOS shown in the table due to downstream LOS F conditions propagating upstream.				
Source: <i>Fehr &amp; Peers</i> , 2003.				

The improvements on the Route 50 mainline (i.e., auxiliary lanes in each direction between Empire Ranch Road and El Dorado Hills Blvd and the extension of an eastbound lane on Route 50 to the Bass Lake Truck Climbing Lane) result in improved traffic operations over the existing conditions for most freeway facilities during the a.m. and p.m. peak hours. However, the following facilities would continue to operate unacceptably.

- Westbound Route 50 east of El Dorado Hills Blvd would operate at LOS F during the a.m. peak hour.
- Westbound Route 50 west of Empire Ranch Road would operate at LOS E/F during the a.m. peak hour.
- The westbound on- and off-ramp junctions with Route 50 will operate at LOS E and F, respectively, during the a.m. peak hour for the proposed interchange at Empire Ranch Road.

***Freeway Operations (Design Year Analysis – 2026)***

Traffic operations for the freeway mainline segments and ramp junctions are shown in Table 6. As shown, Route 50 would operate at LOS E or F in the peak directions (i.e. westbound during the a.m.

peak hour and eastbound during the p.m. peak hour) within the study area.

<b>TABLE 4                      FREEWAY MAINLINE AND RAMP JUNCTION LOS – CONSTRUCTION YEAR (2026)                      PROPOSED PROJECT CONDITIONS</b>				
Freeway Sections	AM Peak		PM Peak	
	V/C <sup>1</sup>	LOS <sup>2</sup>	V/C <sup>1</sup>	LOS <sup>2</sup>
<b><i>Freeway Mainline</i></b>				
Eastbound Route 50: East Bidwell Street to Empire Ranch Road.	0.52	B	0.79	D
Eastbound Route 50: Empire Ranch Road to El Dorado Hills Blvd.	0.67	C	<b><u>0.91</u></b>	<b><u>E</u></b>
Eastbound Route 50: El Dorado Hills Blvd to Bass Lake Road.	0.48	B	<b><u>0.90</u></b>	<b><u>E</u></b>
Westbound Route 50: Bass Lake Road to El Dorado Hills Blvd.	<del>0.85</del>	<del>D</del>	0.58	C
Westbound Route 50: El Dorado Hills Blvd to Empire Ranch Road.	<del>0.85</del>	<del>D</del>	0.67	C
Westbound Route 50: Empire Ranch Road to East Bidwell Street	<b><u>1.13</u></b>	<b><u>F</u></b>	0.86	D
<b><i>Freeway Ramp Junctions - all interchange alternatives</i></b>				
	Density <sup>3</sup>	LOS <sup>2</sup>	Density <sup>3</sup>	LOS <sup>2</sup>
Route 50 Eastbound off-ramp to Empire Ranch Road	25	C	<b><u>36</u></b>	<b><u>E</u></b>
Route 50 Eastbound on-ramp from Empire Ranch Road	17	B	24	C
Route 50 Westbound off-ramp to Empire Ranch Road	<b><u>&gt;43</u></b>	<b><u>F</u></b>	<b><u>38</u></b>	<b><u>E</u></b>
Route 50 Westbound on-ramp from Empire Ranch Road	<b><u>&gt;43</u></b>	<b><u>F</u></b>	33	D
Notes:				
<sup>1</sup> V/C is the volume to capacity ratio.				
<sup>2</sup> LOS calculations for mainline operations based on the El Dorado County General Plan. LOS calculations for ramp junctions based on the HCM 2000 procedures.				
<sup>3</sup> Density in passenger cars per mile per lane.				
<b>Bold and underlined</b> font indicates unacceptable operations.				
<b>Shading</b> denotes that the expected LOS would be worse than the calculated LOS shown in the table due to downstream LOS F conditions propagating upstream.				
Source: <i>Fehr &amp; Peers, 2003.</i>				

The programmed improvements on the Route 50 mainline (as contained in the SACOG 2025 MTP) result in improved traffic operations over the existing conditions for most freeway facilities during the a.m. and p.m. peak hours. The following comments regarding specific segments are noted:

- In general, the combination of an additional interchange to distribute ramp volumes among interchanges, plus the auxiliary lanes between Empire Ranch Road and El Dorado Hills Boulevard, improves operations on Route 50 between El Dorado Hills and Empire Ranch Road.
- Because the new interchange will attract some traffic that otherwise would use E. East Bidwell Street, the volumes between Empire Ranch Road and E. East Bidwell Street are increased, and traffic operations are not improved between these two interchanges.
- Eastbound Route 50 east of Empire Ranch Road would operate at LOS E during the p.m. peak hour.



- Westbound Route 50 west of Empire Ranch Road would operate at LOS F during the a.m. peak hour.
- The eastbound off-ramp would operate at LOS E during the p.m. peak hour.
- The westbound off-ramp would operate unacceptably at LOS F during the a.m. peak hour due to the capacity constraint on the westbound Route 50 mainline segment between El Dorado Hills Blvd and Empire Ranch Road.
- The westbound on- and off-ramp junctions with Route 50 will operate at LOS F during the a.m. peak hour for the proposed interchange at Empire Ranch Road.
- The westbound and eastbound off-ramps junctions with Route 50 will operate at LOS E during the p.m. peak hour for the proposed interchange at Empire Ranch Road.

The traffic operations analysis results above show that the proposed interchange and improvements to Route 50 will result in mainline levels of service generally consistent with the Transportation Concept Report.

**Accident Data**

Accident data from the Traffic Accident Surveillance and Analysis System (TASAS) for a three-year period is shown below, encompassing Route 50 between East Bidwell Street and El Dorado Hills Boulevard.

Location	Total Accidents	Total Fatalities	Actual Accident Rate <sup>1</sup>	Average Accident Rate <sup>1</sup>
Eastbound Route 50: East Bidwell Street to El Dorado Hills Boulevard	145	1	<b><u>1.52</u></b>	0.55
Westbound Route 50: El Dorado Hills Boulevard to East Bidwell Street	70	0	<b><u>0.73</u></b>	0.55

Notes: <sup>1</sup> per million vehicles

**Bold and underline** indicates that the actual accident rate on this segment is greater than the average accident rate for similar facilities.

Source: Final Traffic Study; Caltrans District 3 TASAS Table B, April 2001 to March 2004.

The above table shows that the actual accident rate on eastbound Route 50 in the vicinity of the proposed interchange is nearly three times the average accident rate for similar freeway facilities. In the three-year data collection period, 145 accidents occurred on eastbound Route 50 with one fatality. Seventy accidents occurred on westbound Route 50 with no fatalities, but with a higher-than-average accident rate. The table below categorizes the recorded accidents by type.

Location	Accident Type				Total
	Rear End	Hit Object	Side- swipe	Other <sup>1</sup>	
Eastbound Route 50: East Bidwell Street to El Dorado Hills Boulevard	110 (76%)	11 (8%)	16 (11%)	8 (5%)	145
Westbound Route 50: El Dorado Hills Boulevard to East Bidwell Street	32 (46%)	19 (27%)	7 (10%)	12 (17%)	70

Notes: <sup>1</sup> Other includes broadside, head-on, and over-turn collisions.  
 Source: Final Traffic Study and Caltrans District 3 TASAS Table B, April 2001 to March 2004.

As shown above, the most frequent type of accident on eastbound Route 50 in the project vicinity is rear-end collisions (76 percent). A high frequency of rear-end accidents is consistent with the stop-and-go peak direction traffic conditions that exist along this section of Route 50. Rear-end collisions were also the most frequent type of accident on westbound Route 50 (46%), with hit objects being the second most frequent type of accident (27%).

## 5. Alternatives

### A. Viable Alternatives

The improvements considered in this report include a new interchange connection (Project Element 1), auxiliary lanes between Empire Ranch Road and El Dorado Hills Boulevard (Project Element 2), and implementation of an approved extension of high occupancy vehicle lanes east of El Dorado Hills Boulevard. For purposes of this Draft Project Report, an analysis of alternatives was performed for project elements 1 and 2, and is summarized as follows:

#### Route 50/Empire Ranch Road Interchange (Project Element 1)

One viable alternative for Empire Ranch interchange is presented within this Draft Project Report, as follows:

*Alternative 1* represents a modified hybrid L-2/L-7 partial cloverleaf interchange. In particular, following are anticipated elements of the interchange:

- The overcrossing would be a two lane overcrossing with median and outside shoulders, plus sidewalk/pedestrian access on the west side. Empire Ranch Road would terminate in a dead-end on the south side of the freeway, without any break in access control. Should a connection to the south be deemed desirable in the future, there would need to be a separate project development process, leading to an environmental document, revised freeway agreement, and break in access control, to be determined at that time.

- A single lane westbound diagonal off-ramp would be provided, widening to two lanes at the ramp terminal.
- The westbound on-ramp would be a two lane diagonal ramp (one mixed flow plus one HOV bypass), merging to one lane prior to the Route 50 merge; the on-ramp would include ramp metering.
- A single lane eastbound diagonal off-ramp would be provided, remaining a single lane at the ramp terminal.
- The eastbound on-ramp would be a two lane loop on-ramp (one mixed flow plus one HOV bypass), merging to one lane prior to the Route 50 merge; the on-ramp would include ramp metering.
- The westbound ramp terminal intersection will be signalized; the eastbound ramp terminal intersection will not be signalized.

Although the project is not anticipated to promote pedestrian/bicycle traffic in the foreseeable future (until a future project extends the roadway south of Route 50), the project is being planned for improved pedestrian/bicycle safety at the ramp crossings. The ramp entrances have been modified from the standard design to slow vehicular traffic at the potential conflict points, thus allowing for safer crossing by pedestrians and bicyclists. The proposed geometric refinements are as follows:

- The entrance to the eastbound loop on-ramp is perpendicular to Empire Ranch Road. Because there is no connection to the south of Route 50 proposed by this project, a separate right turn/deceleration lane at the ramp entrance is not necessary. The single southbound lane on Empire Ranch Road over Route 50 includes the appropriate curb return radius at the eastbound loop on-ramp entrance to maintain Surface Transportation Assistance Act (STAA) truck movements.
- The entrance to the westbound diagonal on-ramp is located at the ramp intersection; one southbound lane on Empire Ranch Road becomes a right turn only/deceleration lane at the ramp entrance, with appropriate curb return radius to maintain STAA movements.
- Pedestrian crossing movements across the diagonal on-ramp would be signalized.

Future improvements at this interchange, should Empire Ranch Road be extended south of Route 50, would include widening of the overcrossing structure, plus construction of a westbound loop on-ramp and an eastbound diagonal on-ramp for a completed L-9 configuration. Provision has been included in this design to allow for structure widening and construction of additional ramps as noted, but actual design of these features would need to be evaluated by a subsequent Project Development Team, as noted above.

Alternative 1 would require that some excess material be exported, although this could be minimized with slope flattening/widening and contour grading.

The estimated project capital costs (i.e. not including support costs) for Alternative 1 of Project Element 1 are summarized as follows:

Roadway Items	\$17,130,000
Structure Items	\$4,851,000
<b>Subtotal Construction</b>	<b>\$21,981,000</b>
Right of Way Items	\$6,800,000
<b>TOTAL ALTERNATIVE COST</b>	<b>\$28,781,000</b>

Route 50 Mainline Improvements (Project Element 2)

As indicated elsewhere in this report, the existing eastbound Route 50 truck climbing lane begins near the Scott Road/East Bidwell Street interchange, merging with the mixed-flow lanes within the limits of the proposed Empire Ranch Road interchanges. Consequently, this project includes the extension of the truck climbing lane easterly; the next logical terminus is near the vicinity of El Dorado/Sacramento County line where it merges with the auxiliary lane added with the eastbound loop on-ramp. Due to the high off-ramp volumes at El Dorado Hills Blvd, this eastbound auxiliary lane is proposed to be continuous between the Empire Ranch Road loop on-ramp interchange and the off-ramp to southbound Latrobe Road. Additionally, the El Dorado County's Department of Transportation, as part of other ongoing planning processes, has identified a need for a westbound auxiliary lane between the El Dorado Hills Blvd on-ramp and the off-ramp to Empire Ranch Road.

Two alternatives were identified for the extension of the truck climbing lane and the construction of the auxiliary lanes. Alternative 1 would widen Route 50 within the median; Alternative 2 would widen Route 50 to the outside of the existing lanes. Due to concerns with the remaining median width if Route 50 were widened within the median, Alternative 1 was rejected by Caltrans and Alternative 2 was determined to be the viable alternative for the extension of the truck climbing lane and the construction of the auxiliary lanes.

Project Element 2, Alternative 2, for the extension of the truck climbing lane and the auxiliary lanes would be to widen to the outside of the existing lanes. The existing lane configuration would remain, including the existing thrie beam median barrier rail. Because the widening to the outside of the existing lanes, right of way would need to be acquired along both sides of Route 50 to accommodate the cuts and fills required with this widening.

The estimated project capital costs (i.e. not including support costs) for Alternative 2 of Project Element 2 are summarized as follows:

Roadway Items	\$7,797,000
Structure Items	\$0
<b>Subtotal Construction</b>	<b>\$7,797,000</b>
Right of Way Items	\$703,000
<b>TOTAL PROJECT ELEMENT COST</b>	<b>\$8,500,000</b>

**B. Analysis of Proposal**

*Traffic Operations:*

Detailed traffic operations analyses for the proposed project are included in the Traffic Report located in Attachment F. In addition, mainline traffic volumes and operations, including operations at ramp junctions, are discussed in Section 4(C) of this report. The following summarizes ramp intersection operations:

The study intersections were analyzed under 2006 conditions with and without the construction of the proposed Route 50/Empire Ranch Road interchange. The peak hour traffic operations are summarized in Table 7.

<b>TABLE 7 INTERSECTION LOS – CONSTRUCTION YEAR (2006) NO PROJECT AND PROPOSED PROJECT CONDITIONS</b>					
Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay <sup>1</sup>	LOS <sup>2</sup>	Delay <sup>1</sup>	LOS <sup>2</sup>
<i>No Project Conditions</i>					
Empire Ranch Road/Iron Point Road	Uncontrolled	0	A	0	A
<i>Interchange Alternative 1</i>					
Empire Ranch Road/ Route 50 Eastbound Ramps	Side Street Stop	0	A	0	A
Empire Ranch Road/Route 50 Westbound Ramps	Traffic Signal	27	C	20	B
Empire Ranch Road/Iron Point Road	Traffic Signal	17	B	15	B
Notes: <sup>1</sup> Delay in seconds per vehicle. <sup>2</sup> LOS calculations based on the 2000 HCM procedures. Source: <i>Fehr &amp; Peers, 2003.</i>					

With the proposed Route 50/Empire Ranch Road interchange in place, the two ramp terminal intersections would operate at LOS C or better during both peak hours. No queuing problems are expected at the ramp terminal intersections during the peak hours under Year 2006 conditions; the eastbound ramp intersection does not have conflicting movements, and the westbound ramp terminal intersection operates well without excessive queuing.

***Intersection Operations***

The study intersections were analyzed under 2026 conditions with and without the construction of the proposed Route 50/Empire Ranch Road interchange. The peak hour traffic operations are summarized in Table 8.

<b>TABLE 8</b>					
<b>INTERSECTION LOS – CONSTRUCTION YEAR (2026)</b>					
<b>NO PROJECT AND PROPOSED PROJECT CONDITIONS</b>					
Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay <sup>1</sup>	LOS <sup>2</sup>	Delay <sup>1</sup>	LOS <sup>2</sup>
<i>No Project Conditions</i>					
Empire Ranch Road/Iron Point Road	Traffic Signal	18	B	30	C
<i>Interchange Alternative 1</i>					
Empire Ranch Road/ Route 50 Eastbound Ramps	Side Street Stop	0	A	0	A
Empire Ranch Road/Route 50 Westbound Ramps	Traffic Signal	15	B	13	B
Empire Ranch Road/Iron Point Road	Traffic Signal	<u>43</u>	<u>D</u>	<u>57</u>	<u>E</u>
Notes:					
<sup>1</sup> Delay in seconds per vehicle.					
<sup>2</sup> LOS calculations based on the 2000 HCM procedures.					
Source: <i>Fehr &amp; Peers</i> , 2003.					

With the proposed Route 50/Empire Ranch Road interchange in place, the two ramp terminal intersections would operate at LOS D or better during both peak hours. No queuing problems are expected at the ramp terminal intersections during the peak hours under Year 2026 conditions.

The intersection of Empire Ranch Road and Iron Point Road would operate unacceptably (LOS D or E) during both peak hours for all four interchange alternatives. A third through lane in each direction of Iron Point Road, on either side of Empire Ranch Road, along with providing a “free” right turn on the northbound and westbound intersection approaches would provide an expectable level of service (LOS C, based on the City of Folsom planning standards).

The traffic operations analysis shows that the proposed interchange and improvements to Route 50 will result in mainline levels of service generally consistent with the Transportation Concept report. Ramp intersection levels of service are acceptable for the build and design year.

*Ramp Metering:*

Ramp metering is proposed for all of the interchange on-ramps. HOV bypass lanes are also included on the on-ramps. An analysis was performed to assure adequate storage available on the ramps for expected queues. The ramp metering analysis shows that all of the proposed interchange on-ramps can accommodate the maximum number of projected peak hour trips with allowable ramp metering rates.

*Effect of Special Funded Project on a State Highway:*

The project, including associated mainline elements, has been designed to minimize mainline impacts. As indicated elsewhere in this report, the new interchange will allow better traffic distribution between adjacent interchanges. Additionally, the auxiliary lanes between the proposed interchange and the El Dorado Hills Blvd/Latrobe Road interchange will improve traffic operations because there is more room for vehicles to conduct merge and diverge movements between the interchanges. The extension of a third eastbound lane to the Bass Lake Grade Truck Climbing Lane would allow the HOV lane designation to end beyond the El Dorado Hills Blvd interchange, eliminating a merging of the HOV lane with the adjacent mixed flow lane in the vicinity of an already congested section of Route 50.

Even with the proposed mainline improvements, portions of Route 50 and some of the ramp merge/diverge areas will operate at unacceptable levels of service during peak hours for the Construction Year (2006) and Design Year (2026). The operational deficiencies at the ramp junctions can be attributed to the mainline capacity limits (as acknowledged in the Transportation Concept report) rather than with the interchange design itself.

In order to remedy the project-area mainline operational deficiencies in the Design Year, additional capacity (over and above the Route 50 roadway programmed in the MTP) would need to be added to Route 50 between East Bidwell Street and Bass Lake Road. This additional capacity could include auxiliary lanes and/or additional traveled lanes on Route 50, which are beyond the scope of this study. However, the auxiliary lane design as proposed in this report will reserve the median area for emergency use in the short term, and would allow for additional capacity in the long term.

*Nonstandard Mandatory and Advisory Design Features:*

The proposed project geometrics meet all design standards except as noted below:

Mandatory Design Exceptions

- Stopping Sight Distance at Grade Crests per Section 201.4 requires that the length of a crest vertical curve be designed as per Figure 201.4. The existing crest vertical curve on Route 50 immediately west of the proposed overcrossing location does not provide stopping sight distance required for the design speed on the highway due to steep grades on either side of the vertical curve. The stopping sight distance provided on the existing vertical curve exceeds 80 km/hr, but does not meet the design standard of 110 km/hr for a freeway.
- Stopping Sight Distance at Grade Sags per Section 201.5 requires that the minimum length of vertical curve provide headlight sight distance in grade sags for the appropriate design speed. The proposed sag vertical curve at the bottom of the westbound loop on-ramp does not provide headlight sight distance for an 80 km/hr design speed. Freeway

lighting will be provided at the entrance of the loop on-ramp, where speeds are expected to be less than 80 km/hr due to the horizontal geometrics of the loop.

- Superelevation Rate per Section 202.2 requires that superelevation rates meet the standards shown on Table 202.2. The superelevation rates at the first curve (in the direction of travel) on the westbound diagonal on-ramp does meet the requirements of Section 202.5(3), "Restrictive Situations", which states that for certain types of roadways, including ramps, where curve radius and length and tangents between curves are short, standard superelevation rates and/or transition lengths may not be attainable. In this case, less than standard superelevation rates are justified, with the superelevation on the curve providing a comfortable rate for the driver consistent with Figure 202.2.

#### Advisory Design Exceptions

- Superelevation Transitions per Section 202.5(1) requires that superelevation transitions meet the requirements of Figure 202.5. The proposed superelevation transitions do meet the requirements of Section 202.5(3), "Restrictive Situations", which states that for certain types of roadways, including ramps, where curve radius and length and tangents between curves are short, standard superelevation rates and/or transition lengths may not be attainable. In this case, the non-standard transition length shall be used, with the maximum rate of change for cross slope to be 4% per 20 m, which was the approach used herein.
- Side Slopes per Section 304.1(a) and (b) requires approval for slopes steeper than 1:4 due to safety and erosion control concerns. Due to the height of the cut and fill slopes, required due to the existing terrain, the profile of Route 50, and approved development adjacent to the north side of the freeway, slopes steeper than 1:4 will be necessary. Slopes will be constructed as flat as possible, but will approach 1:2 for fill slopes and 1:1.5 for cut slopes. Appropriate safety features, such as metal beam guard rail, will be provided along with dikes and downdrains to properly channelize runoff from erodible slopes.
- Single Lane Ramps per Section 504.3(5) requires that if a single lane ramp exceeds 300 meters in length, an additional lane should be provided on the ramp to permit passing maneuvers. The eastbound off-ramp will be constructed as a single lane ramp approximately 508 meters long. Design year p.m. peak hour volume on this ramp is 920 vehicles. On the Empire Ranch Road overcrossing, only one northbound lane will be constructed. Depending on future land use south of Route 50, there may be a need in the future for a second lane and auxiliary lane on the off-ramp, and nothing in the current configuration precludes the construction of an additional lane. The proposed interchange design will accommodate the design year traffic volumes with an acceptable level of service.



- Design Speed Considerations per Section 504.2(4)(a) requires that decision sight distance shown in Table 201.7 should be provided at freeway exits. Due to the existing crest vertical curve on Route 50 just west of the proposed interchange location, standard decision sight distance at the exit nose cannot be provided. Overhead sign structures, in advance of the exit, will be provided to mitigate for the inadequate decision sight distance.
- Metered Multi-Lane Entrance Ramps per Section 504.3(2)(b) requires a taper of 50:1 when dropping a lane beyond the metering line. The proposed lane drops at the loop on-ramps are 30:1 in order to maximize storage lengths on the ramps. The proposed lane drop is acceptable because the radius of the loop ramp does not allow traffic to attain speeds to warrant a 50:1 taper.

*Park and Ride Facilities:*

There are no Park and Ride facilities proposed with this project. The Empire Ranch (Russell Ranch) Specific Plan includes provisions for a park and ride lot to be constructed within or adjacent to the proposed commercial development in the northeast quadrant of the interchange.

*Utility and Other Owner Involvement:*

The construction of the interchange will require the relocation of a number of overhead utilities. The utility companies have been notified of the project and the required relocations are being verified.

*Railroad Involvement:*

The project will not encroach onto rail right of way. No railroad involvement is anticipated for this project.

*Highway Planting/Erosion Control:*

During the design of the interchange, appropriate water pollution control measures will be determined and a temporary water pollution control plan will be developed. Highway planting plans will be developed and implemented for a separate construction contract that will follow the construction of the interchange, consistent with Caltrans policy. Excavated and embankment slopes will be as flat as practical, but will exceed the 1:4 standard. Dikes and gutters will be included as appropriate to channelize water to storm drain inlets. Appropriate outlet control measures will be implemented to minimize erosion and sediment transport.

*Noise Barriers:*

No noise barriers will be constructed as part of this project, but a sound wall has been constructed by others in the northwest quadrant of the interchange as part of the construction of a

single family residential subdivision (Empire Ranch Village No. 63). The construction of this sound wall was coordinated with this interchange project, and its design meets recommendations as outlined in the noise technical study of the accompanying Environmental Document regarding location and height of sound walls.

### C. Alternatives Considered but Rejected

#### Route 50/Empire Ranch Road Interchange (Project Element 1)

Three interchange alternatives that were evaluated have been rejected and are not presented for further review/approval. These alternatives are described as follows:

*Alternative 2* represents a modified hybrid Type L-2/L-8 partial cloverleaf interchange. In particular, the following are elements of the interchange:

- The overcrossing would be a two lane overcrossing similar to Alternative 1, with median and outside shoulders, plus sidewalk/pedestrian access on the west side. Empire Ranch Road would terminate in a dead-end on the south side of the freeway, without any break in access control.
- Westbound ramps would be the same as in Alternative 1.
- Eastbound ramps would consist of a single lane loop off-ramp and two lane diagonal on-ramp (one mixed flow plus one HOV bypass) merging to one lane prior to the Route 50 merge; the on-ramp would include ramp metering.
- As in alternative 1, the westbound ramp terminal intersection will be signalized; the eastbound ramp terminal intersection will not be signalized.

Alternative 2 would include similar bike/pedestrian friendly ramp intersections, as in Alternative 1, by providing more controlled movements at ramp terminal intersections.

As noted above, this alternative includes an eastbound loop off-ramp; these types of off-ramps tend to have a much higher accident rate than diagonal off-ramps. Also, this interchange design at this location will require that material be imported for the necessary embankments. Consequently because of safety and cost considerations, this alternative was rejected from further consideration. .

The estimated project capital costs (i.e. not including support costs) for Alternative 2 of Project Element 1 are summarized as follows:

Roadway Items	\$14,567,000
Structure Items	\$4,851,000
<b>Subtotal Construction</b>	<b>\$19,418,000</b>
Right of Way Items	\$6,944,000
<b>TOTAL ALTERNATIVE COST</b>	<b>\$26,362,000</b>

*Alternative 3* represents a modified hybrid Type L-7/L-8 partial cloverleaf interchange. In particular, the following are elements of the interchange:

- The overcrossing would be a two lane overcrossing similar to Alternative 1, with median and outside shoulders, plus sidewalk/pedestrian access on the west side. Empire Ranch Road would terminate in a dead-end on the south side of the freeway, without any break in access control.
- Westbound ramps would include a diagonal off-ramp and a loop on-ramp (Type L-7 configuration).
- Eastbound ramps would consist of a single lane loop off-ramp and two lane diagonal on-ramp (one mixed flow plus one HOV bypass) merging to one lane prior to the Route 50 merge; the on-ramp would include ramp metering.
- As in alternative 1, the westbound ramp terminal intersection will be signalized; the eastbound ramp terminal intersection will not be signalized.

Alternative 3 would include similar bike/pedestrian friendly ramp intersections, as in Alternative 1, by providing more controlled movements at ramp terminal intersections.

As noted above, this alternative includes an eastbound loop off-ramp; these types of off-ramps tend to have a much higher accident rate than diagonal off-ramps. Also, this interchange design at this location will require that material be imported for the necessary embankments. Consequently because of safety and cost considerations, this alternative was rejected from further consideration.

The estimated project capital costs (i.e. not including support costs) for Alternative 3 of Project Element 1 are summarized as follows:

Roadway Items	\$15,075,000
Structure Items	\$4,851,000
<b>Subtotal Construction</b>	<b>\$19,926,000</b>
Right of Way Items	\$6,944,000
<b>TOTAL ALTERNATIVE COST</b>	<b>\$26,870,000</b>

*Alternative 4* represents a Type L-7 partial cloverleaf interchange. In particular, the following are elements of the interchange:

- The overcrossing would be a two lane overcrossing similar to Alternative 1, with median and outside shoulders, plus sidewalk/pedestrian access on the west side. Empire Ranch Road would terminate in a dead-end on the south side of the freeway, without any break in access control.
- Westbound ramps include a diagonal off-ramp, plus a loop on-ramp (Type L-7 configuration).
- Eastbound ramps would consist of a single lane diagonal off-ramp and two lane loop on-ramp (one mixed flow plus one HOV bypass) merging to one lane prior to the Route 50 merge; the on-ramp would include ramp metering.

- As in alternative 1, the westbound ramp terminal intersection will be signalized; the eastbound ramp terminal intersection will not be signalized.

With the westbound loop on-ramp, all southbound to westbound traffic must make a left turn from Empire Ranch Road to the loop on-ramp; this movement represents the majority of the traffic in the a.m. peak hour, and would result in a lower level of service at the intersection of Empire Ranch Road and the westbound interchange ramps than with Alternative 1. Consequently this alternative was rejected.

The estimated project capital costs (i.e. not including support costs) for Alternative 4 of Project Element 1 are summarized as follows:

Roadway Items	\$16,161,000
Structure Items	\$4,851,000
<b>Subtotal Construction</b>	<b>\$21,012,000</b>
Right of Way Items	\$6,800,000
<b>TOTAL ALTERNATIVE COST</b>	<b>\$27,812,000</b>

#### Route 50 Mainline Improvements (Project Element 2)

One mainline improvement alternative that was evaluated has been rejected and is not presented for further review/approval. This alternative is described as follows:

Alternative 1 for the extension of the truck climbing lane and the auxiliary lanes would be to widen within the existing median, with a concrete median barrier, and to restripe the mainline to shift the mixed flow and HOV lanes over one lane to the left (in the direction of travel). The existing number 3 lane in each direction would become the auxiliary lanes. The recent HOV project constructed the median shoulder structural section to traveled way thickness, so the shoulder does not need to be replaced, but the cross slope of the median shoulder would need to be corrected so that the entire section is sloped to the outside of the highway. Because the widening of the mainline occurs within the existing median, no right of way acquisition would be required with this alternative for Project Element 2. It should be noted that the new median width with this alternative will be 6.6 m, which is less than the advisory standard of 10.8 m.

Caltrans considered that this alternative for mainline improvements, but rejected the alternative, indicating that insufficient justification was available for the less than standard median width; in addition, the median area should be reserved at this time.

The estimated project capital costs (i.e. not including support costs) for Alternative 1 of Project Element 2 are summarized as follows:

Roadway Items	\$6,240,000
Structure Items	\$0
<b>Subtotal Construction</b>	<b>\$6,240,000</b>
Right of Way Items	\$0
<b>TOTAL PROJECT ELEMENT COST</b>	<b>\$6,240,000</b>

## 6. Considerations Requiring Discussion

### A. Hazardous Waste

Based on the Preliminary Geotechnical Investigation for the project, the rock formations at the proposed interchange and the area east of the interchange proposed for mainline improvements are not mapped as ultramafic rocks. It is reasonable to assume that serpentinitic material (NOA) is not present within the interchange location. The project corridor to the east of the Bear Mountains Fault and the fault zone itself is mapped as containing ultramafic rocks and therefore could have serpentinite material (NOA).

The possible presence of asbestos will be confirmed during the Materials Report investigation, and appropriate materials handling measures implemented to reduce potential for releases of airborne asbestos, including the preparation of a health and safety plan, obtaining appropriate permits from the local agencies, and wetting down the work area during excavation activities.

### B. Value Analysis

No value analysis is required for this project, as the total cost within Caltrans right of way is less than \$25 million. However, the development of alternatives and subsequent alternatives analysis considered implementation costs. In addition, alternative construction methods and materials will be considered during the design phase.

### C. Resource Conservation

The project has been designed to consider appropriate and judicious use of resources, described as follows:

- The project earthwork will be nearly balanced, minimizing need for off-haul.
- AC pavement in existing shoulders will need to be replaced with traveled way sections, but AC surfacing can be recycled and processed for reuse as aggregate base

### D. Right of Way Issues

Right of way acquisition will be required for construction of this project. Final right of way certification will be required prior to advertisement of the project. A detailed summary of right of way impacts is included in the appendices to this report.

### E. Environmental Issues

The City of Folsom is the state Lead Agency under the California Environmental Quality Act (CEQA). The Federal Highway Administration (FHWA) is Federal lead agency under the National Environmental Policy Act (NEPA). An Environmental Impact Report was prepared for this project by the City of Folsom, pursuant to CEQA and an Environmental Assessment was

prepared pursuant to NEPA. The combined EIR/EA has been prepared in accordance with Caltrans environmental procedures, as well as State environmental regulations. The attached EIR/EA is the appropriate document for this proposal. Some of the environmental impacts and associated mitigations are summarized below:

- Loss of 0.11 hectare (0.27 acres) of jurisdictional waters which meet the Corps of Engineers criteria for wetlands: Obtain permits from associated agencies, and provide replacement habitat and/or mitigation as agreed.
- Construction noise and air quality impacts: Implement appropriate requirements in special provisions for noise and dust control.
- Water Quality (construction phase and permanent): Implement Storm Water Pollution Prevention Plan (SWPPP) for construction phase, and include appropriate best management practices for drainage systems to minimize long-term impacts.

#### **F. Air Quality Conformity**

The project is included in the most recent 2025 Sacramento Metropolitan Transportation Plan (MTP) and the 2003/05 Metropolitan Transportation Improvement Program (MTIP). These plans, including findings of air quality conformity, were approved by the Sacramento Area Council of Governments (SACOG) board on July 18, 2002. Due to recent decisions by the courts system and the EPA, the air quality conformity finding for the SACOG area has lapsed. As SACOG staff works with federal agencies in evaluating future MTP and associated air quality, this project will be included in their analyses. Expected timing for the conforming air quality plan, including this project, is by Spring 2006.

#### **G. Title VI consideration**

There are minimal Title VI considerations with this project. The interchange has been designed with HOV bypass lanes for on-ramps, allowing enhanced use for transit vehicles should a route be added to the area. The interchange has been designed for more "friendly" use by pedestrians and bicycles, specifically at ramp intersections, with compliance to current ADA standards, should areas south of Route 50 be developed to attract such uses. There are no recreation uses, shopping, schools, or hospitals in the project area.

### **7. Other Considerations as Appropriate**

- Public Hearing Process

It is recommended that the draft environmental document be released for public review, and that a Public Hearing be scheduled.

- Route Matters

Concurrent with environmental approvals, the California Transportation Commission (CTC) must approve the break in access control for the interchange. A revised freeway agreement will be required between Caltrans and the City of Folsom to address the new connection to Route 50.

- Permits

Work within the northeast quadrant will impact approximately 0.27 acre of seasonal wetland. Consequently, a Section 404 permit from the U.S. Army Corps of Engineers and a Section 1600 permit from the California Department of Fish & Game may be required. A waiver or certification from the Regional Water Quality Control Board also will be required.

A Notice of Construction (NOC) will need to be filed with Regional Water Quality Control Board (RWQCB) for grading activities exceeding 2.02 hectares (5 acres). A Storm Water Pollution Prevention Plan (SWPPP) will also be required.

- Cooperative Agreements

A cooperative agreement between Caltrans and the City of Folsom will be required for design and project development, as well as construction and maintenance of the Empire Ranch Road interchange.

- Transportation Management Plans (TMP)

The alternatives considered in this study cannot be constructed without some impact to traffic during construction, primarily due to driver curiosity, and temporary transitions between existing and new improvements. However, traffic impacts can be reduced with a well-planned stage construction/traffic handling plan and aggressive public awareness during construction. Temporary railing (Type K) will be used to separate construction zones from traffic. Some work-period lane closures will be required (i.e. for removing delineation, setting K-rail, pavement conforms, etc.) and would be performed during non-peak traffic hours. Following is a general description of construction sequencing for the various project elements:

*Empire Ranch Road Interchange:* The ramps can be constructed without impacting traffic. Work on ramps near the mainline will need to be done during off peak hours with closures of the outside shoulder and outside lanes. Erection and removal of falsework for the new overcrossing will require rerouting of mainline traffic; median crossovers are suggested.

*Outside Paving (west of El Dorado Hills Boulevard):* Outside paving for accommodation of eastbound truck climbing lane extension and westbound auxiliary lane can be accomplished

with shoulder closures and setting of K-rail. No lane closures or shifting of mainline will be required.

Consistent with District policy and procedures, it is expected that design of the project, especially staging and traffic control systems, would be coordinated closely with District TMP coordinator. It is also anticipated that there will be a Construction Zone Enhanced Enforcement Program (COZEEP) in place as part of traffic management during construction, including setting and removal of K-rails.

- **Stage Construction**

Stage Construction and Traffic Handling plans are typically included within construction documents to assure smooth traffic flow and continuous access during construction. However, because there are no existing connections to Route 50 at Empire Ranch Road, stage construction requirements will be minimal. It is expected that the contractor will sequence operations based on earthwork balance. The "Order of Work" in the project special provisions will require Project Element 2 (Auxiliary lanes between Empire Ranch Road and El Dorado Hills Boulevard) be complete prior to opening of the interchange ramps to traffic.

- **Graffiti Control**

Graffiti control measures will be considered during the design phase. There will be minimal visible walls within Caltrans right of way within the project limits; consequently, any graffiti control efforts would be focused on sign structures.

## **8. Programming**

### **A. Proposed Funding and Capital Support Resources**

The project will be funded through a number of sources, and will be the subject of a cooperative agreement between the State, the City of Folsom, and El Dorado County. The interchange element will be funded through a combination of development fees (City of Folsom), supplemented by STIP (RIP) funds. The extension of the eastbound truck climbing lane, plus the construction of the westbound auxiliary lane between Empire Ranch Road and El Dorado Hills Blvd, will be funded through a combination of El Dorado County development fees and STIP (RIP) funds as available. The extension of HOV lanes east of El Dorado Hills Boulevard, a separate project but integral to the operations of Route 50, will be funded by El Dorado County development fees. At this time, no STIP (RIP) fees are programmed for this project.



**B. Schedule:**

Following is the anticipated schedule for completion of the Empire Ranch Road interchange project, pending availability of funding.

**Proposed Project Milestones:**

Begin Project Report/Environmental Study	03/03
Draft Environmental Document Circulation	02/06
Final Project Approval and ED	09/06
Bridge Site Plans*	12/06
Bridge PS&E*	12/07
Roadway PS&E*	12/07
Right of Way Certification*	01/08
Advertise for Bid*	01/08
Complete Construction*	11/09

\* indicates funding dependent milestones

**9. Project Reviews**

This project has been reviewed by John Rocconova, Headquarters Project Development Coordinator. All comments have been incorporated in this report or otherwise addressed.

## 10. Project Contacts

Questions regarding this Project Report may be directed to:

*Caltrans Representatives:*

Clark Peri, Project Manager	(916) 274-0538
Christine Zdunkiewicz, Traffic Reviewer	(916) 274-0531
Lupe Jimenez, Environmental Reviewer	(916) 274-0597
Eric Fredrickson, Structures Reviewer	(916) 227-8916

*Others:*

Tom Garcia, Senior Engineer	(916) 355-7377
Gail Furness de Pardo City of Folsom	(916) 355-7248

Russ Nygaard, Senior Engineer County of El Dorado	(530) 621-5935
--	----------------

Rob Himes, Project Manager	(916) 381-9100
David Melis, Project Engineer	
Kim Erickson, Environmental Manager	
Lisa Pereira McClintock, Outreach Manager Mark Thomas & Company, Inc.	

Ron Milam, Project Manager	(916) 773-1900
Jason Isaac, Project Engineer Fehr & Peers Associates Traffic Consultants	

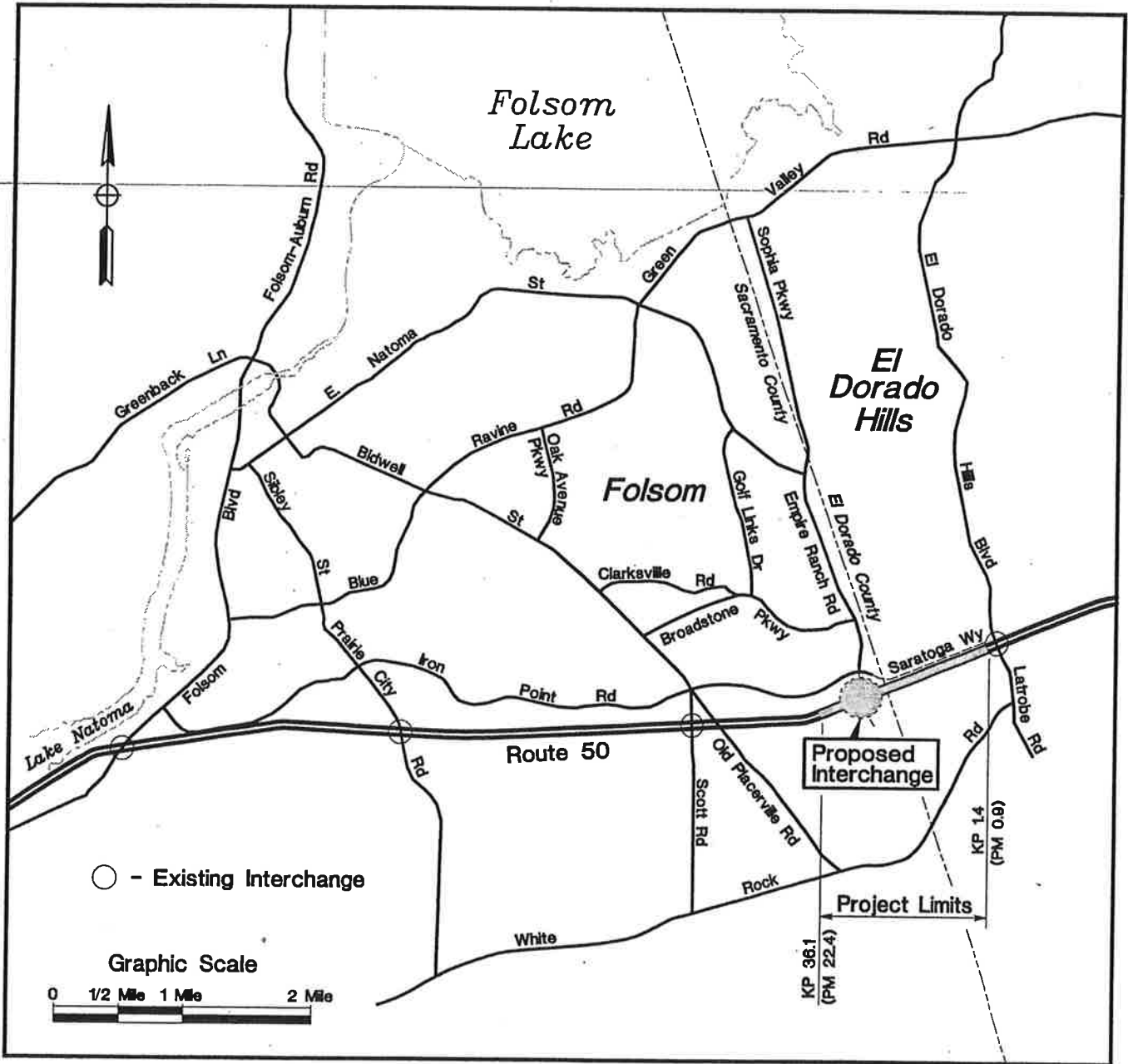
## **Attachments**

Location Map  
Project Geometrics  
Alternatives Considered but Rejected  
Advanced Planning Studies  
Project Cost Estimates  
Traffic Operations Report  
Right of Way Data Sheet/Utility Information Sheet  
Draft Environmental Impact Report (under separate cover)

*Location Map*

---

Attachment A

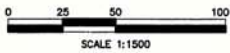
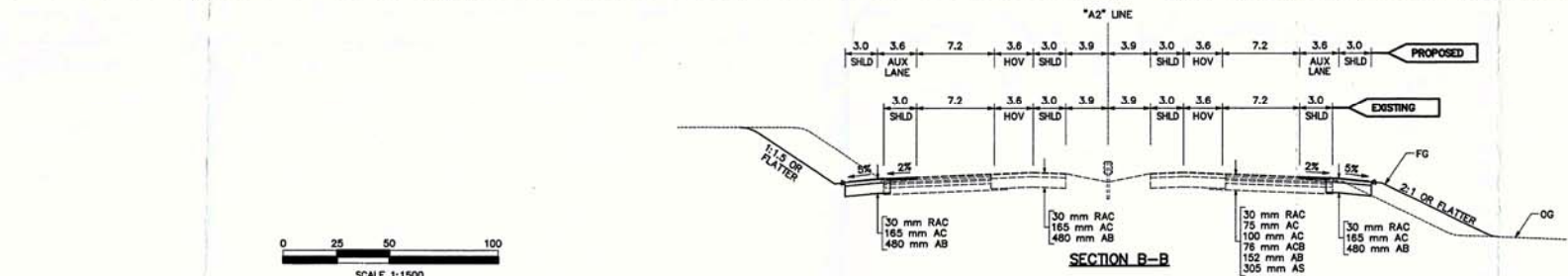
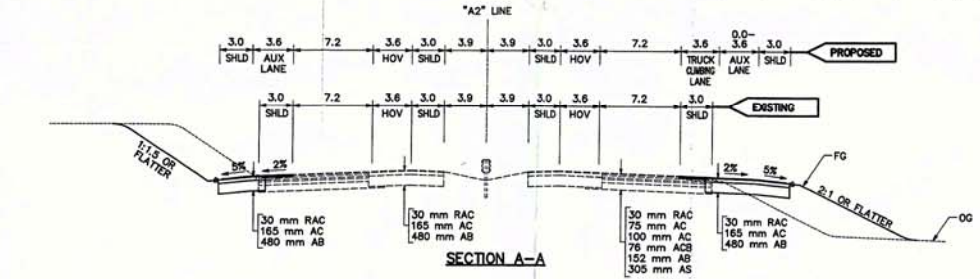
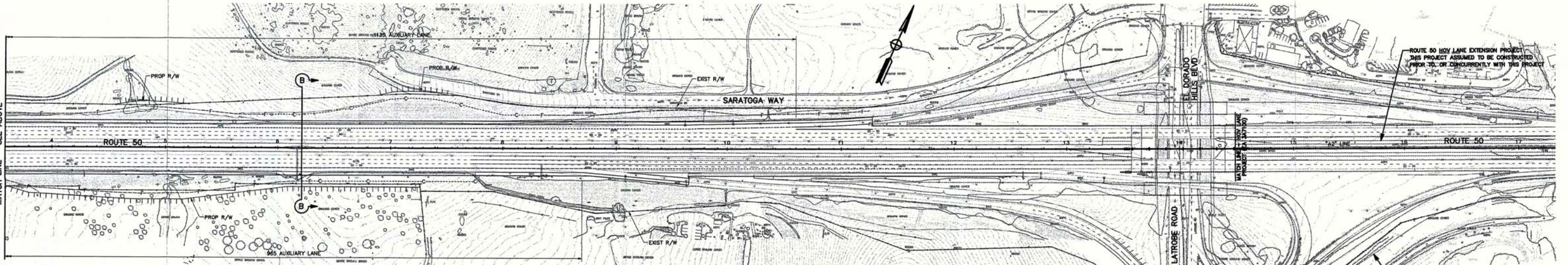
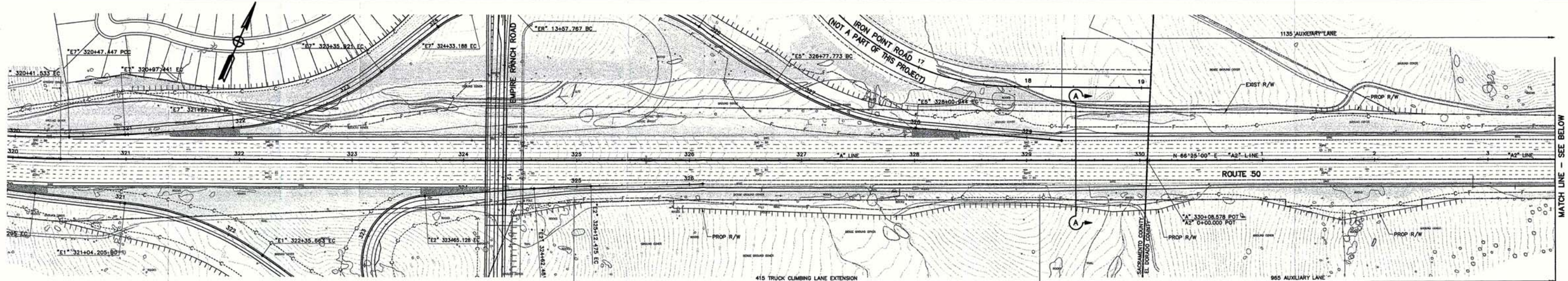


Project Location Map

# *Project Geometrics*

---

## Attachment B



ROUTE 50 HOV LANE EXTENSION PROJECT  
THIS PROJECT ASSUMED TO BE CONSTRUCTED  
PRIOR TO, OR CONCURRENTLY WITH THIS PROJECT

EL DORADO HILLS BLVD/LATROBE ROAD INTERCHANGE  
PROPOSED PHASE 2 IMPROVEMENTS  
(NOT A PART OF THIS PROJECT)

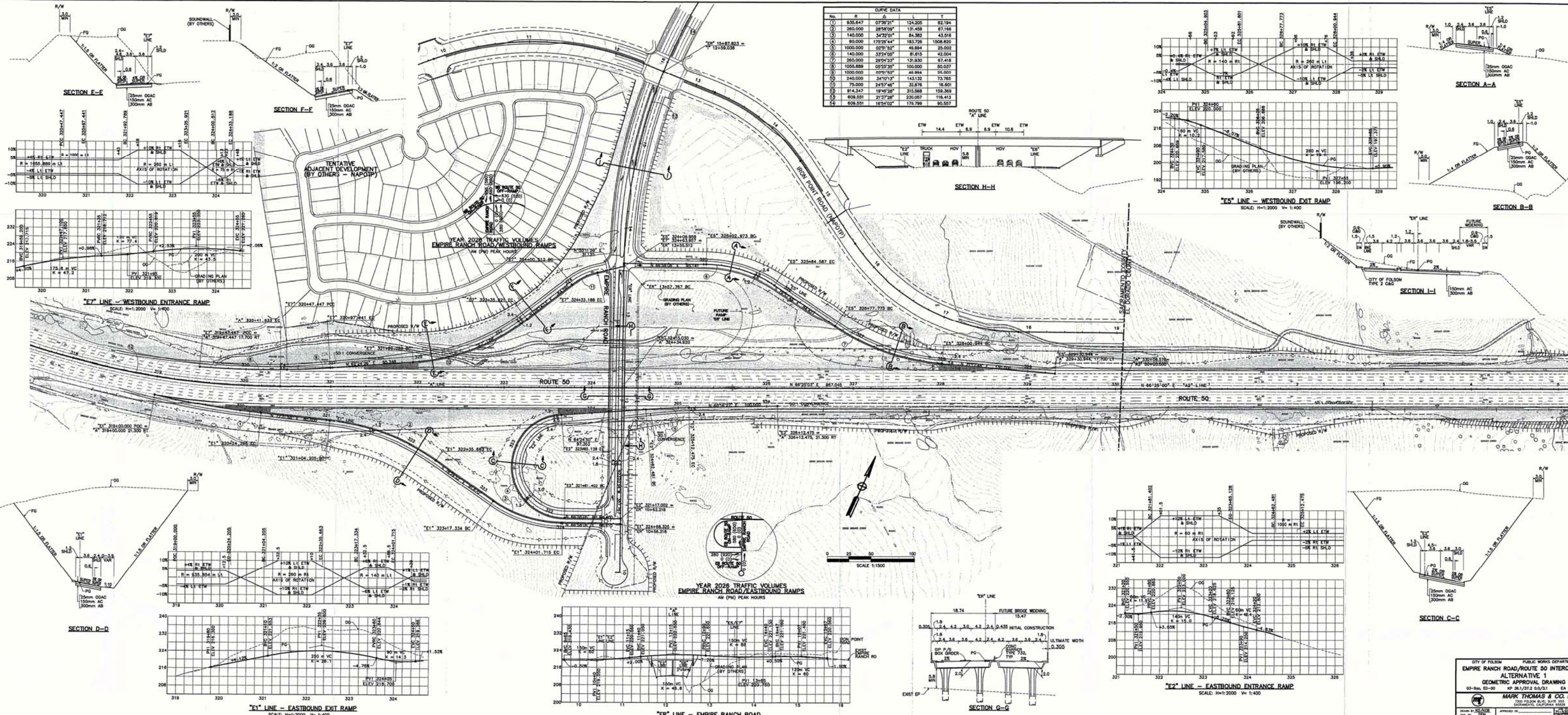
CITY OF FOLSOM PUBLIC WORKS DEPARTMENT  
EMPIRE RANCH ROAD/ROUTE 50 INTERCHANGE  
ROUTE 50 IMPROVEMENTS  
GEOMETRIC APPROVAL DRAWING  
03-Soc-50 KP 36.1/37.2, 03-ED-50 KP 0.0/1.4 EA 108500

**MARK THOMAS & CO. INC.**  
7300 FOLSOM BLVD, SUITE 203  
SACRAMENTO, CALIFORNIA 95825

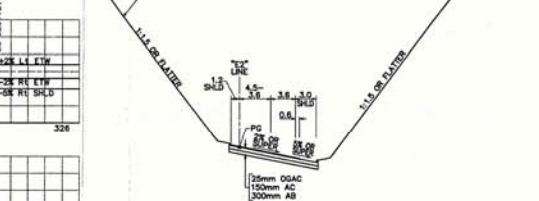
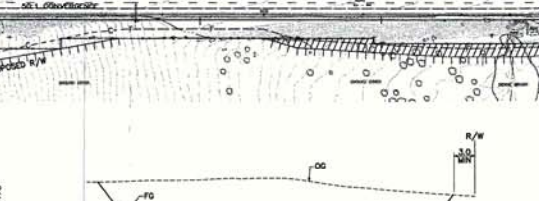
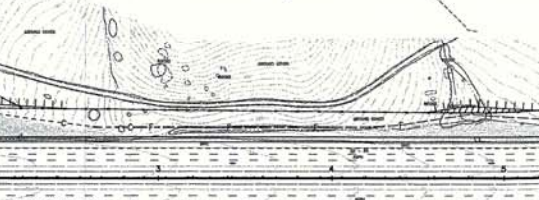
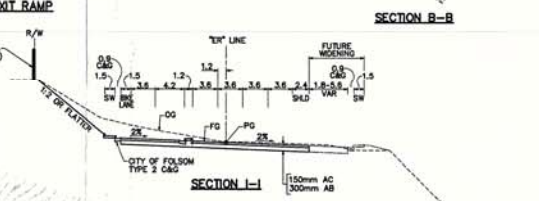
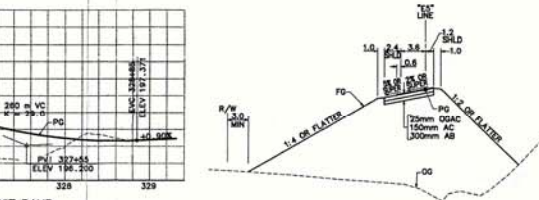
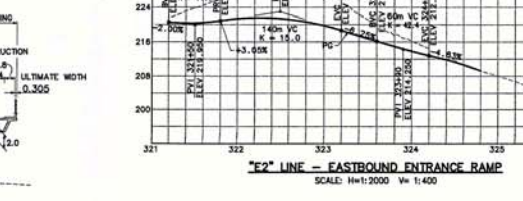
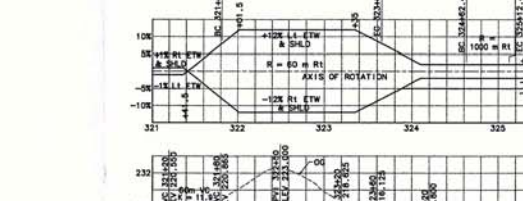
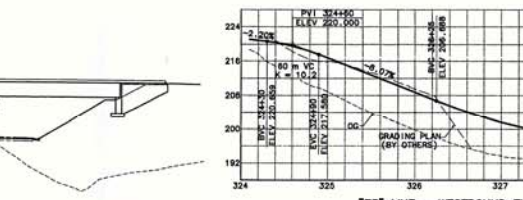
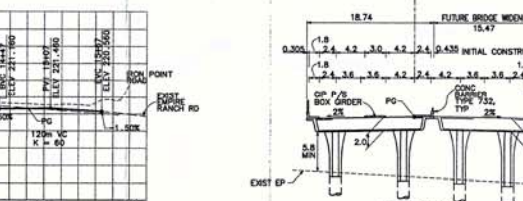
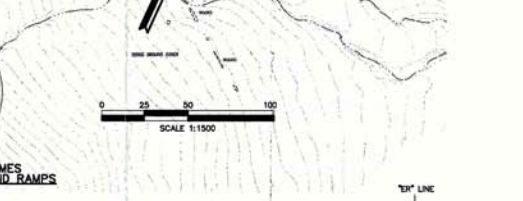
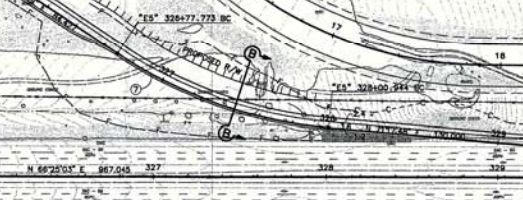
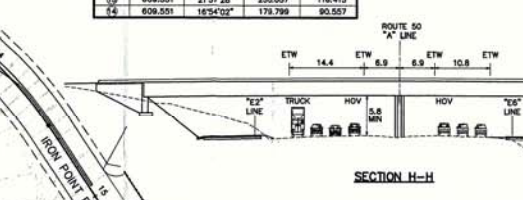
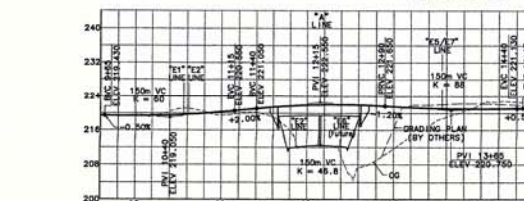
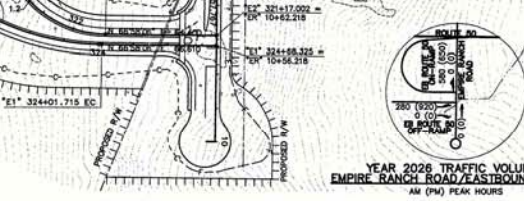
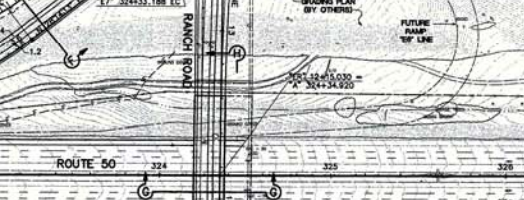
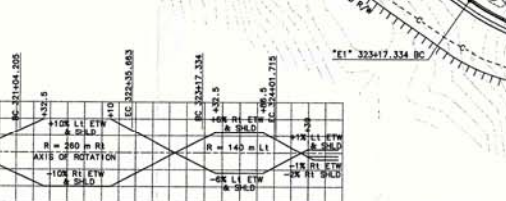
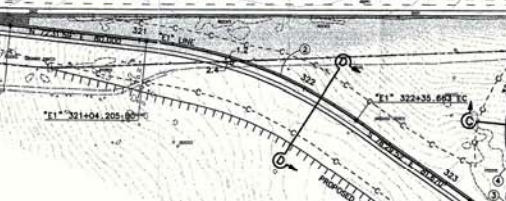
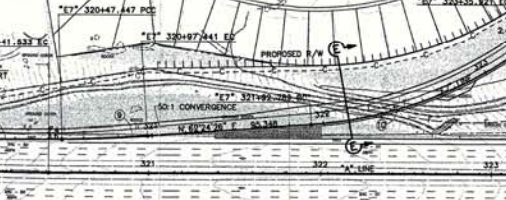
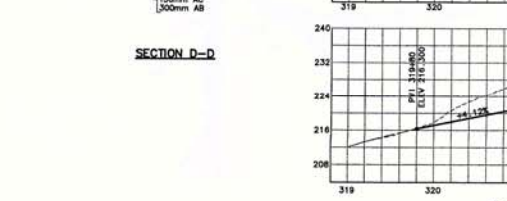
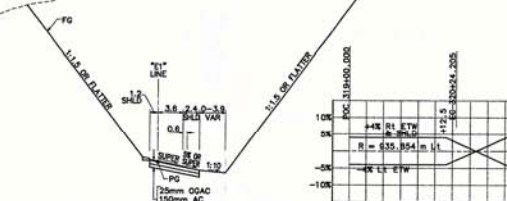
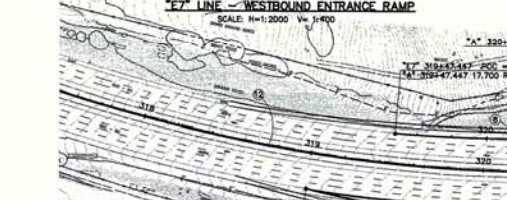
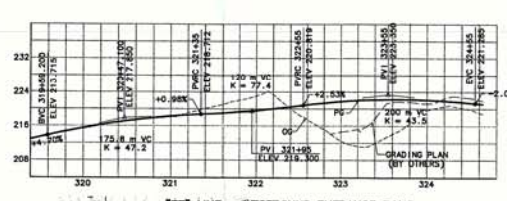
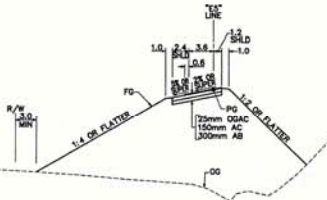
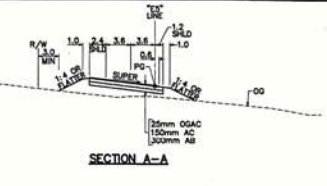
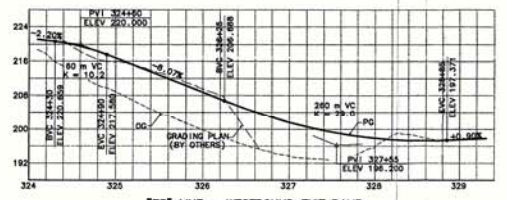
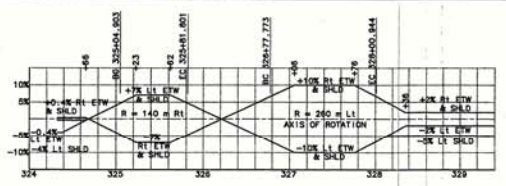
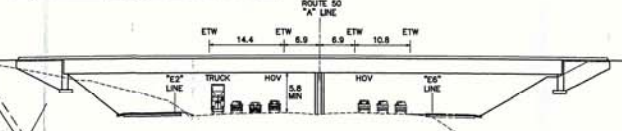
DRN BY: KID  
CHK BY: DEM  
DATE: 07/20/05  
SCALE: AS SHOWN

APPROVED ON: \_\_\_\_\_  
BY: \_\_\_\_\_  
RCE NO: \_\_\_\_\_

SHEET 1 OF 1



No.	R	Δ	L	T
1	935.647	07°30'21"	124.205	82.194
2	260.000	28°58'09"	131.458	87.166
3	140.000	34°32'01"	84.302	43.516
4	60.000	17°24'44"	183.728	108.820
5	1000.000	02°01'52"	48.994	25.002
6	140.000	33°24'09"	81.815	42.004
7	260.000	29°04'23"	131.630	87.418
8	1000.000	02°22'28"	100.000	50.037
9	1000.000	02°01'52"	48.994	25.002
10	240.000	34°01'13"	143.132	73.785
11	75.000	24°07'46"	32.876	16.501
12	874.247	19°42'28"	315.568	159.369
13	606.551	21°37'28"	230.057	116.413
14	606.551	16°54'02"	178.799	90.557



YEAR 2026 TRAFFIC VOLUMES  
EMPIRE RANCH ROAD WESTBOUND RAMP  
AM (PM) PEAK HOURS

YEAR 2026 TRAFFIC VOLUMES  
EMPIRE RANCH ROAD EASTBOUND RAMP  
AM (PM) PEAK HOURS

SECTION F-F  
SCALE: H=1:2000 V=1:400

CITY OF FOLSOM PUBLIC WORKS DEPARTMENT  
EMPIRE RANCH ROAD/ROUTE 50 INTERCHANGE  
ALTERNATIVE 1  
GEOMETRIC APPROVAL DRAWING  
03-266, Ed-02 KP 36.1/27.2 04/21 EA 128500  
MARK THOMAS & CO., INC.  
3700 FOLSOM BLVD., SUITE 203  
SACRAMENTO, CALIFORNIA 95825  
DRAWN BY: SGT/2021  
CHECKED BY: SGT/2021  
SCALE: AS SHOWN



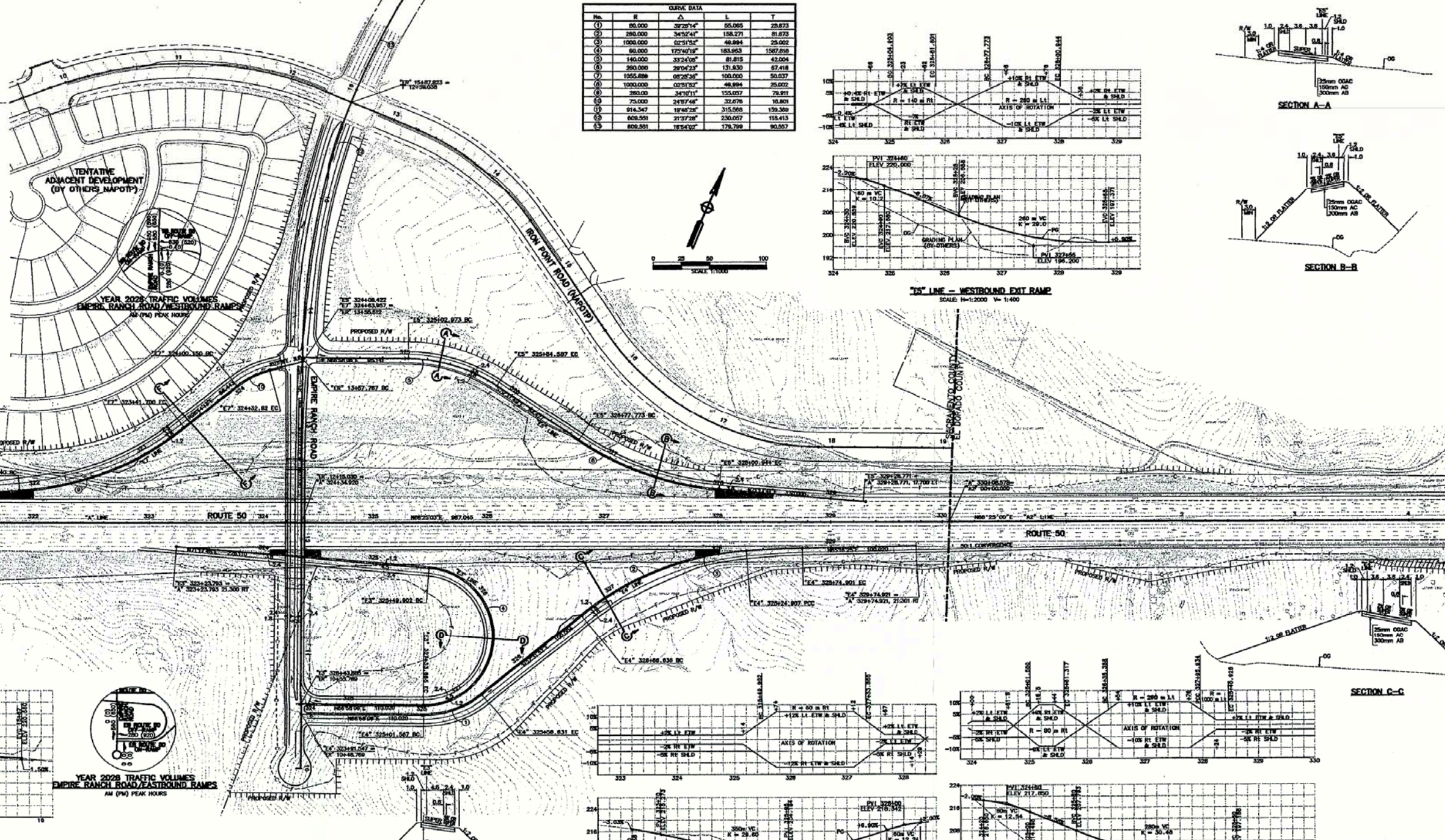
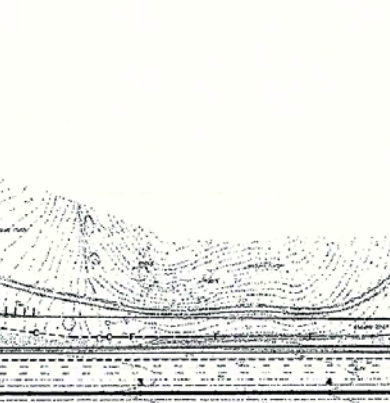
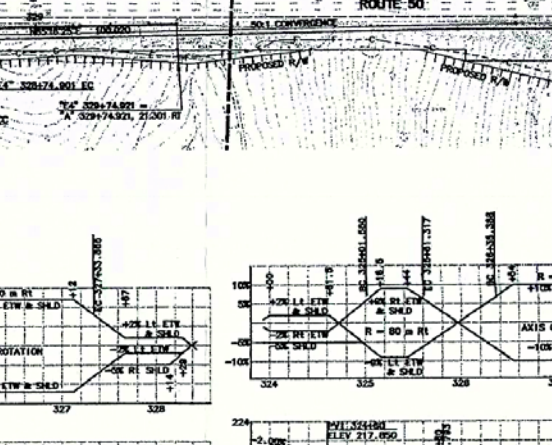
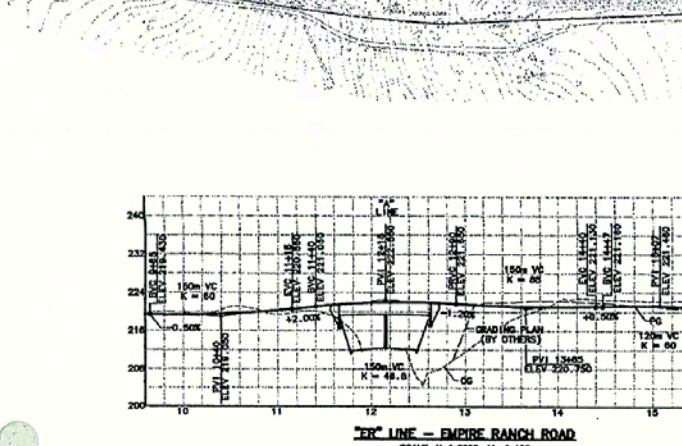
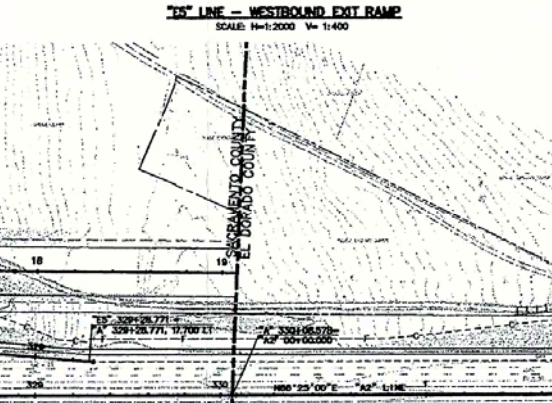
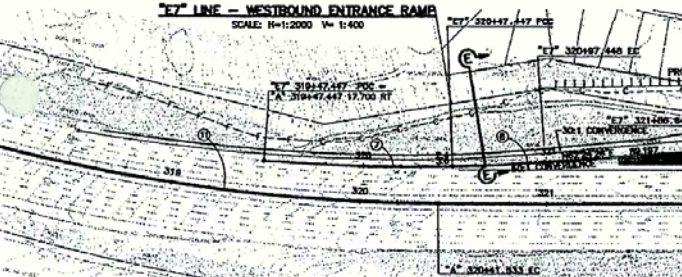
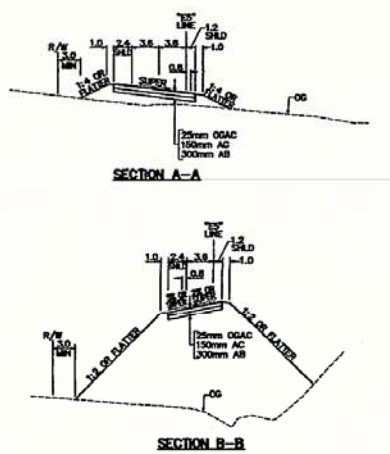
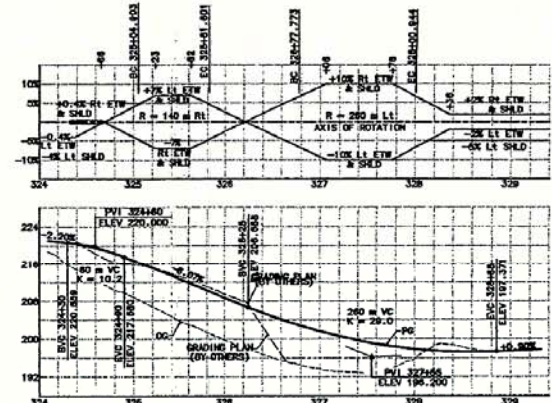
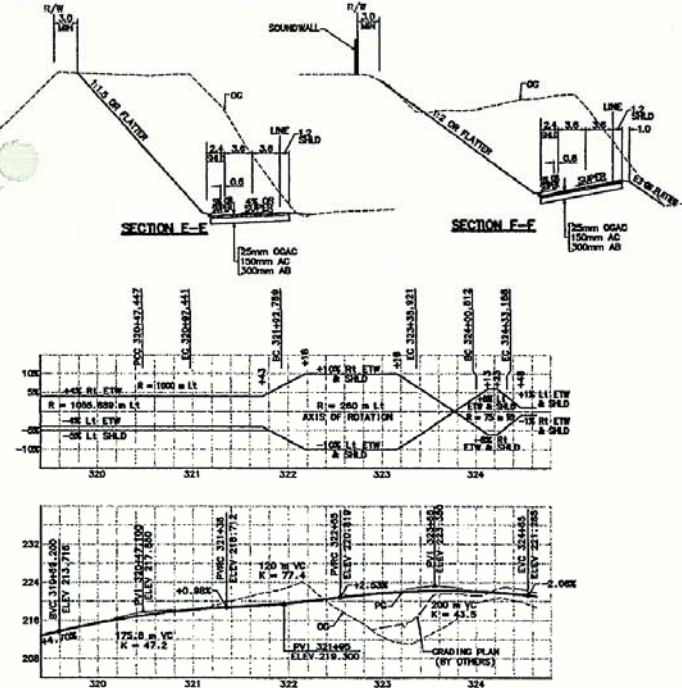
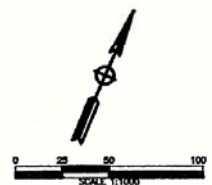
*Alternatives Considered  
but Rejected*

---

---

Attachment C

No.	R	Δ	L	T
1	80.000	39°28'14"	55.065	28.673
2	200.000	34°32'41"	158.271	81.875
3	1000.000	02°31'54"	48.894	25.002
4	80.000	17°47'03"	163.953	150.216
5	140.000	33°24'08"	81.815	42.004
6	200.000	29°04'23"	131.830	67.418
7	1055.888	05°28'36"	100.000	50.037
8	1000.000	02°31'54"	48.894	25.002
9	200.000	34°32'41"	158.271	79.911
10	75.000	02°31'54"	33.676	18.801
11	814.347	19°45'28"	315.565	179.369
12	609.591	21°37'28"	230.057	118.413
13	809.801	18°54'02"	178.789	90.567

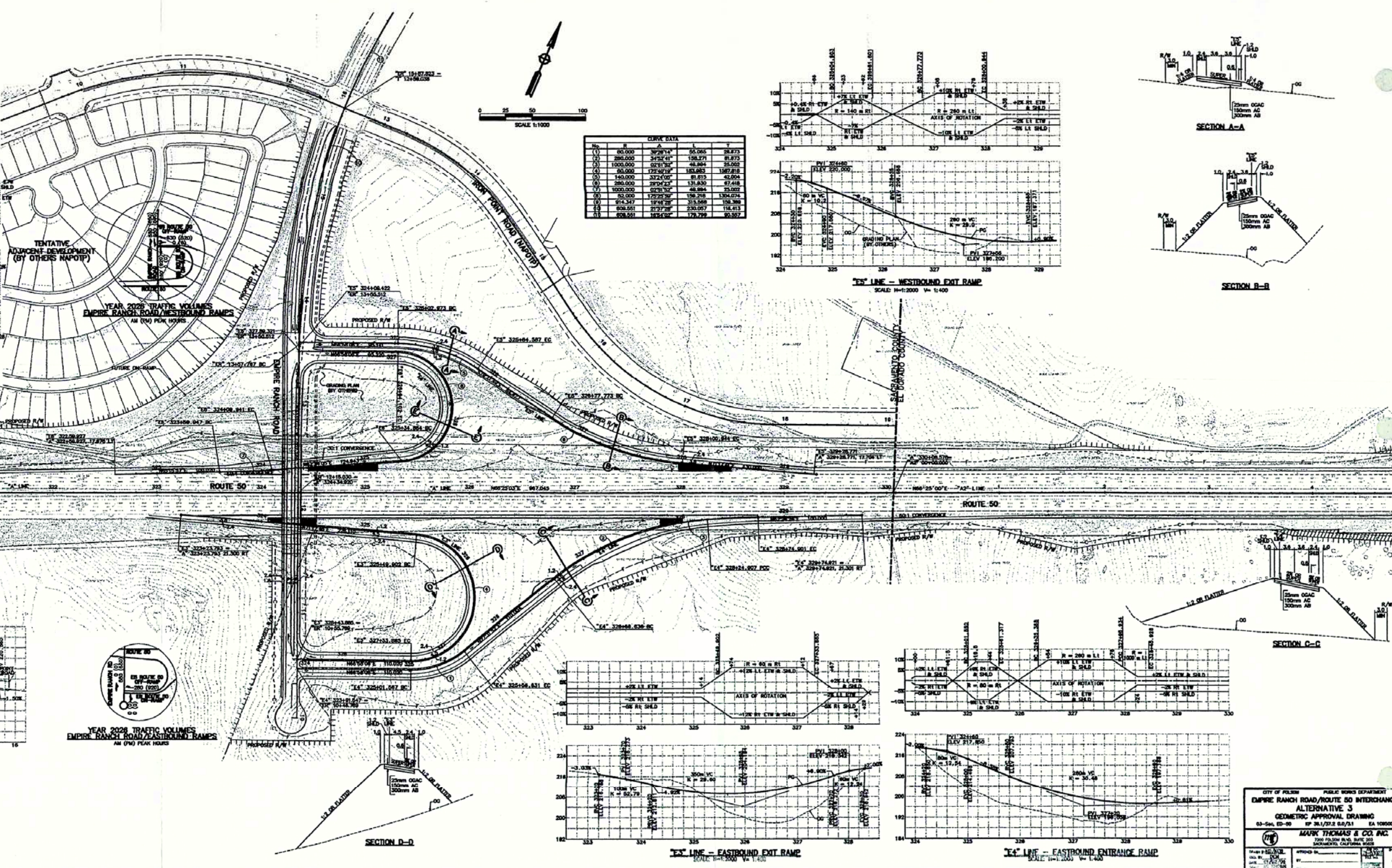
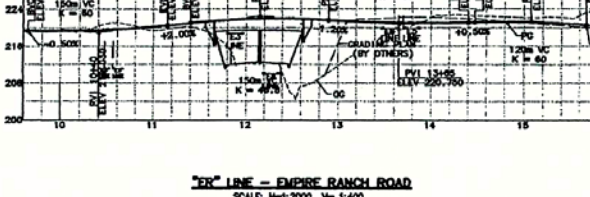
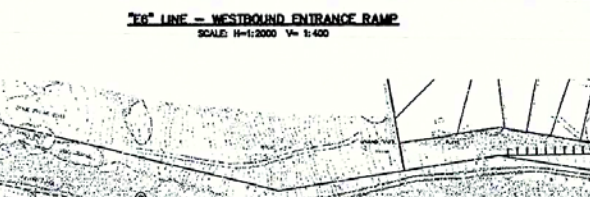
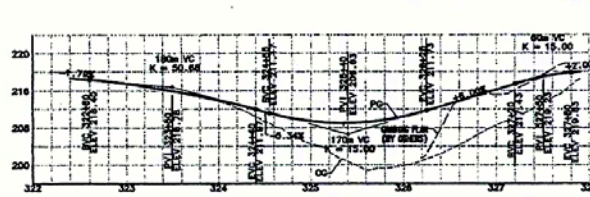
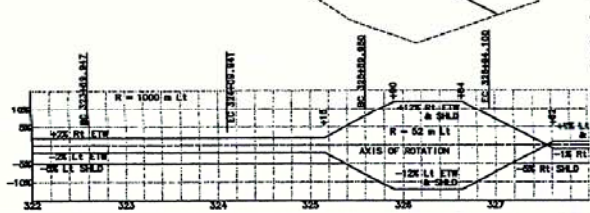
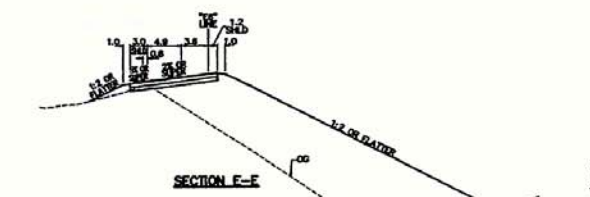


TENTATIVE ADJACENT DEVELOPMENT (BY OTHERS MAP/PT)

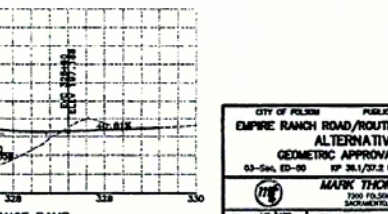
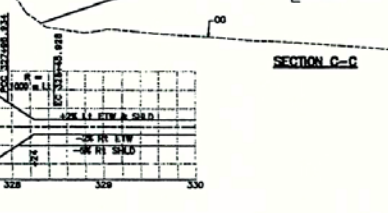
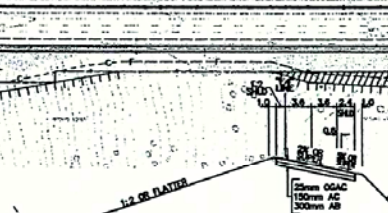
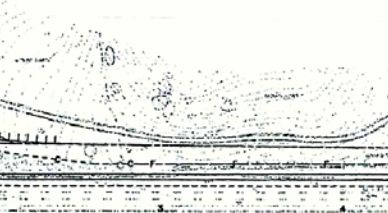
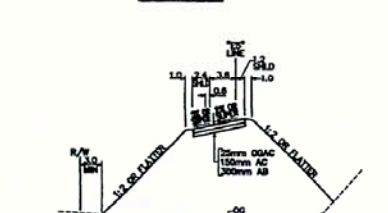
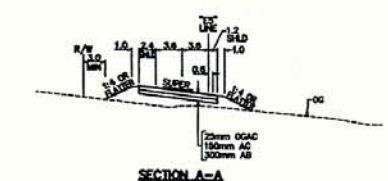
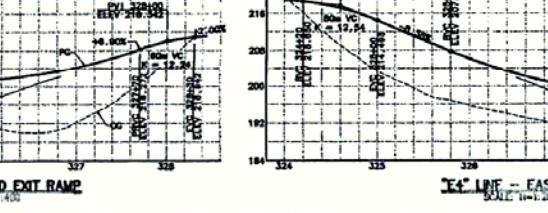
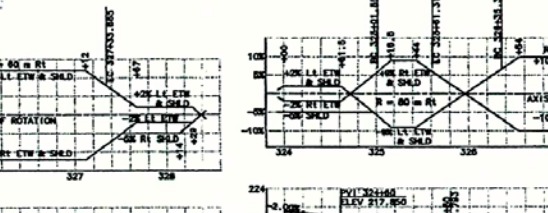
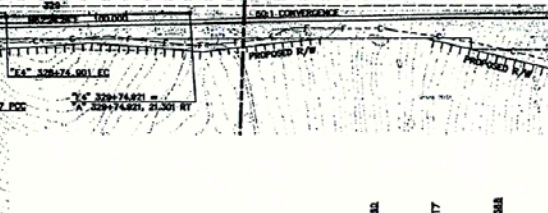
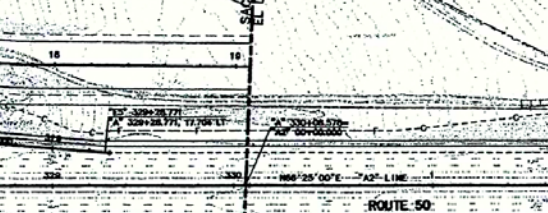
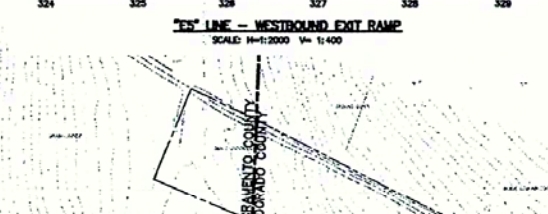
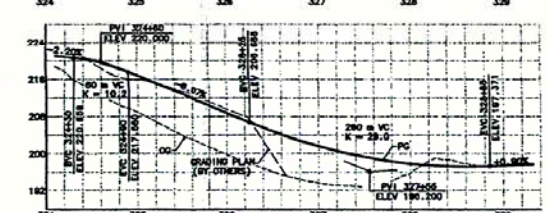
YEAR 2028 TRAFFIC VOLUMES  
EMPIRE RANCH ROAD WESTBOUND RAMP  
AM (PM) PEAK HOURS

YEAR 2028 TRAFFIC VOLUMES  
EMPIRE RANCH ROAD EASTBOUND RAMP  
AM (PM) PEAK HOURS

CITY OF FOLSOM PUBLIC WORKS DEPARTMENT  
EMPIRE RANCH ROAD/ROUTE 50 INTERCHANGE  
ALTERNATIVE 2  
GEOMETRIC APPROVAL DRAWING  
63-566, EP-03 8/13/2024 02/21 EA 128800  
200 FOLSOM BLVD, SUITE 200  
SACRAMENTO, CALIFORNIA 95632  
MARK THOMAS & CO. INC.  
DATE: 02/21/2024  
SCALE: AS SHOWN



Station	R	Δ	L	PVI	ELEV
(1)	80.000	347°14'	50.005	328.773	
(2)	280.000	347°14'	190.271	328.773	
(3)	1000.000	92°11'36"	48.884	35.002	
(4)	80.000	172°48'19"	163.683	197.818	
(5)	140.000	332°40'05"	81.813	42.004	
(6)	280.000	297°04'23"	131.830	87.418	
(7)	1000.000	07°31'30"	48.884	35.002	
(8)	80.000	172°29'29"	136.218	1304.074	
(9)	914.347	187°48'29"	313.589	108.389	
(10)	608.561	217°27'28"	230.057	104.413	
(11)	608.561	183°42'04"	179.729	92.527	



TENTATIVE ADJACENT DEVELOPMENT (BY OTHERS NOTED)

YEAR 2026 TRAFFIC VOLUMES EMPIRE RANCH ROAD/WESTBOUND RAMP

AM (PM) PEAK HOURS

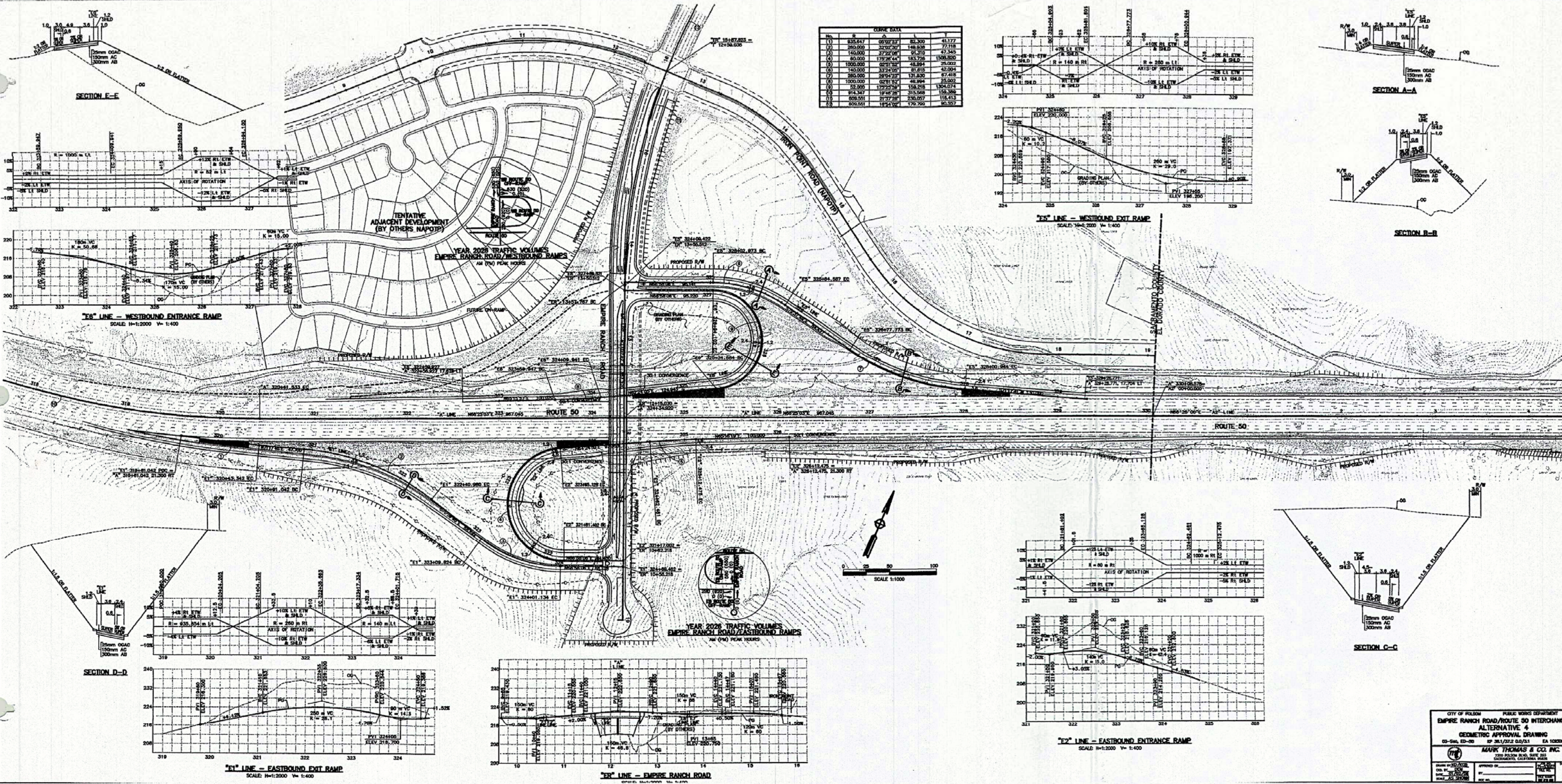
YEAR 2026 TRAFFIC VOLUMES EMPIRE RANCH ROAD/EASTBOUND RAMP

AM (PM) PEAK HOURS

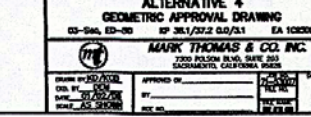
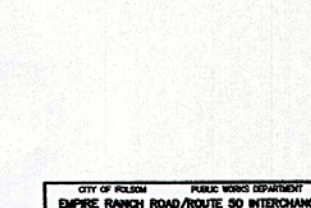
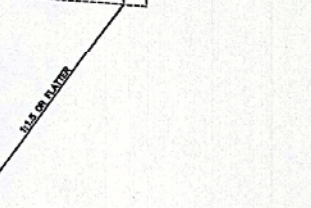
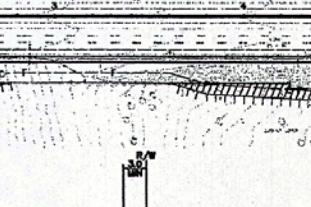
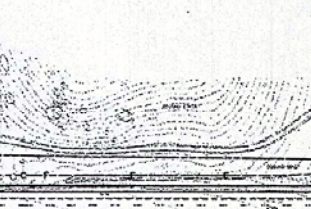
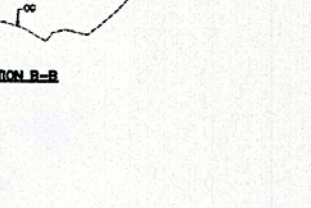
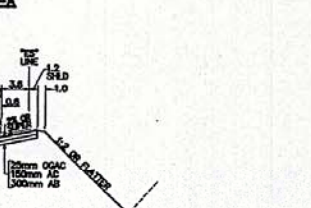
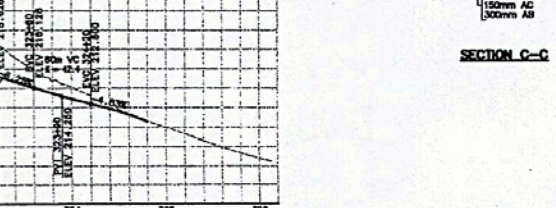
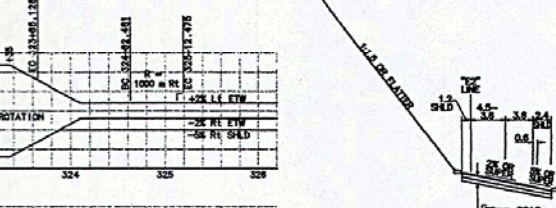
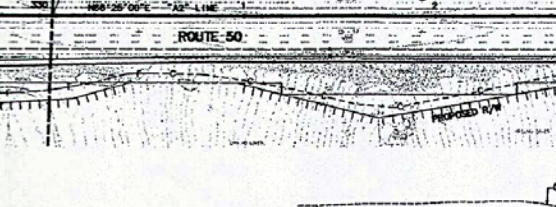
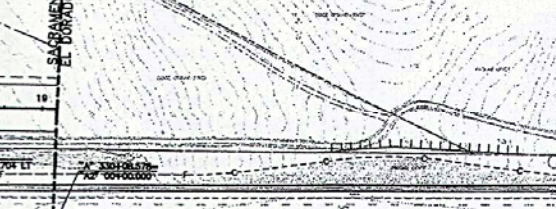
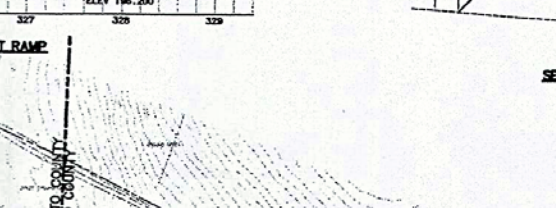
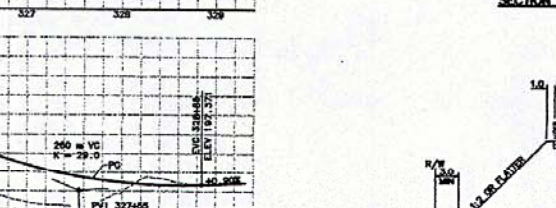
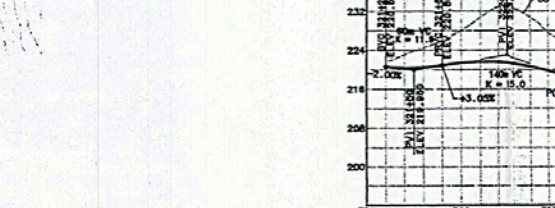
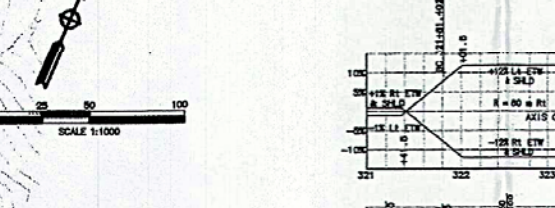
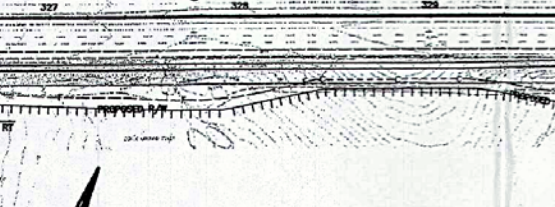
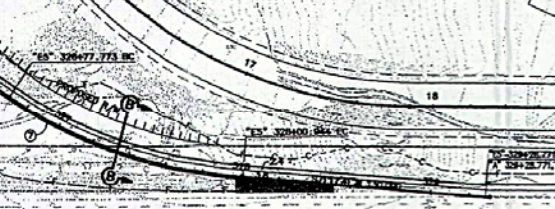
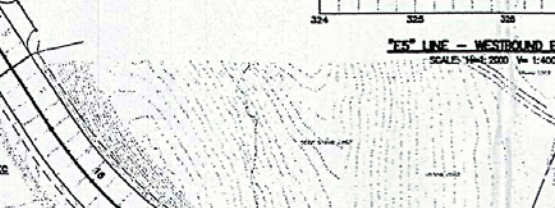
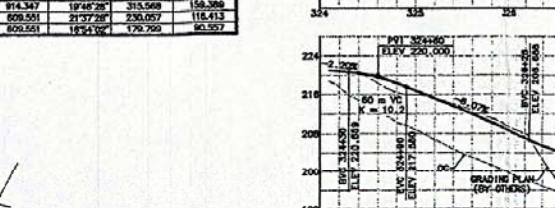
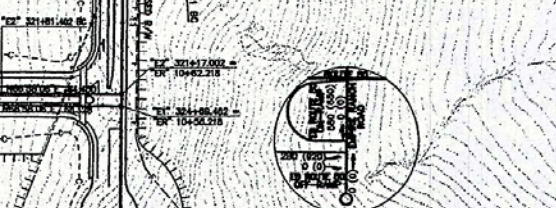
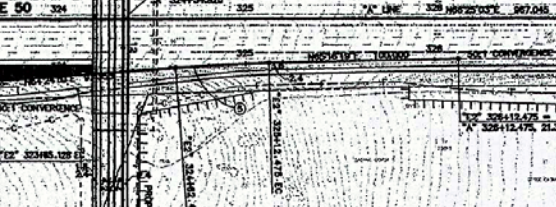
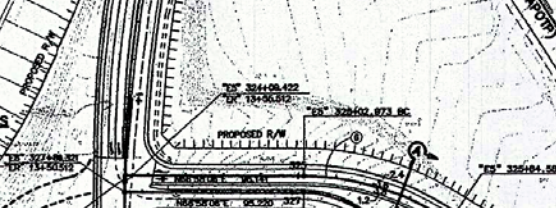
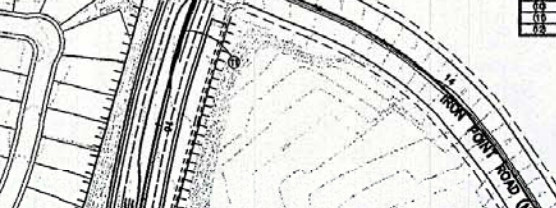
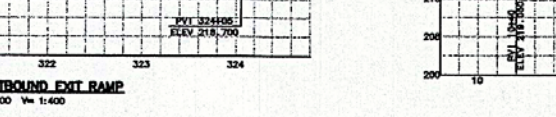
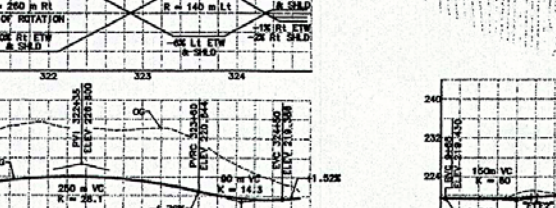
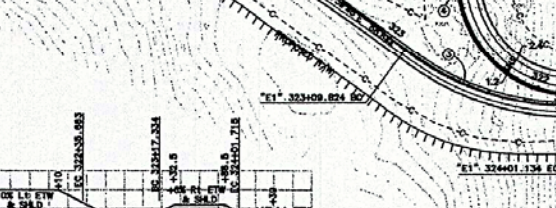
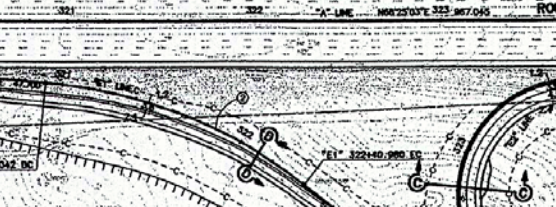
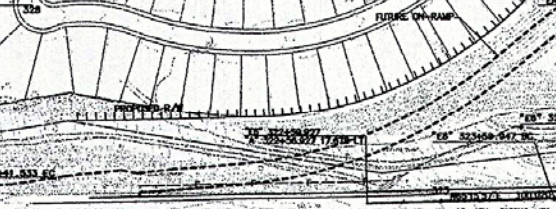
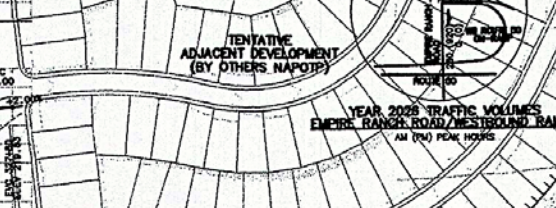
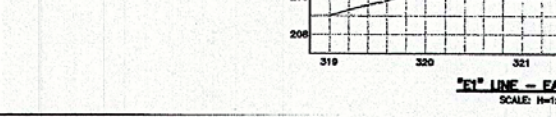
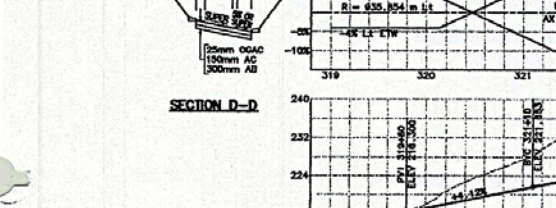
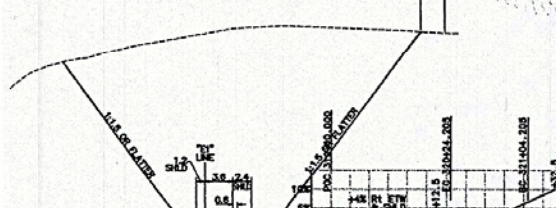
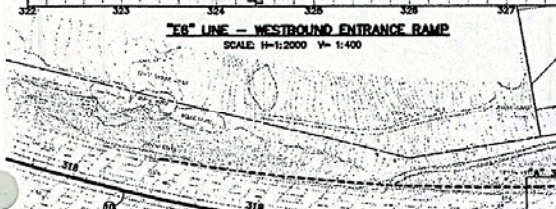
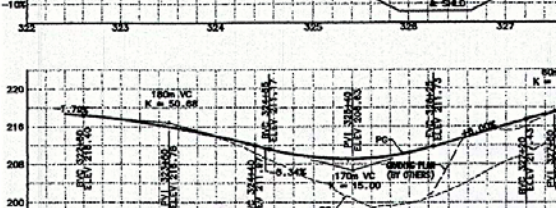
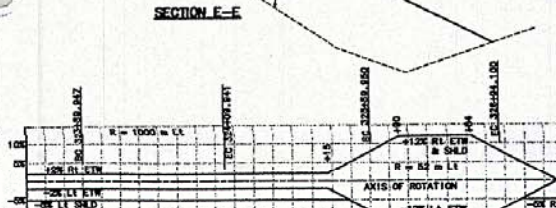
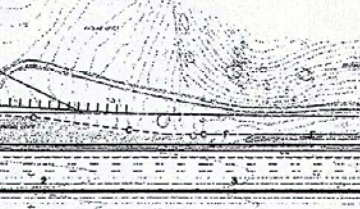
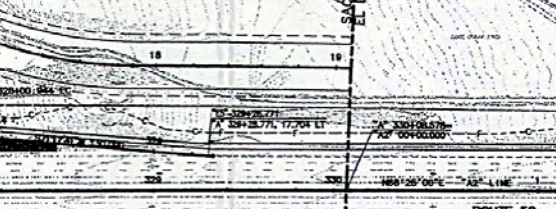
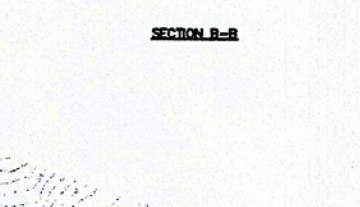
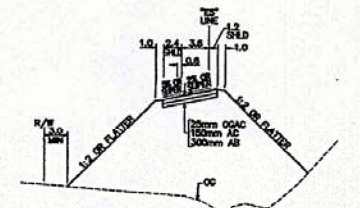
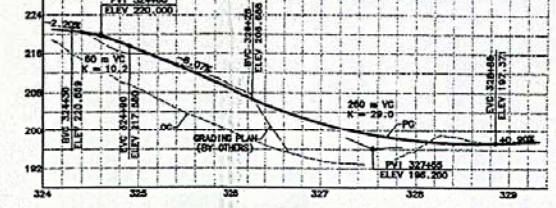
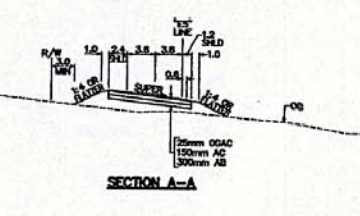
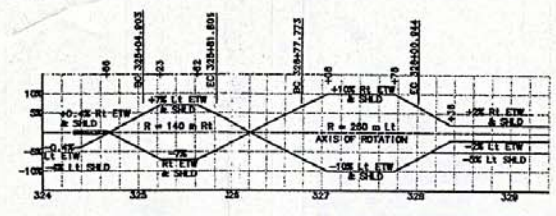
YEAR 2026 TRAFFIC VOLUMES EMPIRE RANCH ROAD/EASTBOUND RAMP

AM (PM) PEAK HOURS

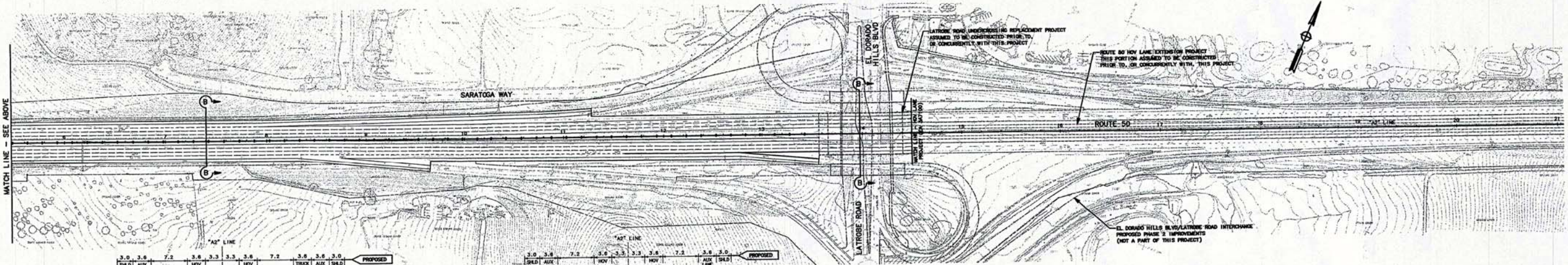
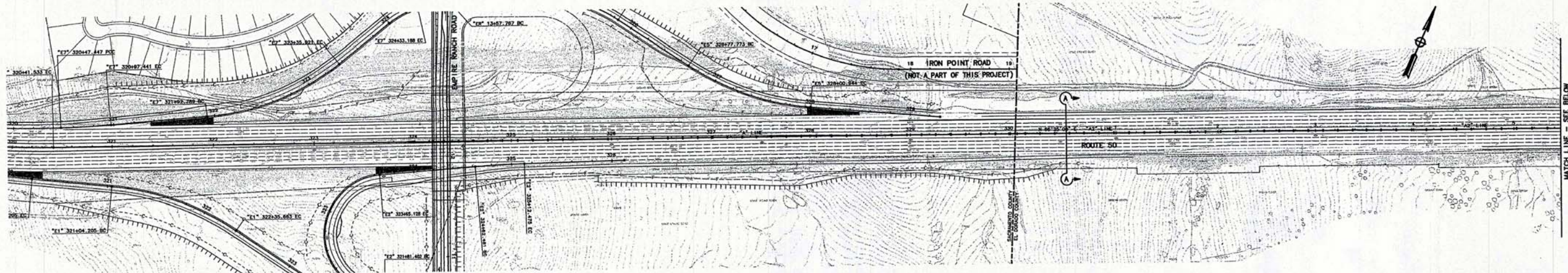
CITY OF FOLSOM PUBLIC WORKS DEPARTMENT  
 EMPIRE RANCH ROAD/ROUTE 50 INTERCHANGE  
 ALTERNATIVE 3  
 GEOMETRIC APPROVAL DRAWING  
 22-066 ED-00 1" = 80.0' 11/23/23 6:03/51 1A 100000  
 MARK THOMAS & CO., INC.  
 700 FOLSOM BLVD., SUITE 200  
 SACRAMENTO, CALIFORNIA 95833  
 DATE: 11/23/23 11:10 AM 23/0001



STATION	PC	PT	PI	EC	STATION	PC	PT	PI	EC
10	835.647	850.223	82.300	41.177	10	835.647	850.223	82.300	41.177
11	280.000	372.000	148.838	77.118	11	280.000	372.000	148.838	77.118
12	140.000	372.000	91.310	47.340	12	140.000	372.000	91.310	47.340
13	80.000	175.264	183.728	108.850	13	80.000	175.264	183.728	108.850
14	1000.000	600.000	48.964	25.000	14	1000.000	600.000	48.964	25.000
15	140.000	332.800	81.818	42.004	15	140.000	332.800	81.818	42.004
16	280.000	287.942	131.830	67.418	16	280.000	287.942	131.830	67.418
17	1000.000	600.000	48.964	25.000	17	1000.000	600.000	48.964	25.000
18	52.000	175.264	183.728	108.850	18	52.000	175.264	183.728	108.850
19	814.347	1948.78	313.568	158.386	19	814.347	1948.78	313.568	158.386
20	608.551	2137.28	230.057	116.413	20	608.551	2137.28	230.057	116.413
21	802.551	1824.07	178.750	85.577	21	802.551	1824.07	178.750	85.577

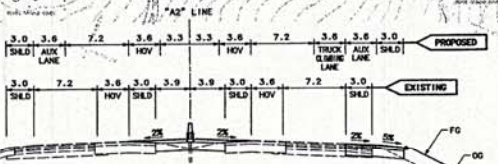


CITY OF FOLSOM PUBLIC WORKS DEPARTMENT  
**EMPIRE RANCH ROAD/ROUTE 50 INTERCHANGE**  
 ALTERNATIVE 4  
 GEOMETRIC APPROVAL DRAWING  
 03-04-03-00 17 381/212 03/21 EA 10220  
 MARK THOMAS & CO. INC.  
 770 FOLSOM BLVD. SUITE 200  
 SACRAMENTO, CALIFORNIA 95834

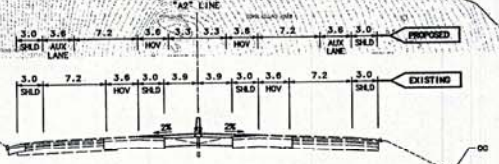


MATCH LINE - SEE ABOVE

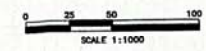
MATCH LINE - SEE BELOW



SECTION A-A



SECTION B-B



CITY OF FOLSOM PUBLIC WORKS DEPARTMENT  
 EMPIRE RANCH ROAD/ROUTE 50 INTERCHANGE  
 ROUTE 50 IMPROVEMENTS  
 GEOMETRIC APPROVAL DRAWING

03-566, ED-50 KP 36.1/37.2 0.0/3.1 EA 100500

**MARK THOMAS & CO. INC.**  
 700 FOLSON BLVD, SUITE 500  
 SACRAMENTO, CALIFORNIA 95833

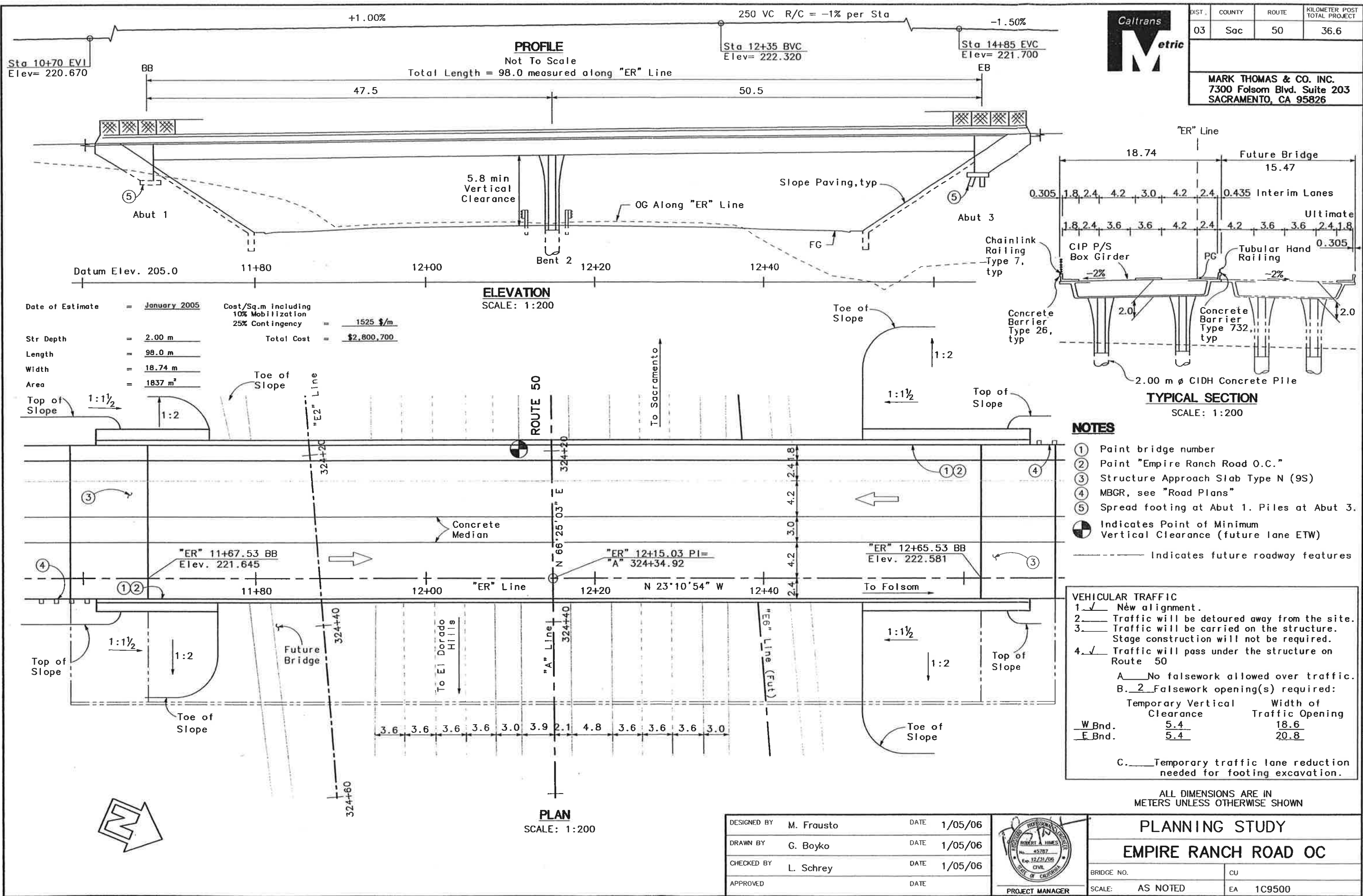
DATE: 12/20/03	APPROVED BY: [Signature]	DATE: 12/20/03	BY: [Signature]
DRAWN BY: [Signature]	DATE: 12/20/03	DATE: 12/20/03	DATE: 12/20/03

*Advanced Planning Study*

---

---

Attachment D



DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
03	Sac	50	36.6

**MARK THOMAS & CO. INC.**  
7300 Folsom Blvd. Suite 203  
SACRAMENTO, CA 95826

Date of Estimate = January 2005

Str Depth = 2.00 m

Length = 98.0 m

Width = 18.74 m

Area = 1837 m<sup>2</sup>

Cost/Sq.m including 10% Mobilization 25% Contingency = 1525 \$/m

Total Cost = \$2,800,700

- NOTES**
- Paint bridge number
  - Paint "Empire Ranch Road O.C."
  - Structure Approach Slab Type N (9S)
  - MBGR, see "Road Plans"
  - Spread footing at Abut 1. Piles at Abut 3.
  - Indicates Point of Minimum Vertical Clearance (future lane ETW)
  - Indicates future roadway features

**VEHICULAR TRAFFIC**

- New alignment.
- Traffic will be detoured away from the site.
- Traffic will be carried on the structure. Stage construction will not be required.
- Traffic will pass under the structure on Route 50

A. No falsework allowed over traffic.

B. 2 Falsework opening(s) required:

Temporary Vertical Clearance	Width of Traffic Opening
W Bnd. <u>5.4</u>	<u>18.6</u>
E Bnd. <u>5.4</u>	<u>20.8</u>

C. Temporary traffic lane reduction needed for footing excavation.

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY	M. Frausto	DATE	1/05/06
DRAWN BY	G. Boyko	DATE	1/05/06
CHECKED BY	L. Schrey	DATE	1/05/06
APPROVED		DATE	



**PLANNING STUDY**

**EMPIRE RANCH ROAD OC**

BRIDGE NO.	CU
SCALE:	AS NOTED
EA	1C9500

# *Project Cost Estimate*

Attachment E



### PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE 03-Sac/ED-50  
 Type of Estimate (Pre-PSR,  
 PSR, PR, etc.): PR  
 Program Code: \_\_\_\_\_  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : \_\_\_\_\_

**Project Description:**

**Limits:** On Route 50 from Empire Ranch Road in the City of Folsom (near the Sacramento/El Dorado County Line)

**Proposed Improvement:** This project proposes to construct a new interchange on Route 50 at Empire Ranch Road  
**(Scope)**

**Alternative:** Project Element 1 - Interchange Alternative 1 (Type L-2/Type L-7)

ROADWAY ITEMS	\$17,130,000
STRUCTURE ITEMS	\$4,851,000
<b>SUBTOTAL CONSTRUCTION</b>	<b>\$21,981,000</b>
RIGHT OF WAY	\$6,800,000
<b>TOTAL ALTERNATIVE COST</b>	<b>\$28,781,000</b>

**Reviewed by** \_\_\_\_\_ (Signature) \_\_\_\_\_ (Date)  
**Program Manager**

**Approved by** David E. Melis (916)-381-9100 01/31/06  
**Project Manager** (Signature) (Phone) (Date)

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

### I. ROADWAY ITEMS

	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Section Cost</u>
<u>Section 1 - Earthwork</u>				
Roadway Excavation	141,085	m <sup>3</sup>	\$35.00	\$4,937,975
Imported Borrow		m <sup>3</sup>	\$15.00	\$0
Clearing & Grubbing	1	LS	\$75,000	\$75,000
Develop Water Supply	1	LS	\$20,000	\$20,000
Stormwater Treatment BMP's	1	LS	\$300,000	\$300,000
				<u>Total Earthwork</u> <u>\$5,332,975</u>

### Section 2 - Structural Section \*

PCC Pavement ( _____ Depth)		m <sup>3</sup>		\$0
PCC Pavement ( _____ Depth)		m <sup>3</sup>		\$0
Asphalt Concrete	7,618	mt	\$70.00	\$533,260
Open Graded Asphalt Concrete	880	mt	\$75.00	\$66,000
				\$0
Aggregate Base	9,223	m <sup>3</sup>	\$45.00	\$415,013
Aggregate Subbase		m <sup>3</sup>	\$20.00	\$0
Asphalt Treated Permeable Base		m <sup>3</sup>	\$50.00	\$0
Blanket & Edge Drains		m	\$15.00	\$0
Edge Drain Outlet		m	\$40.00	\$0
				<u>Total Structural Section</u> <u>\$1,014,273</u>

### Section 3 - Drainage

Extend Box Culvert		LS		\$0
Storm Drains	1	LS	\$793,000	\$793,000
Small Drainage Facilities		LS	\$0	\$0
Project Drainage (X-drains, overside, etc.)	1	LS	\$222,200	\$222,200
				\$0
				<u>Total Drainage</u> <u>\$1,015,200</u>

\* Attach sketch showing typical structural section elements of the roadway.  
 Include (if available) T.I., R-Value, and date when tests were performed

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Section Cost</u>
<u>Section 4 - Specialty Items</u>				
Retaining Walls		m <sup>2</sup>	\$550.00	\$0
Soundwalls		m <sup>2</sup>		\$0
Equipment/Animal Passes		EA		\$0
Relocate Private Irrigation Facilities		m		\$0
Landscaping/Irrigation		HA		\$0
Erosion Control	1,238,000	m <sup>2</sup>	\$1.50	\$1,857,000
Slope Protection		m <sup>2</sup>		\$0
Barriers and Guardrails	1	LS	\$190,000	\$190,000
Hazardous Waste Work		LS		\$0
Environmental Mitigation	1	LS	\$100,000	\$100,000
Minor Concrete (Curb, Gutter & Sidewalk)		m3		\$0
				\$0
			<b>Total Specialty Items</b>	<b>\$2,147,000</b>
<u>Section 5 - Traffic Items</u>				
Lighting	1	LS	\$100,000	\$100,000
Traffic Signals	1	EA	\$150,000	\$150,000
Permanent Signing & Striping	1	LS	\$240,000	\$240,000
Traffic Control Systems	1	LS	\$750,000	\$750,000
Traffic Management Plan	1	LS	\$75,000	\$75,000
Ramp Metering	2	EA	\$150,000	\$300,000
			<b>Total Traffic Items</b>	<b>\$1,615,000</b>

**SUBTOTAL SECTIONS 1 - 5: \$11,124,448**

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

<u>Section 6 - Minor Items</u>		(5-10%)			
Subtotal Sections 1 - 5	<u>\$11,124,448</u>	X	10%	<u>\$1,112,445</u>	
				TOTAL MINOR ITEMS:	<u>\$1,112,445</u>

<u>Section 7 - Roadway Mobilization</u>		(5-10%)			
Subtotal Sections 1 - 5	<u>\$11,124,448</u>				
Minor Items	<u>\$1,112,445</u>				
Sum	<u>\$12,236,892</u>	X	10%	<u>\$1,223,689</u>	
				TOTAL ROADWAY MOBILIZATION	<u>\$1,223,689</u>

<u>Section 8 - Roadway Additions</u>		(5-10%)			
Supplemental					
Subtotal Sections 1 - 5	<u>\$11,124,448</u>				
Minor Items	<u>\$1,112,445</u>				
Sum	<u>\$12,236,892</u>	X	10%	<u>\$1,223,689</u>	

Contingencies					
Subtotal Sections 1 - 5	<u>\$11,124,448</u>				
Minor Items	<u>\$1,112,445</u>				
Sum	<u>\$12,236,892</u>	X	20% *	<u>\$2,447,378</u>	
				TOTAL ROADWAY ADDITIONS	<u>\$3,671,068</u>

TOTAL ROADWAY ITEMS \$17,130,000  
 (Total of Sections 1 - 8)

Estimate			
Prepared By:	David E. Melis	(916)-381-9100	31-Jan-06
	(Print Name)	(Phone)	(Date)

\* Use 25% at the PSR stage or a higher or lower rate if justified.

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

### II. STRUCTURES ITEMS

	#1	#2	#3	#4	#5
Bridge Name	Empire Ranch Rd				
Bridge No.	Overcrossing (New)				
Structure Type	CIP P/S Box Girder				
Width (m) - out to out	18.74				
Span Lengths (m)	98.0				
Total Area (m <sup>2</sup> )	1,836.5				
Footing Type (pile/spread)					
Cost per m <sup>2</sup> .	\$2,641.60				
Including:					
Mobilization: 10%					
Contingency: 25%					
Bridge Removal					
Approach Slabs					
Total Cost For Structure	\$4,851,000				
<b>SUBTOTAL STRUCTURES ITEMS</b>					<b>\$4,851,000</b>
Railroad Related Costs					
<b>TOTAL STRUCTURES ITEMS:</b>					<b>\$4,851,000</b>

COMMENTS: Bridge removal and approach slabs cost have contingencies included.

Estimate Prepared By: David E. Melis      0      (916)-381-9100      31-Jan-06  
 (Print Name)      (Print Name)      (Phone)      (Date)

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
KP: 3.1/37.2, 0.0/3.1  
EA: 1C9500  
PP No. : 0

### III. RIGHT OF WAY

Right-of-Way estimates should consider the probable highest and best use and type and intent of improvements at the time of acquisition. Assume acquisition including utility relocation occurs at the right of way certification milestone as shown in the Funding and Scheduling Section of the report. For further guidance see Chapter 1, Caltrans Right of Way Procedural Handbook.

	Current Value (Future Use)	Escalation Rate (%/yr)	Escalated Value *
Acquisition, including excess lands and damages to remainders	\$6,766,800	5.00%	\$7,460,400
Utility Relocation (Project Cost)	\$29,000	5.00%	\$32,000
Clearance / Demolition		5.00%	\$0
Relocation Assistance Program		5.00%	\$0
Title and Escrow Fees	\$4,000	N/A	\$4,000
CONSTRUCTION CONTRACT WORK			
TOTAL RIGHT OF WAY ** (CURRENT VALUE)	\$6,800,000	TOTAL ESCALATED RIGHT OF WAY	\$7,496,400

\* - Escalated to assumed year of advertising: 2008

\*\* - Current total value for use on sheet 1 of 6

Estimate prepared by: David E. Melis (916)-381-9100 31-Jan-06  
 (Print Name) (Phone) (Date)

**PRELIMINARY PROJECT COST ESTIMATE SUMMARY**

DIST - CO - RTE 03-Sac/ED-50  
 Type of Estimate (Pre-PSR,  
 PSR, PR, etc.): PR  
 Program Code:  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. :                     

**Project Description:**

**Limits:** On Route 50 from Empire Ranch Road in the City of Folsom to El Dorado Hills Blvd in El Dorado County

**Proposed Improvement:** Construct Auxiliary Lanes by widening to the outside of Route 50 between Empire Ranch Road IC and El Dorado Hills Blvd IC

**Alternative:** Project Element 2 (Alternative 2) - Construct Auxiliary Lanes by widening to the outside of Route 50 between Empire Ranch Road IC and El Dorado Hills Blvd IC.

ROADWAY ITEMS	\$7,797,000
STRUCTURE ITEMS	\$0
<b>SUBTOTAL CONSTRUCTION</b>	<b>\$7,797,000</b>
RIGHT OF WAY	\$703,000
<b>TOTAL ALTERNATIVE COST</b>	<b>\$8,500,000</b>

Reviewed by \_\_\_\_\_ (Signature) \_\_\_\_\_ (Date)  
 Program Manager

Approved by David E. Melis (916)-381-9100 01/31/06  
 Project Manager (Signature) (Phone) (Date)

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

### I. ROADWAY ITEMS

	Quantity	Unit	Unit Cost	Section Cost
<u>Section 1 - Earthwork</u>				
Roadway Excavation	25,294	m <sup>3</sup>	\$35.00	\$885,290
Imported Borrow		m <sup>3</sup>	\$15.00	\$0
Clearing & Grubbing	1	LS	\$75,000	\$75,000
Develop Water Supply	1	LS	\$20,000	\$20,000
Stormwater Treatment BMP's	1	LS	\$300,000	\$300,000
				<u>Total Earthwork</u>
				<u>\$1,280,290</u>

### Section 2 - Structural Section \*

PCC Pavement ( _____ Depth)		m <sup>3</sup>		\$0
PCC Pavement ( _____ Depth)		m <sup>3</sup>		\$0
Asphalt Concrete	17,194	mt	\$70.00	\$1,203,580
Rubberized Asphalt Concrete	660	mt	\$75.00	\$49,500
				\$0
Aggregate Base	11,800	m <sup>3</sup>	\$45.00	\$531,000
Aggregate Subbase		m <sup>3</sup>	\$20.00	\$0
Asphalt Treated Permeable Base		m <sup>3</sup>	\$50.00	\$0
Blanket & Edge Drains		m	\$15.00	\$0
Edge Drain Outlet		m	\$40.00	\$0
				<u>Total Structural Section</u>
				<u>\$1,784,080</u>

### Section 3 - Drainage

Extend Box Culvert		LS		\$0
Storm Drains	1	LS	\$383,000	\$383,000
Small Drainage Facilities		LS	\$0	\$0
Project Drainage (X-drains, overside, etc.)	1	LS	\$107,300	\$107,300
				\$0
				<u>Total Drainage</u>
				<u>\$490,300</u>

\* Attach sketch showing typical structural section elements of the roadway.  
 Include (if available) T.I., R-Value, and date when tests were performed



## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No.: 0

	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Section Cost</u>
<u>Section 4 - Specialty Items</u>				
Retaining Walls		m <sup>2</sup>	\$550.00	\$0
Soundwalls		m <sup>2</sup>		\$0
Equipment/Animal Passes		EA		\$0
Relocate Private Irrigation Facilities		m		\$0
Landscaping/Irrigation		HA		\$0
Erosion Control	21,000	m <sup>2</sup>	\$1.50	\$31,500
Slope Protection		m <sup>2</sup>		\$0
Barriers and Guardrails	1	LS	\$92,000	\$92,000
Hazardous Waste Work		LS		\$0
Environmental Mitigation		LS		\$0
Minor Concrete (Curb, Gutter & Sidewalk)		m3		\$0
				\$0
			<u>Total Specialty Items</u>	<u>\$123,500</u>
 <u>Section 5 - Traffic Items</u>				
Lighting	1	LS	\$600,000	\$600,000
Traffic Signals		EA		\$0
Permanent Signing & Striping	1	LS	\$445,000	\$445,000
Traffic Control Systems	1	LS	\$300,000	\$300,000
Traffic Management Plan	1	LS	\$40,000	\$40,000
Ramp Metering		EA		\$0
			<u>Total Traffic Items</u>	<u>\$1,385,000</u>
 <b>SUBTOTAL SECTIONS 1 - 5:</b>				 <u>\$5,063,170</u>

# PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

Section 6 - Minor Items

Subtotal Sections 1 - 5	<u>\$5,063,170</u>		(5-10%)		
		X	10%	<u>\$506,317</u>	
				TOTAL MINOR ITEMS:	<u><u>\$506,317</u></u>

Section 7 - Roadway Mobilization

Subtotal Sections 1 - 5	<u>\$5,063,170</u>				
Minor Items	<u>\$506,317</u>		(5-10%)		
Sum	<u>\$5,569,487</u>	X	10%	<u>\$556,949</u>	
				TOTAL ROADWAY MOBILIZATION	<u><u>\$556,949</u></u>

Section 8 - Roadway Additions

<u>Supplemental</u>					
Subtotal Sections 1 - 5	<u>\$5,063,170</u>				
Minor Items	<u>\$506,317</u>		(5-10%)		
Sum	<u>\$5,569,487</u>	X	10%	<u>\$556,949</u>	
Contingencies					
Subtotal Sections 1 - 5	<u>\$5,063,170</u>				
Minor Items	<u>\$506,317</u>				
Sum	<u>\$5,569,487</u>	X	20% *	<u>\$1,113,897</u>	
				TOTAL ROADWAY ADDITIONS	<u><u>\$1,670,846</u></u>

TOTAL ROADWAY ITEMS \$7,797,000  
 (Total of Sections 1 - 8)

Estimate			
Prepared By:	David E. Melis	(916)-381-9100	31-Jan-06
	(Print Name)	(Phone)	(Date)

\* Use 25% at the PSR stage or a higher or lower rate if justified.

# PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

**II. STRUCTURES ITEMS**

#1
#2
#3
#4
#5

Bridge Name	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>
Bridge No.	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>
Structure Type	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>
Width (m) - out to out	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>
Span Lengths (m)	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>
Total Area (m <sup>2</sup> )	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>
Footing Type (pile/spread)	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>
Cost per m <sup>2</sup> .	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>
including:					
Mobilization: 10%					
Contingency: 25%					
Bridge Removal	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>
Approach Slabs	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>
Total Cost For Structure	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>                    </u>

SUBTOTAL STRUCTURES ITEMS                                           \$0

Railroad Related Costs                                                                                                         

TOTAL STRUCTURES ITEMS:                                           \$0

COMMENTS: Bridge removal and approach slabs cost have contingencies included.

Estimate Prepared By: David E. Melis 0 (916)-381-9100 31-Jan-06  
(Print Name) (Print Name) (Phone) (Date)

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
KP: 3.1/37.2, 0.0/3.1  
EA: 1C9500  
PP No. : 0

### III. RIGHT OF WAY

Right-of-Way estimates should consider the probable highest and best use and type and intent of improvements at the time of acquisition. Assume acquisition including utility relocation occurs at the right of way certification milestone as shown in the Funding and Scheduling Section of the report. For further guidance see Chapter 1, Caltrans Right of Way Procedural Handbook.

	<u>Current Value (Future Use)</u>	<u>Escalation Rate (%/yr)</u>	<u>Escalated Value *</u>
Acquisition, including excess lands and damages to remainders	<u>\$549,600</u>	<u>5.00%</u>	<u>\$605,900</u>
Utility Relocation (Project Cost)	<u>\$146,000</u>	<u>5.00%</u>	<u>\$161,000</u>
Clearance / Demolition	<u></u>	<u>5.00%</u>	<u>\$0</u>
Relocation Assistance Program	<u></u>	<u>5.00%</u>	<u>\$0</u>
Title and Escrow Fees	<u>\$7,000</u>	<u>N/A</u>	<u>\$7,000</u>
<b>CONSTRUCTION CONTRACT WORK</b>			
	<u></u>	<u></u>	<u></u>
TOTAL RIGHT OF WAY ** (CURRENT VALUE)	<u>\$703,000</u>	TOTAL ESCALATED RIGHT OF WAY	<u>\$774,000</u>

\* - Escalated to assumed year of advertising: 2008

\*\* - Current total value for use on sheet 1 of 6

Estimate prepared by: David E. Melis (916)-381-9100 31-Jan-06  
(Print Name) (Phone) (Date)

### PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE 03-Sac/ED-50  
 Type of Estimate (Pre-PSR,  
 PSR, PR, etc.): PR  
 Program Code: \_\_\_\_\_  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : \_\_\_\_\_

**Project Description:**

**Limits:** On Route 50 from Empire Ranch Road in the City of Folsom (near the Sacramento/El Dorado County Line)

**Proposed Improvement:** This project proposes to construct a new interchange on Route 50 at Empire Ranch Road  
**(Scope)**

**Alternative:** Project Element 1 - Interchange Alternative 2 (Type L-2/Type L-8)

ROADWAY ITEMS	\$14,567,000
STRUCTURE ITEMS	\$4,851,000
<b>SUBTOTAL CONSTRUCTION</b>	<b>\$19,418,000</b>
RIGHT OF WAY	\$6,944,000
<b>TOTAL ALTERNATIVE COST</b>	<b>\$26,362,000</b>

**Reviewed by** \_\_\_\_\_ (Signature) \_\_\_\_\_ (Date)  
**Program Manager**

**Approved by** David S. Melis (916)-381-9100 01/31/06  
**Project Manager** (Signature) (Phone) (Date)

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

### I. ROADWAY ITEMS

	Quantity	Unit	Unit Cost	Section Cost
<u>Section 1 - Earthwork</u>				
Roadway Excavation	22,150	m <sup>3</sup>	\$35.00	\$775,250
Imported Borrow	185,360	m <sup>3</sup>	\$15.00	\$2,780,400
Clearing & Grubbing	1	LS	\$75,000	\$75,000
Develop Water Supply	1	LS	\$20,000	\$20,000
Stormwater Treatment BMP's	1	LS	\$300,000	\$300,000
				<u>Total Earthwork</u>
				<u>\$3,950,650</u>

### Section 2 - Structural Section \*

PCC Pavement ( _____ Depth)		m <sup>3</sup>		\$0
PCC Pavement ( _____ Depth)		m <sup>3</sup>		\$0
Asphalt Concrete	8,170	mt	\$70.00	\$571,900
Open Graded Asphalt Concrete	953	mt	\$75.00	\$71,475
				\$0
Aggregate Base	9,680	m <sup>3</sup>	\$45.00	\$435,600
Aggregate Subbase		m <sup>3</sup>	\$20.00	\$0
Asphalt Treated Permeable Base		m <sup>3</sup>	\$50.00	\$0
Blanket & Edge Drains		m	\$15.00	\$0
Edge Drain Outlet		m	\$40.00	\$0
				<u>Total Structural Section</u>
				<u>\$1,078,975</u>

### Section 3 - Drainage

Extend Box Culvert		LS		\$0
Storm Drains	1	LS	\$629,000	\$629,000
Small Drainage Facilities		LS	\$0	\$0
Project Drainage (X-drains, overside, etc.)	1	LS	\$377,222	\$377,222
				\$0
				<u>Total Drainage</u>
				<u>\$1,006,222</u>

\* Attach sketch showing typical structural section elements of the roadway.  
 Include (if available) T.I., R-Value, and date when tests were performed

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Section Cost</u>
<b><u>Section 4 - Specialty Items</u></b>				
Retaining Walls		m <sup>2</sup>	\$550.00	\$0
Soundwalls		m <sup>2</sup>		\$0
Equipment/Animal Passes		EA		\$0
Relocate Private Irrigation Facilities		m		\$0
Landscaping/Irrigation		HA		\$0
Erosion Control	1,238,000	m <sup>2</sup>	\$1.50	\$1,857,000
Slope Protection		m <sup>2</sup>		\$0
Barriers and Guardrails	1	LS	\$151,000	\$151,000
Hazardous Waste Work		LS		\$0
Environmental Mitigation	1	LS	\$100,000	\$100,000
Minor Concrete (Curb, Gutter & Sidewalk)		m3		\$0
				\$0
				<u>Total Specialty Items</u>
				<u>\$2,108,000</u>
<b><u>Section 5 - Traffic Items</u></b>				
Lighting	1	LS	\$100,000	\$100,000
Traffic Signals	1	EA	\$150,000	\$150,000
Permanent Signing & Striping	1	LS	\$240,000	\$240,000
Traffic Control Systems	1	LS	\$750,000	\$750,000
Traffic Management Plan	1	LS	\$75,000	\$75,000
Ramp Metering		EA		\$0
				<u>Total Traffic Items</u>
				<u>\$1,315,000</u>
<b>SUBTOTAL SECTIONS 1 - 5:</b>				<u>\$9,458,847</u>

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

<u>Section 6 - Minor Items</u>		(5-10%)		
Subtotal Sections 1 - 5	<u>\$9,458,847</u>	X	10%	<u>\$945,885</u>
				TOTAL MINOR ITEMS: <u>\$945,885</u>

<u>Section 7 - Roadway Mobilization</u>				
Subtotal Sections 1 - 5	<u>\$9,458,847</u>			
Minor Items	<u>\$945,885</u>		(5-10%)	
Sum	<u>\$10,404,732</u>	X	10%	<u>\$1,040,473</u>
				TOTAL ROADWAY MOBILIZATION <u>\$1,040,473</u>

<u>Section 8 - Roadway Additions</u>				
Supplemental				
Subtotal Sections 1 - 5	<u>\$9,458,847</u>			
Minor Items	<u>\$945,885</u>		(5-10%)	
Sum	<u>\$10,404,732</u>	X	10%	<u>\$1,040,473</u>
				TOTAL ROADWAY ADDITIONS <u>\$3,121,420</u>

Contingencies				
Subtotal Sections 1 - 5	<u>\$9,458,847</u>			
Minor Items	<u>\$945,885</u>			
Sum	<u>\$10,404,732</u>	X	20% *	<u>\$2,080,946</u>
				TOTAL ROADWAY ITEMS <u>\$14,567,000</u>
				(Total of Sections 1 - 8)

Estimate			
Prepared By:	David E. Melis	(916)-381-9100	31-Jan-06
	(Print Name)	(Phone)	(Date)

\* Use 25% at the PSR stage or a higher or lower rate if justified.



## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

### II. STRUCTURES ITEMS

	#1	#2	#3	#4	#5
Bridge Name	Empire Ranch Rd				
Bridge No.	Overcrossing (New)				
Structure Type	CIP P/S Box Girder				
Width (m) - out to out	18.74				
Span Lengths (m)	98.0				
Total Area (m <sup>2</sup> )	1,836.5				
Footing Type (pile/spread)					
Cost per m <sup>2</sup> . cluding: Mobilization: 10% Contingency: 25%	\$2,641.60				
Bridge Removal					
Approach Slabs					
Total Cost For Structure	\$4,851,351				
<b>SUBTOTAL STRUCTURES ITEMS</b>					<u>\$4,851,351</u>
Railroad Related Costs					
<b>TOTAL STRUCTURES ITEMS:</b>					<u>\$4,851,000</u>

COMMENTS: Bridge removal and approach slabs cost have contingencies included.

Estimate Prepared By: David E. Melis      0      (916)-381-9100      31-Jan-06  
(Print Name)      (Print Name)      (Phone)      (Date)

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
 03-Sac/ED-50  
 KP: 3.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

### III. RIGHT OF WAY

Right-of-Way estimates should consider the probable highest and best use and type and intent of improvements at the time of acquisition. Assume acquisition including utility relocation occurs at the right of way certification milestone as shown in the Funding and Scheduling Section of the report. For further guidance see Chapter 1, Caltrans Right of Way Procedural Handbook.

	<u>Current Value (Future Use)</u>	<u>Escalation Rate (%/yr)</u>	<u>Escalated Value *</u>
Acquisition, including excess lands and damages to remainders	<u>\$6,910,800</u>	<u>5.00%</u>	<u>\$7,619,200</u>
Utility Relocation (Project Cost)	<u>\$29,000</u>	<u>5.00%</u>	<u>\$32,000</u>
Clearance / Demolition	<u></u>	<u>5.00%</u>	<u>\$0</u>
Relocation Assistance Program	<u></u>	<u>5.00%</u>	<u>\$0</u>
Title and Escrow Fees	<u>\$4,000</u>	<u>N/A</u>	<u>\$4,000</u>
<b>CONSTRUCTION CONTRACT WORK</b>			
TOTAL RIGHT OF WAY ** (CURRENT VALUE)	<u>\$6,944,000</u>	TOTAL ESCALATED RIGHT OF WAY	<u>\$7,655,200</u>

\* - Escalated to assumed year of advertising: 2008

\*\* - Current total value for use on sheet 1 of 6

Estimate prepared by: David E. Melis (916)-381-9100 31-Jan-06  
 (Print Name) (Phone) (Date)

### PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE 03-Sac/ED-50  
 Type of Estimate (Pre-PSR,  
 PSR, PR, etc.): PR  
 Program Code: \_\_\_\_\_  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : \_\_\_\_\_

**Project Description:**

**Limits:** On Route 50 from Empire Ranch Road in the City of Folsom (near the Sacramento/El Dorado County Line)

**Proposed Improvement:** This project proposes to construct a new interchange on Route 50 at Empire Ranch Road  
**(Scope)** \_\_\_\_\_

**Alternative:** Project Element 1 - Interchange Alternative 3 (Type L-7/Type L-8)

ROADWAY ITEMS	\$15,075,000
STRUCTURE ITEMS	\$4,851,000
<b>SUBTOTAL CONSTRUCTION</b>	<b>\$19,926,000</b>
RIGHT OF WAY	\$6,944,000
<b>TOTAL ALTERNATIVE COST</b>	<b>\$26,870,000</b>

**Reviewed by** \_\_\_\_\_ **Program Manager** (Signature) \_\_\_\_\_ (Date)

**Approved by** David E. Melis (916)-381-9100 01/31/06  
**Project Manager** (Signature) (Phone) (Date)

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

### I. ROADWAY ITEMS

	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Section Cost</u>
<u>Section 1 - Earthwork</u>				
Roadway Excavation	12,860	m <sup>3</sup>	\$35.00	\$450,100
Imported Borrow	233,760	m <sup>3</sup>	\$15.00	\$3,506,400
Clearing & Grubbing	1	LS	\$75,000	\$75,000
Develop Water Supply	1	LS	\$20,000	\$20,000
Stormwater Treatment BMP's	1	LS	\$300,000	\$300,000
				<u>Total Earthwork</u> <u>\$4,351,500</u>
<u>Section 2 - Structural Section *</u>				
PCC Pavement ( _____ Depth)		m <sup>3</sup>		\$0
PCC Pavement ( _____ Depth)		m <sup>3</sup>		\$0
Asphalt Concrete	8,555	mt	\$70.00	\$598,850
Open Graded Asphalt Concrete	1,010	mt	\$75.00	\$75,750
				\$0
Aggregate Base	10,000	m <sup>3</sup>	\$45.00	\$450,000
Aggregate Subbase		m <sup>3</sup>	\$20.00	\$0
Asphalt Treated Permeable Base		m <sup>3</sup>	\$50.00	\$0
Blanket & Edge Drains		m	\$15.00	\$0
Edge Drain Outlet		m	\$40.00	\$0
				<u>Total Structural Section</u> <u>\$1,124,600</u>
<u>Section 3 - Drainage</u>				
Extend Box Culvert		LS		\$0
Storm Drains	1	LS	\$685,000	\$685,000
Small Drainage Facilities		LS	\$0	\$0
Project Drainage (X-drains, overside, etc.)	1	LS	\$191,700	\$191,700
				\$0
				<u>Total Drainage</u> <u>\$876,700</u>

\* Attach sketch showing typical structural section elements of the roadway.  
 Include (if available) T.I., R-Value, and date when tests were performed

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

	Quantity	Unit	Unit Cost	Section Cost
<u>Section 4 - Specialty Items</u>				
Retaining Walls		m <sup>2</sup>	\$550.00	\$0
Soundwalls		m <sup>2</sup>		\$0
Equipment/Animal Passes		EA		\$0
Relocate Private Irrigation Facilities		m		\$0
Landscaping/Irrigation		HA		\$0
Erosion Control	1,238,000	m <sup>2</sup>	\$1.50	\$1,857,000
Slope Protection		m <sup>2</sup>		\$0
Barriers and Guardrails	1	LS	\$164,000	\$164,000
Hazardous Waste Work		LS		\$0
Environmental Mitigation	1	LS	\$100,000	\$100,000
Minor Concrete (Curb, Gutter & Sidewalk)		m3		\$0
				\$0
				<u>Total Specialty Items</u> \$2,121,000
<u>Section 5 - Traffic Items</u>				
Lighting	1	LS	\$100,000	\$100,000
Traffic Signals	1	EA	\$150,000	\$150,000
Permanent Signing & Striping	1	LS	\$240,000	\$240,000
Traffic Control Systems	1	LS	\$750,000	\$750,000
Traffic Management Plan	1	LS	\$75,000	\$75,000
Ramp Metering		EA		\$0
				<u>Total Traffic Items</u> \$1,315,000
<b>SUBTOTAL SECTIONS 1 - 5:</b>				<u>\$9,788,800</u>

# PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

Section 6 - Minor Items

Subtotal Sections 1 - 5	<u>\$9,788,800</u>	(5-10%) X 10%	<u>\$978,880</u>	
			TOTAL MINOR ITEMS:	<u><u>\$978,880</u></u>

Section 7 - Roadway Mobilization

Subtotal Sections 1 - 5	<u>\$9,788,800</u>			
Minor Items	<u>\$978,880</u>	(5-10%)		
Sum	<u>\$10,767,680</u>	X 10%	<u>\$1,076,768</u>	
			TOTAL ROADWAY MOBILIZATION	<u><u>\$1,076,768</u></u>

Section 8 - Roadway Additions

<u>Supplemental</u>				
Subtotal Sections 1 - 5	<u>\$9,788,800</u>			
Minor Items	<u>\$978,880</u>	(5-10%)		
Sum	<u>\$10,767,680</u>	X 10%	<u>\$1,076,768</u>	
				TOTAL ROADWAY ADDITIONS
				<u><u>\$3,230,304</u></u>

Contingencies

Subtotal Sections 1 - 5	<u>\$9,788,800</u>			
Minor Items	<u>\$978,880</u>			
Sum	<u>\$10,767,680</u>	X 20% *	<u>\$2,153,536</u>	
				TOTAL ROADWAY ITEMS
				<u><u>\$15,075,000</u></u>
				(Total of Sections 1 - 8)

Estimate Prepared By:	David E. Melis	(916)-381-9100	31-Jan-06
	(Print Name)	(Phone)	(Date)

\* Use 25% at the PSR stage or a higher or lower rate if justified.

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No.: 0

### II. STRUCTURES ITEMS

	#1	#2	#3	#4	#5
Bridge Name	Empire Ranch Rd				
Bridge No.	Overcrossing (New)				
Structure Type	CIP P/S Box Girder				
Width (m) - out to out	18.74				
Span Lengths (m)	98.0				
Total Area (m <sup>2</sup> )	1,836.5				
Footing Type (pile/spread)					
Cost per m <sup>2</sup> . including: Mobilization: 10% Contingency: 25%	\$2,641.60				
Bridge Removal					
Approach Slabs					
Total Cost For Structure	\$4,851,351				
<b>SUBTOTAL STRUCTURES ITEMS</b>					<b>\$4,851,351</b>
Railroad Related Costs					
<b>TOTAL STRUCTURES ITEMS:</b>					<b>\$4,851,000</b>

COMMENTS: Bridge removal and approach slabs cost have contingencies included.

Estimate Prepared By: David E. Melis      0      (916)-381-9100      31-Jan-06  
 (Print Name)      (Print Name)      (Phone)      (Date)

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 3.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

### III. RIGHT OF WAY

Right-of-Way estimates should consider the probable highest and best use and type and intent of improvements at the time of acquisition. Assume acquisition including utility relocation occurs at the right of way certification milestone as shown in the Funding and Scheduling Section of the report. For further guidance see Chapter 1, Caltrans Right of Way Procedural Handbook.

	<u>Current Value (Future Use)</u>	<u>Escalation Rate (%/yr)</u>	<u>Escalated Value *</u>
Acquisition, including excess lands and damages to remainders	<u>\$6,910,800</u>	<u>5.00%</u>	<u>\$7,619,200</u>
Utility Relocation (Project Cost)	<u>\$29,000</u>	<u>5.00%</u>	<u>\$32,000</u>
Clearance / Demolition	<u></u>	<u>5.00%</u>	<u>\$0</u>
Relocation Assistance Program	<u></u>	<u>5.00%</u>	<u>\$0</u>
Title and Escrow Fees	<u>\$4,000</u>	<u>N/A</u>	<u>\$4,000</u>
<b>CONSTRUCTION CONTRACT WORK</b>			
TOTAL RIGHT OF WAY ** (CURRENT VALUE)	<u>\$6,944,000</u>	TOTAL ESCALATED RIGHT OF WAY	<u>\$7,655,200</u>

\* - Escalated to assumed year of advertising: 2008

\*\* - Current total value for use on sheet 1 of 6

Estimate prepared by: David E. Melis (916)-381-9100 31-Jan-06  
 (Print Name) (Phone) (Date)



### PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE 03-Sac/ED-50  
 Type of Estimate (Pre-PSR,  
 PSR, PR, etc.): PR  
 Program Code: \_\_\_\_\_  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : \_\_\_\_\_

**Project Description:**

**Limits:** On Route 50 from Empire Ranch Road in the City of Folsom (near the Sacramento/El Dorado County Line)

**Proposed Improvement:** This project proposes to construct a new interchange on Route 50 at Empire Ranch Road  
**(Scope)**

**Alternative:** Project Element 1 - Interchange Alternative 4 (Type L-7)

ROADWAY ITEMS	\$16,161,000
STRUCTURE ITEMS	\$4,851,000
<b>SUBTOTAL CONSTRUCTION</b>	<b>\$21,012,000</b>
RIGHT OF WAY	\$6,800,000
<b>TOTAL ALTERNATIVE COST</b>	<b>\$27,812,000</b>

Reviewed by \_\_\_\_\_  
 Program Manager (Signature) (Date)

Approved by David G. Melis (916)-381-9100 01/31/06  
 Project Manager (Signature) (Phone) (Date)

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

### I. ROADWAY ITEMS

	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Section Cost</u>
<u>Section 1 - Earthwork</u>				
Roadway Excavation	131,815	m <sup>3</sup>	\$35.00	\$4,613,525
Imported Borrow		m <sup>3</sup>	\$15.00	\$0
Clearing & Grubbing	1	LS	\$75,000	\$75,000
Develop Water Supply	1	LS	\$20,000	\$20,000
Stormwater Treatment BMP's	1	LS	\$300,000	\$300,000
				<u>Total Earthwork</u> <u>\$5,008,525</u>
 <u>Section 2 - Structural Section *</u>				
PCC Pavement ( _____ Depth)		m <sup>3</sup>		\$0
PCC Pavement ( _____ Depth)		m <sup>3</sup>		\$0
Asphalt Concrete	8,005	mt	\$70.00	\$560,350
Open Graded Asphalt Concrete	935	mt	\$75.00	\$70,125
				\$0
Aggregate Base	9,545	m <sup>3</sup>	\$45.00	\$429,525
Aggregate Subbase		m <sup>3</sup>	\$20.00	\$0
Asphalt Treated Permeable Base		m <sup>3</sup>	\$50.00	\$0
Blanket & Edge Drains		m	\$15.00	\$0
Edge Drain Outlet		m	\$40.00	\$0
				<u>Total Structural Section</u> <u>\$1,060,000</u>
 <u>Section 3 - Drainage</u>				
Extend Box Culvert		LS		\$0
Storm Drains	1	LS	\$759,000	\$759,000
Small Drainage Facilities		LS	\$0	\$0
Project Drainage (X-drains, overside, etc.)	1	LS	\$212,400	\$212,400
				\$0
				<u>Total Drainage</u> <u>\$971,400</u>

\* Attach sketch showing typical structural section elements of the roadway.  
 Include (if available) T.I., R-Value, and date when tests were performed

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No.: 0

	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Section Cost</u>
<u>Section 4 - Specialty Items</u>				
Retaining Walls		m <sup>2</sup>	\$550.00	\$0
Soundwalls		m <sup>2</sup>		\$0
Equipment/Animal Passes		EA		\$0
Relocate Private Irrigation Facilities		m		\$0
Landscaping/Irrigation		HA		\$0
Erosion Control	1,238,000	m <sup>2</sup>	\$1.50	\$1,857,000
Slope Protection		m <sup>2</sup>		\$0
Barriers and Guardrails	1	LS	\$182,000	\$182,000
Hazardous Waste Work		LS		\$0
Environmental Mitigation	1	LS	\$100,000	\$100,000
Minor Concrete (Curb, Gutter & Sidewalk)		m3		\$0
				\$0
				<u>Total Specialty Items</u> <u>\$2,139,000</u>
<u>Section 5 - Traffic Items</u>				
Lighting	1	LS	\$100,000	\$100,000
Traffic Signals	1	EA	\$150,000	\$150,000
Permanent Signing & Striping	1	LS	\$240,000	\$240,000
Traffic Control Systems	1	LS	\$750,000	\$750,000
Traffic Management Plan	1	LS	\$75,000	\$75,000
Ramp Metering		EA		\$0
				<u>Total Traffic Items</u> <u>\$1,315,000</u>
<b>SUBTOTAL SECTIONS 1 - 5:</b>				<u>\$10,493,925</u>

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

<u>Section 6 - Minor Items</u>		(5-10%)		
Subtotal Sections 1 - 5	<u>\$10,493,925</u>	X	10%	<u>\$1,049,393</u>
				TOTAL MINOR ITEMS: <u>\$1,049,393</u>

<u>Section 7 - Roadway Mobilization</u>				
Subtotal Sections 1 - 5	<u>\$10,493,925</u>			
Minor Items	<u>\$1,049,393</u>			
Sum	<u>\$11,543,318</u>	X	10%	<u>\$1,154,332</u>
				TOTAL ROADWAY MOBILIZATION <u>\$1,154,332</u>

<u>Section 8 - Roadway Additions</u>				
Supplemental				
Subtotal Sections 1 - 5	<u>\$10,493,925</u>			
Minor Items	<u>\$1,049,393</u>			
Sum	<u>\$11,543,318</u>	X	10%	<u>\$1,154,332</u>
				TOTAL ROADWAY ADDITIONS <u>\$3,462,995</u>

Contingencies				
Subtotal Sections 1 - 5	<u>\$10,493,925</u>			
Minor Items	<u>\$1,049,393</u>			
Sum	<u>\$11,543,318</u>	X	20% *	<u>\$2,308,664</u>
				TOTAL ROADWAY ITEMS <u>\$16,161,000</u>
				(Total of Sections 1 - 8)

Estimate			
Prepared By:	David E. Melis	(916)-381-9100	31-Jan-06
	(Print Name)	(Phone)	(Date)

\* Use 25% at the PSR stage or a higher or lower rate if justified.

# PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

## II. STRUCTURES ITEMS

	#1	#2	#3	#4	#5
Bridge Name	Empire Ranch Rd				
Bridge No.	Overcrossing (New)				
Structure Type	CIP P/S Box Girder				
Width (m) - out to out	18.74				
Span Lengths (m)	98.0				
Total Area (m <sup>2</sup> )	1,836.5				
Footing Type (pile/spread)					
Cost per m <sup>2</sup> . including: Mobilization: 10% Contingency: 25%	\$2,641.60				
Bridge Removal					
Approach Slabs					
Total Cost For Structure	\$4,851,000				
<b>SUBTOTAL STRUCTURES ITEMS</b>					<b>\$4,851,000</b>
Railroad Related Costs					
<b>TOTAL STRUCTURES ITEMS:</b>					<b>\$4,851,000</b>

COMMENTS: Bridge removal and approach slabs cost have contingencies included.

Estimate Prepared By: David E. Melis      0      (916)-381-9100      31-Jan-06  
 (Print Name)      (Print Name)      (Phone)      (Date)

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 3.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

### III. RIGHT OF WAY

Right-of-Way estimates should consider the probable highest and best use and type and intent of improvements at the time of acquisition. Assume acquisition including utility relocation occurs at the right of way certification milestone as shown in the Funding and Scheduling Section of the report. For further guidance see Chapter 1, Caltrans Right of Way Procedural Handbook.

	<u>Current Value (Future Use)</u>	<u>Escalation Rate (%/yr)</u>	<u>Escalated Value.*</u>
Acquisition, including excess lands and damages to remainders	<u>\$6,766,800</u>	<u>5.00%</u>	<u>\$7,460,400</u>
Utility Relocation (Project Cost)	<u>\$29,000</u>	<u>5.00%</u>	<u>\$32,000</u>
Clearance / Demolition	<u></u>	<u>5.00%</u>	<u>\$0</u>
Relocation Assistance Program	<u></u>	<u>5.00%</u>	<u>\$0</u>
Title and Escrow Fees	<u>\$4,000</u>	<u>N/A</u>	<u>\$4,000</u>
<b>CONSTRUCTION CONTRACT WORK</b>			
TOTAL RIGHT OF WAY ** (CURRENT VALUE)	<u>\$6,800,000</u>	TOTAL ESCALATED RIGHT OF WAY	<u>\$7,496,400</u>

\* - Escalated to assumed year of advertising: 2008

\*\* - Current total value for use on sheet 1 of 6

Estimate prepared by: David E. Melis (916)-381-9100 31-Jan-06  
 (Print Name) (Phone) (Date)

### PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE 03-Sac/ED-50  
 Type of Estimate (Pre-PSR,  
 PSR, PR, etc.): PR  
 Program Code: \_\_\_\_\_  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : \_\_\_\_\_

**Project Description:**

**Limits:** On Route 50 from Empire Ranch Road in the City of Folsom to El Dorado Hills Blvd in El Dorado County

**Proposed Improvement:** Construct Auxiliary Lanes by widening to the outside of Route 50 between Empire Ranch Road IC and El Dorado Hills Blvd IC

**(Scope)** \_\_\_\_\_

**Alternative:** Project Element 2 (Alternative 1) - Construct Auxiliary Lanes by widening to the inside of Route 50 between Empire Ranch Road IC and El Dorado Hills Blvd IC.

ROADWAY ITEMS	\$6,240,000
STRUCTURE ITEMS	\$0
<b>SUBTOTAL CONSTRUCTION</b>	<b>\$6,240,000</b>
RIGHT OF WAY	\$0
<b>TOTAL ALTERNATIVE COST</b>	<b>\$6,240,000</b>

**Reviewed by** \_\_\_\_\_ (Signature) \_\_\_\_\_ (Date)  
**Program Manager**

**Approved by** David E. Melis (916)-381-9100 01/31/06  
**Project Manager** (Signature) (Phone) (Date)

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
 03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

### I. ROADWAY ITEMS

	Quantity	Unit	Unit Cost	Section Cost
<u>Section 1 - Earthwork</u>				
Roadway Excavation	15,855	m <sup>3</sup>	\$35.00	\$554,925
Imported Borrow		m <sup>3</sup>	\$15.00	\$0
Clearing & Grubbing	1	LS	\$75,000	\$75,000
Develop Water Supply	1	LS	\$20,000	\$20,000
Stormwater Treatment BMP's	1	LS	\$300,000	\$300,000
				<u>Total Earthwork</u>
				<u>\$949,925</u>
 <u>Section 2 - Structural Section *</u>				
PCC Pavement ( ____ Depth)		m <sup>3</sup>		\$0
PCC Pavement ( ____ Depth)		m <sup>3</sup>		\$0
Asphalt Concrete	9,775	mt	\$70.00	\$684,250
Rubberized Asphalt Concrete	660	mt	\$75.00	\$49,500
				\$0
Aggregate Base	11,800	m <sup>3</sup>	\$45.00	\$531,000
Aggregate Subbase		m <sup>3</sup>	\$20.00	\$0
Asphalt Treated Permeable Base		m <sup>3</sup>	\$50.00	\$0
Blanket & Edge Drains		m	\$15.00	\$0
Edge Drain Outlet		m	\$40.00	\$0
				<u>Total Structural Section</u>
				<u>\$1,264,750</u>
 <u>Section 3 - Drainage</u>				
Extend Box Culvert		LS		\$0
Storm Drains	1	LS	\$277,000	\$277,000
Small Drainage Facilities		LS	\$0	\$0
Project Drainage (X-drains, overside, etc.)	1	LS	\$77,500	\$77,500
				\$0
				<u>Total Drainage</u>
				<u>\$354,500</u>

\* Attach sketch showing typical structural section elements of the roadway.  
 Include (if available) T.I., R-Value, and date when tests were performed



## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Section Cost</u>
<u>Section 4 - Specialty Items</u>				
Retaining Walls		m <sup>2</sup>	\$550.00	\$0
Soundwalls		m <sup>2</sup>		\$0
Equipment/Animal Passes		EA		\$0
Relocate Private Irrigation Facilities		m		\$0
Landscaping/Irrigation		HA		\$0
Erosion Control	21,000	m <sup>2</sup>	\$1.50	\$31,500
Slope Protection		m <sup>2</sup>		\$0
Barriers and Guardrails	1	LS	\$66,000	\$66,000
Hazardous Waste Work		LS		\$0
Environmental Mitigation		LS		\$0
Minor Concrete (Curb, Gutter & Sidewalk)		m <sup>3</sup>		\$0
				\$0
			<u>Total Specialty Items</u>	<u>\$97,500</u>
<u>Section 5 - Traffic Items</u>				
Lighting	1	LS	\$600,000	\$600,000
Traffic Signals		EA		\$0
Permanent Signing & Striping	1	LS	\$445,000	\$445,000
Traffic Control Systems	1	LS	\$300,000	\$300,000
Traffic Management Plan	1	LS	\$40,000	\$40,000
Ramp Metering		EA		\$0
			<u>Total Traffic Items</u>	<u>\$1,385,000</u>
<b>SUBTOTAL SECTIONS 1 - 5:</b>				<u>\$4,051,675</u>

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

Section 6 - Minor Items

Subtotal Sections 1 - 5	<u>\$4,051,675</u>		(5-10%)		
		X	10%	<u>\$405,168</u>	
				TOTAL MINOR ITEMS:	<u><u>\$405,168</u></u>

Section 7 - Roadway Mobilization

Subtotal Sections 1 - 5	<u>\$4,051,675</u>				
Minor Items	<u>\$405,168</u>		(5-10%)		
Sum	<u>\$4,456,843</u>	X	10%	<u>\$445,684</u>	
				TOTAL ROADWAY MOBILIZATION	<u><u>\$445,684</u></u>

Section 8 - Roadway Additions

<u>Supplemental</u>					
Subtotal Sections 1 - 5	<u>\$4,051,675</u>				
Minor Items	<u>\$405,168</u>		(5-10%)		
Sum	<u>\$4,456,843</u>	X	10%	<u>\$445,684</u>	

Contingencies

Subtotal Sections 1 - 5	<u>\$4,051,675</u>				
Minor Items	<u>\$405,168</u>				
Sum	<u>\$4,456,843</u>	X	20% *	<u>\$891,369</u>	
				TOTAL ROADWAY ADDITIONS	<u><u>\$1,337,053</u></u>

TOTAL ROADWAY ITEMS \$6,240,000  
 (Total of Sections 1 - 8)

Estimate			
Prepared By:	David E. Melis	(916)-381-9100	31-Jan-06
	(Print Name)	(Phone)	(Date)

\* Use 25% at the PSR stage or a higher or lower rate if justified.

# PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
 KP: 36.1/37.2, 0.0/3.1  
 EA: 1C9500  
 PP No. : 0

## II. STRUCTURES ITEMS

	#1	#2	#3	#4	#5
Bridge Name	_____	_____	_____	_____	_____
Bridge No.	_____	_____	_____	_____	_____
Structure Type	_____	_____	_____	_____	_____
Width (m) - out to out	_____	_____	_____	_____	_____
Span Lengths (m)	_____	_____	_____	_____	_____
Total Area (m <sup>2</sup> )	_____	_____	_____	_____	_____
Footing Type (pile/spread)	_____	_____	_____	_____	_____
Cost per m <sup>2</sup> . including: Mobilization: 10% Contingency: 25%	_____	_____	_____	_____	_____
Bridge Removal	_____	_____	_____	_____	_____
Approach Slabs	_____	_____	_____	_____	_____
Total Cost For Structure	_____	_____	_____	_____	_____

SUBTOTAL STRUCTURES ITEMS                      \$0

Railroad Related Costs \_\_\_\_\_

TOTAL STRUCTURES ITEMS:                      \$0

COMMENTS: Bridge removal and approach slabs cost have contingencies included.

Estimate Prepared By: David E. Melis                      0                      (916)-381-9100                      31-Jan-06  
(Print Name)                      (Print Name)                      (Phone)                      (Date)

## PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE  
03-Sac/ED-50  
KP: 3.1/37.2, 0.0/3.1  
EA: 1C9500  
PP No. : 0

### III. RIGHT OF WAY

Right-of-Way estimates should consider the probable highest and best use and type and intent of improvements at the time of acquisition. Assume acquisition including utility relocation occurs at the right of way certification milestone as shown in the Funding and Scheduling Section of the report. For further guidance see Chapter 1, Caltrans Right of Way Procedural Handbook.

	<u>Current Value (Future Use)</u>	<u>Escalation Rate (%/yr)</u>	<u>Escalated Value *</u>
Acquisition, including excess lands and damages to remainders		5.00%	\$0
Utility Relocation (Project Cost)		5.00%	\$0
Clearance / Demolition		5.00%	\$0
Relocation Assistance Program		5.00%	\$0
Title and Escrow Fees		N/A	\$0
CONSTRUCTION CONTRACT WORK			
TOTAL RIGHT OF WAY ** (CURRENT VALUE)	\$0	TOTAL ESCALATED RIGHT OF WAY	\$0

\* - Escalated to assumed year of advertising: 2008

\*\* - Current total value for use on sheet 1 of 6

Estimate prepared by: David E. Melis (916)-381-9100 31-Jan-06  
(Print Name) (Phone) (Date)

# *Traffic Operations Report*

---

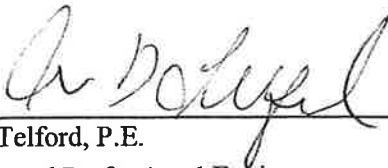
---

Attachment F

# TRAFFIC REPORT

FOR THE EMPIRE RANCH ROAD/ROUTE 50 INTERCHANGE  
PROJECT REPORT

This report was prepared under my direction and responsible charge. I attest to the technical information contained herein and have judged the qualification of any technical specialists providing engineering data upon which recommendations, conclusions, and decisions are based.



4/28/04  
Date

---

Alan Telford, P.E.  
Registered Professional Engineer  
Fehr & Peers Associates, Inc.

# TABLE OF CONTENTS

---

<u>Section</u>	<u>Page</u>
<b>1. INTRODUCTION .....</b>	<b>1</b>
<b>2. TRAFFIC OPERATIONS ANALYSIS METHODOLOGY.....</b>	<b>3</b>
2.1 Traffic Volume Forecasts .....	3
2.2 Analysis Methodology and Key Assumptions .....	5
2.3 Analysis Evaluation Criteria .....	9
<b>3. EXISTING TRAFFIC OPERATIONS ANALYSIS .....</b>	<b>10</b>
3.1 Study Area.....	10
3.2 Study Locations .....	11
3.3 Data Sources.....	11
3.5 Existing Freeway Mainline Level of Service.....	13
3.6 Traffic Safety.....	13
<b>4. PROJECT DESCRIPTION .....</b>	<b>15</b>
4.1 No Build Alternative .....	15
4.2 Build Alternatives.....	17
<b>5. CONSTRUCTION YEAR (2006) OPERATIONS ANALYSIS.....</b>	<b>22</b>
5.1 Planned Improvements .....	22
5.2 Alternatives .....	22
5.3 Study Locations .....	26
5.4 Traffic Growth and Travel Patterns Comparison.....	27
5.5 Freeway Mainline Operations.....	28
5.6 Freeway Ramp Junction Operations .....	30
5.7 Intersection Operations.....	31
5.8 Ramp Meter Analysis .....	35
<b>6. DESIGN YEAR (2026) CONDITIONS ANALYSIS .....</b>	<b>37</b>
6.1 Planned Improvements .....	37
6.2 Alternatives .....	37
6.3 Traffic Growth and Travel Patterns Comparison.....	42
6.4 Freeway Mainline Operations.....	44
6.5 Freeway Ramp Junction Operations .....	46
6.6 Intersection Operations.....	49
6.7 Ramp Meter Analysis .....	54
6.8 Circulation Performance.....	55
<b>7. ROUTE 50 CORRIDOR IMPROVEMENT ISSUES.....</b>	<b>57</b>

## **TABLE OF CONTENTS**

---

### **Appendix A**

Travel Demand Forecasts Technical Memorandum

### **Appendix B**

Existing Conditions

### **Appendix C**

Construction Year (2006) Conditions

### **Appendix D**

Construction Year (2006) With Improvements Conditions

### **Appendix E**

Design Year (2026) Conditions

### **Appendix F**

Design Year (2026) With Improvements Conditions



## LIST OF TABLES

---

<u>Table</u>	<u>Page</u>
Table 1 Signalized Intersection LOS Criteria.....	7
Table 2 Unsignalized Intersection LOS Criteria.....	7
Table 3 Freeway Ramp Merge and Ramp Diverge LOS Criteria.....	8
Table 4 Freeway Mainline Peak Hour LOS Thresholds <sup>1</sup> .....	8
Table 5 Freeway Mainline LOS - Existing Conditions.....	13
Table 6 Route 50 Accident History - July 1999 Through June 2002.....	14
Table 7 Route 50 Accident History – Number of Accidents by Type.....	14
Table 8 Route 50 Roadway Improvements in MTP.....	16
Table 9 Ramp Volume Comparison – Construction Year (2006) Conditions <i>No Build and Build Alternatives</i> .....	27
Table 10 Freeway Mainline LOS – Construction Year (2006) Conditions <i>No Build and Build Alternatives</i> .....	28
Table 11 Freeway Ramp Junction LOS – Construction Year (2006) Conditions <i>Build Alternatives</i> ...	30
Table 12 Intersection LOS – Construction Year (2006) Conditions <i>Build Alternatives</i> .....	34
Table 13 Intersection Queue Summary – Construction Year (2006) Conditions <i>Build Alternatives</i> ....	35
Table 14 Ramp Metering Operations – Construction Year (2006) Conditions <i>Build Alternatives</i> .....	36
Table 15 Ramp Volume Comparison – Design Year (2026) Conditions <i>No Build and Build Alternatives</i> .....	43
Table 16 Freeway Mainline LOS – Design Year (2026) Conditions <i>No Build and Build Alternatives</i> .....	44
Table 17 Freeway Ramp Junction LOS – Design Year (2026) Conditions <i>Build Alternatives</i> .....	49
Table 18 Intersection LOS – Design Year (2026) Conditions <i>Build Alternatives</i> .....	50
Table 19 Intersection Queue Summary – Design Year (2026) Conditions <i>Build Alternatives</i> .....	53
Table 20 Ramp Metering Operations – Design Year (2026) Conditions <i>No Build and Build Alternatives</i> .....	54
Table 21 Percent Change in VMT and VHT – Design Year (2026) Conditions <i>No Build and Build Alternatives</i> .....	55

## LIST OF FIGURES

---

<u>Figure</u>	<u>Page</u>
Figure 1 Study Area .....	2
Figure 2 Peak Hour Traffic Volumes and Lane Configurations – Existing Conditions.....	12
Figure 3 Empire Ranch Road/Route 50 Interchange Design Plan – Alternatives 1-4 .....	18
Figure 4 Empire Ranch Road/Route 50 Interchange Location – Alternatives 1-4.....	19
Figure 5 Freeway Mainline and Ramp Peak Hour Traffic Volumes and Lane Configurations – Construction Year (2006) No Build Conditions – plus intersection volumes at Iron Point Road intersection .....	23
Figure 6 Freeway Mainline and Ramp Peak Hour Traffic Volumes and Lane Configurations – Construction Year (2006) Build Conditions.....	24
Figure 7 Intersection Peak Hour Traffic Volumes and Lane Configurations – Construction Year (2006) Alternatives 1 through 4 Conditions .....	25
Figure 8 Recommended Roadway Improvements for Mitigation and LOS Comparison (Option 2) – Construction Year (2006) Build Conditions.....	32
Figure 9 Recommended Roadway Improvements for Mitigation and LOS Comparison (Option 3) – Construction Year (2006) Build Conditions.....	33
Figure 10 Freeway Mainline and Ramp Peak Hour Traffic Volumes and Lane Configurations – Design Year (2026) No Build Conditions – .....	38
Figure 11 Freeway Mainline and Ramp Peak Hour Traffic Volumes and Lane Configurations – Design Year (2026) Build Conditions .....	39
Figure 12 Intersection Peak Hour Traffic Volumes and Lane Configurations – Design Year (2026) No Build Conditions .....	40
Figure 13 Intersection Peak Hour Traffic Volumes and Lane Configurations – Design Year (2026) Build Alternatives 1 through 4 Conditions.....	41
Figure 14 Recommended Roadway Improvements for Mitigation and LOS Comparison (Option 2) - Design Year (2026) Build Conditions .....	47
Figure 15 Recommended Roadway Improvements for Mitigation and LOS Comparison (Option 3) - Design Year (2026) Build Conditions .....	48
Figure 16 Recommended Intersection Improvements for Mitigation and LOS Comparison - Design Year (2026) Build Conditions .....	52
Figure 17 Base Year 2000 and 2025 Population and Employment in Study Area .....	58
Figure 18 Proposed Roadway Improvements Contained in SACOG 2025 MTP .....	59
Figure 19 Illustrative ITS Plan .....	61

## **1. INTRODUCTION**

The purpose of this report is to describe the traffic operations analysis for the proposed Route 50 /Empire Ranch Road Interchange Project Report (PR). This project would construct a new interchange on Route 50 in the City of Folsom located between the East Bidwell Street/Scott Road interchange and the El Dorado Hills Boulevard interchange near the border between Folsom and El Dorado County. The new interchange would provide access to Empire Ranch Road, a new north-south arterial roadway that is planned to serve the eastern portion of Folsom and connect to Sophia Parkway in El Dorado County. The objective of this project is to improve accessibility to planned development in eastern Folsom and western El Dorado Hills and to reduce congestion at existing Route 50 interchanges in both jurisdictions.

The traffic operations analyses contained in this report include components of the freeway system and local arterial system that would be affected by the Empire Ranch Road/Route 50 interchange. The study area shown in Figure 1 includes Route 50 from East Bidwell Street/Scott Road to the future Silva Valley Parkway interchange. The remainder of this report contains the following chapters.

- Chapter 2 – Traffic Operations Analysis Methodology
- Chapter 3 – Existing Conditions
- Chapter 4 – Project Description
- Chapter 5 – 2006 Operations Analysis
- Chapter 6 – 2026 Operations Analysis
- Chapter 7 – Regional Circulation Issues

Chapter 2 describes the methodology used to develop traffic volume forecasts and analyze freeway and local arterial traffic operations. Chapter 3 presents the existing traffic operations in the study area. Chapter 4 describes the No Build alternative and the four proposed build alternatives. Chapters 5 and 6 present the results of the traffic operations analysis under construction year (2006) and design year (2026) conditions, respectively. Chapter 7 describes the regional circulation issues within the study area.



**PROJECT STUDY AREA**  
**FIGURE 1**

## 2. TRAFFIC OPERATIONS ANALYSIS METHODOLOGY

Prior to analyzing traffic operations for the various arterial and freeway facilities, the scope of work and methodologies for developing traffic volume forecasts and conducting traffic operations analysis were reviewed by the Project Development Team (PDT), which consisted of representatives from Caltrans, El Dorado County, the City of Folsom, Sacramento County, and Mark Thomas & Co. Inc. The methodology used to forecast future travel demand is described below followed by the methodologies used for the traffic operations analysis.

### 2.1 TRAFFIC VOLUME FORECASTS

The traffic volume forecasts were generated using a modified version of the 2002 version of the 2025 SACMET model that is maintained by the Sacramento Area Council of Governments (SACOG). This is the latest approved version of the model. The modifications to the model included land use updates to reflect recently approved projects and roadway network refinements to be consistent with Tier 1 roadway improvements contained in the 2025 Metropolitan Transportation Plan (MTP). A summary of the key modifications is provided below.

- Split Traffic Analysis Zones (TAZs) – SACMET TAZs in the vicinity of the project area were split where necessary to increase the level of land use detail in the study area.
- Adjust Base Year Land Use – The SACMET Base Year land uses were modified based on a review of a detailed aerial photograph and field visits.
- Modify Roadway Networks – The SACMET roadway network was modified to include the proposed project, to match the existing and planned roadway alignments, and to maintain consistency with Tier 1 roadway improvements contained in the MTP.

After making these modifications, 2025 a.m. and p.m. peak hour traffic volume forecasts were generated and adjusted to account for model error. A technical memorandum (see Appendix A) presenting the preliminary travel demand forecasts based on the roadway network and land use modifications for 2025 was submitted to the PDT for review. PDT comments are reflected in the final forecasts contained in this report and used in the traffic operations analysis.

Since the design year for this project is 2026, the 2025 forecasts were factored up to account for an extra year of growth. Ramp volumes were increased by four percent and the mainline Route 50 volumes were increased by two percent. These growth factors are based on the overall projected growth rates between 2002 and 2025 for the study area. A final adjustment to the 2026 forecasts was made by Caltrans after reviewing the projected traffic loadings between the El Dorado Hills Boulevard, Empire Ranch Road, and East Bidwell Street interchanges. At the request of Caltrans, some peak hour traffic was shifted from the adjacent interchanges to the Empire Ranch Road interchange to provide a more reasonable balance of traffic loading among the interchanges. This type of refinement is often required when using a regional travel demand model to develop local area traffic forecasts, and as a sensitivity analysis to "test" certain movements.

Construction year (2006) peak hour forecasts were developed by applying a linear growth rate between existing and 2025 conditions. An average annual growth rate of two percent was used for all locations except for the Route 50 westbound on-ramp at El Dorado Hills Boulevard during the a.m. peak hour. For this location, it was assumed that the existing bottleneck on Route 50 at the on-ramp discourages some travelers from using the on-ramp during the a.m. peak hour. The planned elimination of this bottleneck as part of the El Dorado Hills Boulevard interchange reconstruction (Phase 1 improvements are assumed to be completed by 2006) is likely to cause an increase in peak hour trips in addition to new trips from population and employment growth. These induced trips would occur from travelers adjusting their departure times, diverting from an alternative route, or shifting from another mode. Therefore, 30 percent of the traffic growth anticipated between existing and 2025 conditions was assumed to occur by 2006 although only 15 percent of the time has passed. For the planned facilities such as Empire Ranch Road and Iron Point Road, where the interpolation methodology was not applicable, the 2006 traffic forecasts were developed by factoring the 2026 forecasts after reviewing existing traffic counts and 2005 traffic forecasts developed using the regional SACMET model.

The construction year peak hour traffic forecasts were developed assuming that Iron Point Road would extend to the county line but would not connect to Saratoga Way by 2006. However, the construction year analysis includes traffic conditions both with and without a connection between Iron Point Road and Saratoga Way to compare the distribution of traffic between these two scenarios.

## 2.2 ANALYSIS METHODOLOGY AND KEY ASSUMPTIONS

A traffic operations analysis was completed for the freeway mainline, freeway ramp junctions, ramp terminal intersections, and ramp metering. Analysis methodologies and key assumptions are listed below.

### Analysis Methodology

- All operations analyses were conducted using procedures and methodologies contained in the *Highway Capacity Manual 2000* (HCM 2000), Transportation Research Board, 2000.
- Freeway mainline segments were analyzed using the LOS thresholds contained in the El Dorado County General Plan. These LOS thresholds are based on the methodologies contained in the HCM 2000.
- Freeway ramp junctions were analyzed using the Highway Capacity Software (HCS), which applies the HCM 2000 procedures.
- Signalized intersections were analyzed using Synchro 5.0. Synchro's calculation of intersection delay is consistent with the procedures described in the HCM 2000. Unsignalized ramp terminal intersections were analyzed using Traffix 7.5 with the HCM 2000 methodology included.
- Ramp metering was analyzed using the methodologies contained in *Highway Design Manual*, Caltrans, 2001.
- The operations analysis does not quantitatively consider the system-wide operational effects on Route 50 and the connecting arterial system because a traffic simulation model was not used. However, the report qualitatively describes the locations where potential operational problems occur due to system-wide effects.

### Key Assumptions

- A Peak Hour Factor (PHF) of 0.90 was used for freeway mainline, ramps and local roadways.
- A peak hour truck percentage of 4 percent for freeway mainline and ramps and 2 percent for local roadways were used for both peak hours.
- A free flow speed of 70 mph was used for the freeway mainline and 35 mph for the ramps.

- The intersection saturation flow rate was assumed to be 1,900 passenger cars per hour per lane.
- The percentage of high occupancy vehicles (HOV's) for the on-ramp traffic was assumed to be 14 percent, a typical value for commuter traffic.
- The HCM 2000 methodology for freeway operations analysis does not account for High Occupancy Vehicle (HOV) lanes. Therefore, this study reduced mainline volumes by the projected utilization percentages described below and excluded the HOV lanes from the ramp junction technical calculations. For eastbound Route 50 under 2026 conditions, HOV traffic was assumed to be 16 percent and 22 percent in the a.m. and p.m. peak hours, respectively, per direction from Caltrans. For westbound Route 50, HOV traffic was assumed to be 23 percent and 16 percent in the a.m. and p.m. peak hours, respectively. The HOV percentages for 2006 conditions were developed by interpolating between the existing HOV traffic counts and 2026 HOV traffic forecasts.
- The ramp metering queuing calculations were based on 15-minute interval traffic counts collected during the two-hour peak periods (7:00 to 9:00 a.m. and 4:00 to 6:00 p.m.).
- A vehicle length of 9 meters (29.5 feet, the distance from the front of one vehicle to the front of the next vehicle) was used to determine the ramp metering queue lengths.
- Ramp metering rates were set to the practical lower and upper limits of 240 and 1,000 vehicles per hour per lane, respectively.
- Ramp meters were assumed to operate during the entire two-hour a.m. and p.m. peak hour analysis periods.

The analysis methodology described above was used to measure a.m. and p.m. peak hour traffic operations for the study intersections and Route 50. The analysis results include a descriptive term known as level of service (LOS). LOS is a measure of traffic operating conditions, which varies from LOS A (the best) to LOS F (the worst). Tables 1 through 3 describe the LOS criteria from the *HCM 2000* for signalized intersections, unsignalized intersections, and freeway ramp junctions, respectively.



<b>TABLE 1 SIGNALIZED INTERSECTION LOS CRITERIA</b>		
LOS	Description	Average Control Delay (seconds/vehicle)
A	Operations with very low delay occurring with favorable progression and/or short cycle length.	≤ 10
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10 to 20
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20 to 35
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35 to 55
E	Operations with high delay values indicating poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	> 55 to 80
F	Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	> 80

Source: *Highway Capacity Manual* (Transportation Research Board, 2000)

<b>TABLE 2 UNSIGNALIZED INTERSECTION LOS CRITERIA</b>		
LOS	Description	Average Control Delay (seconds/vehicle)
A	Little or no conflicting traffic.	≤ 10
B	The approach begins to notice absence of available gaps.	> 10 to 15
C	The approach begins experiencing delay for available gaps.	> 15 to 25
D	The approach experiences queuing due to a reduction in available gaps.	> 25 to 35
E	Extensive queuing due to insufficient gaps.	> 35 to 50
F	Insufficient gaps of suitable size to allow traffic demand to cross safely through a major traffic stream.	> 50

Source: *Highway Capacity Manual* (Transportation Research Board, 2000)

<b>TABLE 3 FREEWAY RAMP MERGE AND RAMP DIVERGE LOS CRITERIA</b>		
LOS	Description	Density <sup>1</sup>
A	Free-flow speeds prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.	≤ 10
B	Free-flow speeds are maintained. The ability to maneuver with the traffic stream is only slightly restricted.	> 10 to 20
C	Flow with speeds at or near free-flow speeds. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more care and vigilance on the part of the driver.	> 20 to 28
D	Speeds decline slightly with increasing flows. Freedom to maneuver with the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort.	> 28 to 35
E	Operation at capacity. There are virtually no usable gaps within the traffic stream, leaving little room to maneuver. Any disruption can be expected to produce a breakdown with queuing.	> 35 to 43
F	Represents a breakdown in flow.	> 43

Notes:  
(1) Density in passenger cars per mile per lane.  
Source: *Highway Capacity Manual* (Transportation Research Board, 2000).

Although ramp junctions will govern freeway operations through the study area, the traffic operations analysis included a check of mainline Route 50 capacity using the LOS threshold capacities contained in Table 4.

<b>TABLE 4 FREEWAY MAINLINE PEAK HOUR LOS THRESHOLDS<sup>1</sup></b>					
Facility Type	A	B	C	D	E
2 Lanes	1,110 / 0.28	2,010 / 0.50	2,880 / 0.72	3,570 / 0.89	4,010 / 1.00
2 Lanes + Auxiliary lane	1,410 / 0.28	2,550 / 0.51	3,640 / 0.72	4,490 / 0.89	5,035 / 1.00
3 Lanes	1,700 / 0.28	3,080 / 0.51	4,400 / 0.73	5,410 / 0.89	6,060 / 1.00
3 Lanes + Auxiliary lane	2,010 / 0.28	3,640 / 0.51	5,180 / 0.73	6,350 / 0.89	7,100 / 1.00
4 Lanes	2,320 / 0.29	4,200 / 0.52	5,950 / 0.73	7,280 / 0.89	8,140 / 1.00

Note:  
(1) Numbers in each cell indicate traffic volume / volume-capacity ratio.  
Source: *El Dorado County General Plan*.

### 2.3 ANALYSIS EVALUATION CRITERIA

The analysis evaluation criteria are used to determine acceptable traffic operating conditions. According to the *State Route 50 Transportation Concept Report* (Caltrans, District 3, April 1998), Caltrans has adopted LOS F as the route concept LOS for Route 50 within the project vicinity. The *Sacramento County General Plan* (1993) establishes LOS E as the LOS standard for Route 50 within the study area. However, for the purpose of this interchange design study, LOS D or better conditions are considered desirable for freeway facilities including freeway mainline, ramp junctions, and ramp terminal intersections in the study area.

The *City of Folsom General Plan* (1995) identifies LOS C for local roadways. Therefore, LOS C is used for the local study intersection.

### **3. EXISTING TRAFFIC OPERATIONS ANALYSIS**

The existing conditions analysis presents the physical and operational characteristics of the roadway system in the vicinity of the proposed project. This information provides part of the context for the purpose and need to construct improvements.

#### **3.1 STUDY AREA**

Route 50 and the existing key roadways in the study area are described below.

##### Route 50

Route 50 is a major east-west regional highway connecting Sacramento and the Central Valley with Lake Tahoe and the Sierra Nevada mountains. Beginning at the Interstate 80 separation, Route 50 travels through Yolo County, Sacramento County, El Dorado County, and ends at the California/Nevada State Line. Within the study area, Route 50 is four-lane divided freeway and runs east-west through the City of Folsom. As the transportation backbone facility in the City of Folsom and El Dorado County, Route 50 carries a significant amount of commuter traffic and recreational travel to ski resorts and Nevada casinos.

##### East Bidwell Street

East Bidwell Street is a four- to six-lane north-south arterial in the City of Folsom that extends from Route 50 to Coloma Street in the Folsom Historic District. East Bidwell Street becomes Scott Road south of Route 50. The East Bidwell Street/Scott Road interchange is located west of the proposed Empire Ranch Road interchange.

##### Iron Point Road

Iron Point Road is a four- to six-lane east-west arterial roadway in the City of Folsom that parallels Route 50 to the north from Folsom Boulevard to east of East Bidwell Street. This roadway is planned to extend east to Empire Ranch Road and eventually connect to Saratoga Way in El Dorado County.

### El Dorado Hills Boulevard

El Dorado Hills Boulevard is a four- to six-lane north-south arterial roadway in El Dorado County that extends from Route 50 to Green Valley Road. El Dorado Hills Boulevard becomes Latrobe Road south of Route 50 and Salmon Falls Road north of Green Valley Road. The El Dorado Hills Boulevard/Latrobe Road interchange is located east of the proposed Empire Ranch Road interchange.

## **3.2 STUDY LOCATIONS**

The operations analysis under existing conditions includes the following freeway facilities.

### **Freeway Mainline Segments**

- Route 50 eastbound: East Bidwell Street/Scott Road to El Dorado Hills Boulevard/Latrobe Road
- Route 50 eastbound: El Dorado Hills Boulevard/Latrobe Road to Bass Lake Road
- Route 50 westbound: Bass Lake Road to El Dorado Hills Boulevard/Latrobe Road
- Route 50 westbound: El Dorado Hills Boulevard/Latrobe Road to East Bidwell Street/Scott Road

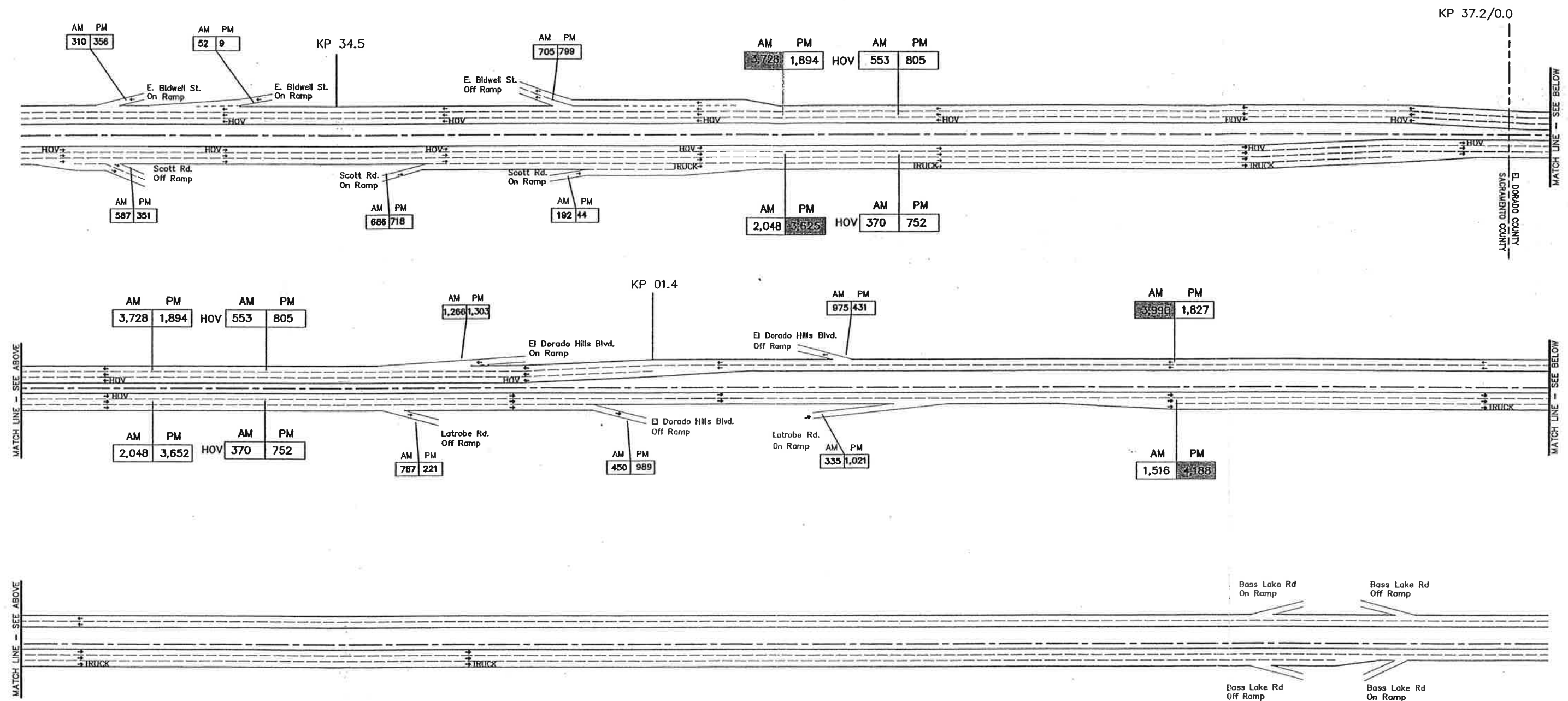
No existing conditions analysis was performed for the study intersections since none exist under current conditions.

## **3.3 DATA SOURCES**

The traffic analysis was conducted based on traffic flow, geometric roadway, and accident data. The following data was collected to complete the existing conditions analysis.

- The existing freeway mainline a.m. (6:00-8:30) and p.m. (4:00-6:00) peak period traffic volumes and lane configurations on Route 50 between East Bidwell Street and El Dorado Hills Boulevard were collected by Fehr & Peers in June 2003.
- The a.m. and p.m. peak hour traffic volumes at the East Bidwell Street on- and off-ramps were collected by Fehr & Peers in June 2002.
- The a.m. and p.m. peak hour traffic volumes at the El Dorado Hills Boulevard on- and off-ramps were collected by Prism Engineering in 2003.

Figure 2 displays the existing freeway mainline peak hour traffic volumes and lane configurations.



**LEGEND**

- HOV - High Occupancy Vehicle Lane
- AUX - Auxiliary lane
- TRUCK - Truck Climbing Lane
- AM PM - Peak Hour Traffic Volumes
- 990 1,280 - Traffic volume constrained by freeway bottlenecks, actual peak hour demand is higher.



N

NOT TO SCALE

### 3.5 EXISTING FREEWAY MAINLINE LEVEL OF SERVICE

Table 5 summarizes the AM and PM peak hour LOS on Route 50 between East Bidwell Street/Scott Road and El Dorado Hills Boulevard/Latrobe Road. For locations with constrained traffic volumes, Caltrans travel time analysis from the 2002 Congestion Report (Caltrans District 3, December 2002) was used to estimate LOS.

TABLE 5 FREEWAY MAINLINE LOS - EXISTING CONDITIONS				
Freeway Mainline	AM Peak		PM Peak	
	V/C <sup>1</sup>	LOS <sup>2</sup>	V/C <sup>1</sup>	LOS <sup>2</sup>
Route 50 Eastbound: E. Bidwell St. to El Dorado Hills Blvd.	0.51	C	<b><u>F</u><sup>3</sup></b>	
Route 50 Eastbound: El Dorado Hills Blvd. to Bass Lake Rd.	0.38	B	<b><u>&gt;1.00</u></b>	<b><u>F</u></b>
Route 50 Westbound: Bass Lake Rd. To El Dorado Hills Blvd	<b><u>F</u><sup>3</sup></b>		0.46	B
Route 50 Westbound: El Dorado Hills Blvd. to E. Bidwell St.	<b><u>F</u><sup>3</sup></b>		0.47	B
Notes:				
(1) V/C is the volume to capacity ratio.				
(2) LOS based on the El Dorado County General Plan.				
(3) LOS F was identified at these locations based on the 2002 Congestion Report (Caltrans District 3, December 2002).				
Bold font with underscore indicates unacceptable operations.				
Source: Fehr & Peers, 2003.				

Table 5 shows that the Route 50 mainline segments between East Bidwell Street/Scott Road and Bass Lake Road operate unacceptably at LOS F in the peak directions (i.e., westbound during the a.m. peak hour and eastbound during the p.m. peak hour). The Caltrans 2002 Congestion Report defines congestion delay as a condition lasting for 15 minutes or longer where travel demand exceeds freeway design capacity, as evidenced by vehicular speeds of 35 mph or less during peak commute periods on a typical incident-free weekday (see Appendix B for Caltrans 2002 Congestion Map).

### 3.6 TRAFFIC SAFETY

Table 6 shows a summary of a three-year traffic accident history on Route 50 between East Bidwell Street/Scott Road and El Dorado Hills Boulevard/Latrobe Road in the project vicinity. The TASAS database maintained by Caltrans is the source for this information. The data shown is for the three-year period between July 1999 and June 2002.

Location	Total Accidents	Total Fatalities	Actual Accident Rate <sup>1</sup>	Average Accident Rate <sup>1</sup>
Route 50: between E. Bidwell St. and El Dorado Hills Blvd. (Post Mile SAC 21.500 to ED 0.859)	136	0	<b>0.72</b>	0.68
Notes: (1) Per million vehicles. <b>Bold type indicates that the actual accident rate on this segment is greater than the average accident rate for similar facilities.</b> Source: Caltrans District 3 TASAS Table B, July 1999 to June 2002.				

The above table shows that the actual accident rate on mainline Route 50 in the vicinity of the proposed Empire Ranch Road interchange is slightly higher than the average accident rate for similar freeway facilities. In the three-year data collection period, 136 accidents occurred with no fatalities. Table 7 categorizes the recorded accidents by type.

*new info*



Location	Accident Type				Total
	Rear End	Hit Object	Side-swipe	Other <sup>1</sup>	
Route 50: between E. Bidwell St. and El Dorado Hills Blvd. (Post Mile SAC 21.500 to ED 0.859)	87 (64%)	16 (12%)	15 (11%)	18 (13%)	136
Notes: (1) Other includes broadside, head-on, over-turn collisions. Source: Caltrans District 3 TASAS Table B, July 1999 to June 2002.					

As shown in Table 7, the most frequent type of accident on Route 50 is rear-end collisions (64 percent). A high frequency of rear-end accidents is consistent with the stop-and-go peak direction traffic conditions that exist along this section of Route 50.



## **4. PROJECT DESCRIPTION**

The construction of the Empire Ranch Road interchange is an integral component of the City of Folsom transportation network to accommodate approved growth since the development of its General Plan in the early 1990s. El Dorado County has also incorporated the interchange as part of its growth plans by cooperatively working with the City to provide connections between Saratoga Way and Iron Point Road and between Sophia Parkway and Empire Ranch Road. The proposed interchange would be located on Route 50 between the East Bidwell Street/Scott Road and El Dorado Hills Boulevard/Latrobe Road interchanges near the border between Sacramento and El Dorado Counties. Detailed descriptions of the project alternatives are provided below.

### **4.1 NO BUILD ALTERNATIVE**

For comparison purposes, a “do-nothing” or No Build alternative is analyzed in this study and includes the following roadway improvements within the study area.

- The proposed Empire Ranch Road interchange is not constructed on Route 50.
- Tier 1 roadway improvements (i.e., these improvements have reasonably expected revenues) contained in the 2025 Sacramento Metropolitan Transportation Plan (MTP) are assumed to be in place depending on their completion dates (see Table 8).
- Other future roadway improvements committed to by the City of Folsom and El Dorado County that could affect traffic circulation in the study area.

Table 8 lists the Tier 1 roadway improvements within the study area and the expected completion year. Chapter 7 discusses the coordination and timing of these improvements in more detail.

<b>TABLE 8 ROUTE 50 ROADWAY IMPROVEMENTS IN MTP</b>		
Location	Roadway Improvements	Year
Route 50: El Dorado Hills Blvd. to S. Shingle Springs/Ponderosa Rd.	Add HOV lanes	2010
Route 50: Silva Valley Parkway Interchange	Add a new interchange	2008
Route 50: El Dorado Hills Boulevard Interchange	Reconstruct interchange (phase 1) and construct new two-lane extension of Saratoga Way to Arrowhead Drive	2006
Empire Ranch Rd.: El Dorado County line to Iron Point Rd.	Construct four-lane section	2006
Iron Point Rd.: East of East Bidwell St.	Extend with four-lane section to El Dorado County	2005
Saratoga Way: County line (Iron Point Road) to Arrowhead Drive	Construct a new four-lane undivided road	2018
Sophia Parkway: Green Valley Road to Empire Ranch Road	Construct a new four-lane divided road	2006
Source: 2025 Metropolitan Transportation Plan, SACOG 2002.		

According to Table 8, no major improvements would be made to the Route 50 freeway mainline before 2006. However, the following improvements would be in place on Route 50 within the project vicinity by 2010.

- A new interchange would be constructed on Route 50 at Silva Valley Parkway, which is located halfway between El Dorado Hills Boulevard/Latrobe Road and Bass Lake Road. This interchange would consist of one off-ramp and two on-ramps serving each direction of Route 50. These on- and off-ramps would be connected with the ramps at adjacent interchanges (i.e., El Dorado Hills Boulevard interchange to the west and Bass Lake Road interchange to the east) using auxiliary lanes.
- HOV lanes would be added to Route 50 between El Dorado Hills Boulevard/Latrobe Road and South Shingle Springs Road/Ponderosa Road. Therefore, the Route 50 freeway mainline between El Dorado Hills Boulevard/Latrobe Road and Bass Lake Road would be widened from two mixed-flow lanes to a total of four lanes (i.e., two mixed-flow lanes plus a HOV lane and an auxiliary lane) in both directions.

## 4.2 BUILD ALTERNATIVES

The build alternatives propose to construct a new interchange on Route 50 between East Bidwell Street/Scott Road and El Dorado Hills Boulevard/Latrobe Road at Empire Ranch Road. Four project design alternatives have been selected for evaluation. These design alternatives have been identified as Build Alternatives 1 to 4 (see Figure 3). Each alternative includes the following elements, which may be constructed as one entire project or in phases.

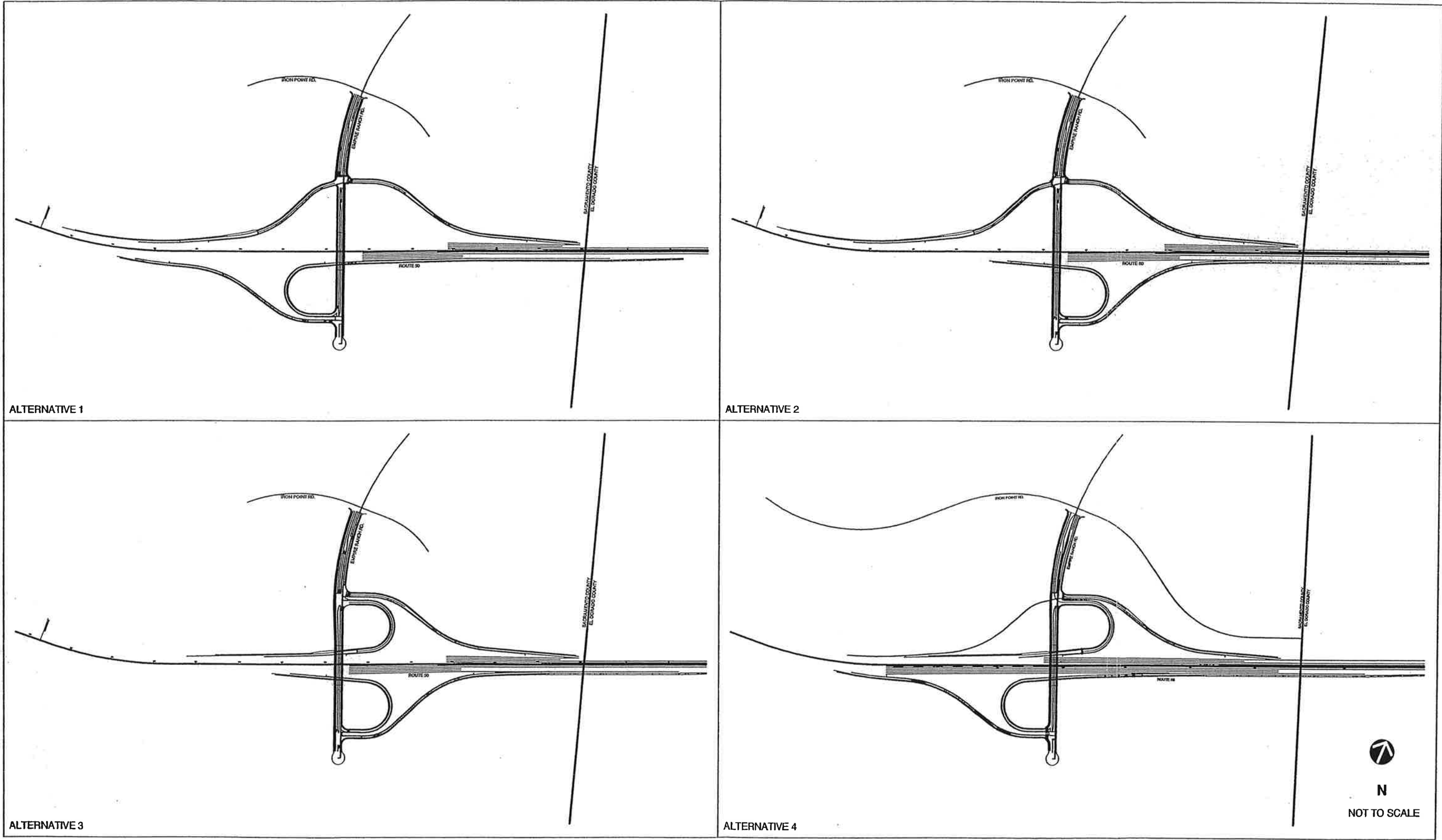
- Element 1: Construct a new interchange on Route 50 at Empire Ranch Road
- Element 2: Extend the eastbound truck-climbing lane and construct westbound auxiliary lane from Empire Ranch Road to El Dorado Hills Boulevard/Latrobe Road by widening *outside* within the median of Route 50
- Element 3: Modify the El Dorado Hills Boulevard/ Latrobe Road interchange undercrossing and construct an additional eastbound lane in the median to the Bass Lake grade truck-climbing lane. The HOV lane designation on this additional eastbound lane will be extended from its current terminus (west of the El Dorado Hills Boulevard interchange) to approximately ¼ mile west of the start of existing Bass Lake grade truck-climbing lane

The Empire Ranch Road interchange configurations (Element 1) vary between alternatives while Elements 2 and 3 would be same for all four alternatives. Figure 4 shows the location of the interchange and its spacing with adjacent interchanges for Alternatives 1 through 4.

The proposed interchange has an expected opening date of 2006. Therefore, 2006 was used for the construction year and 2026 was used for the design year analysis. Each of the alternatives is described below and depicted in Conceptual Geometric Drawings.

### Alternative 1

Alternative 1 proposes to construct a combination of Type L-2 and Type L-7 partial cloverleaf interchange with a two-lane overcrossing (see Figure 3 for design plan). Although the 2025 MTP identifies the Empire Ranch Road interchange as a four-lane overcrossing, a two-lane overcrossing was proposed for this interchange based on the projected design year (2026) traffic demand on Empire Ranch Road. However, the right of way (ROW) for a four-lane overcrossing was reserved on Empire Ranch Road for the future widening as needed.



ALTERNATIVE 1

ALTERNATIVE 2

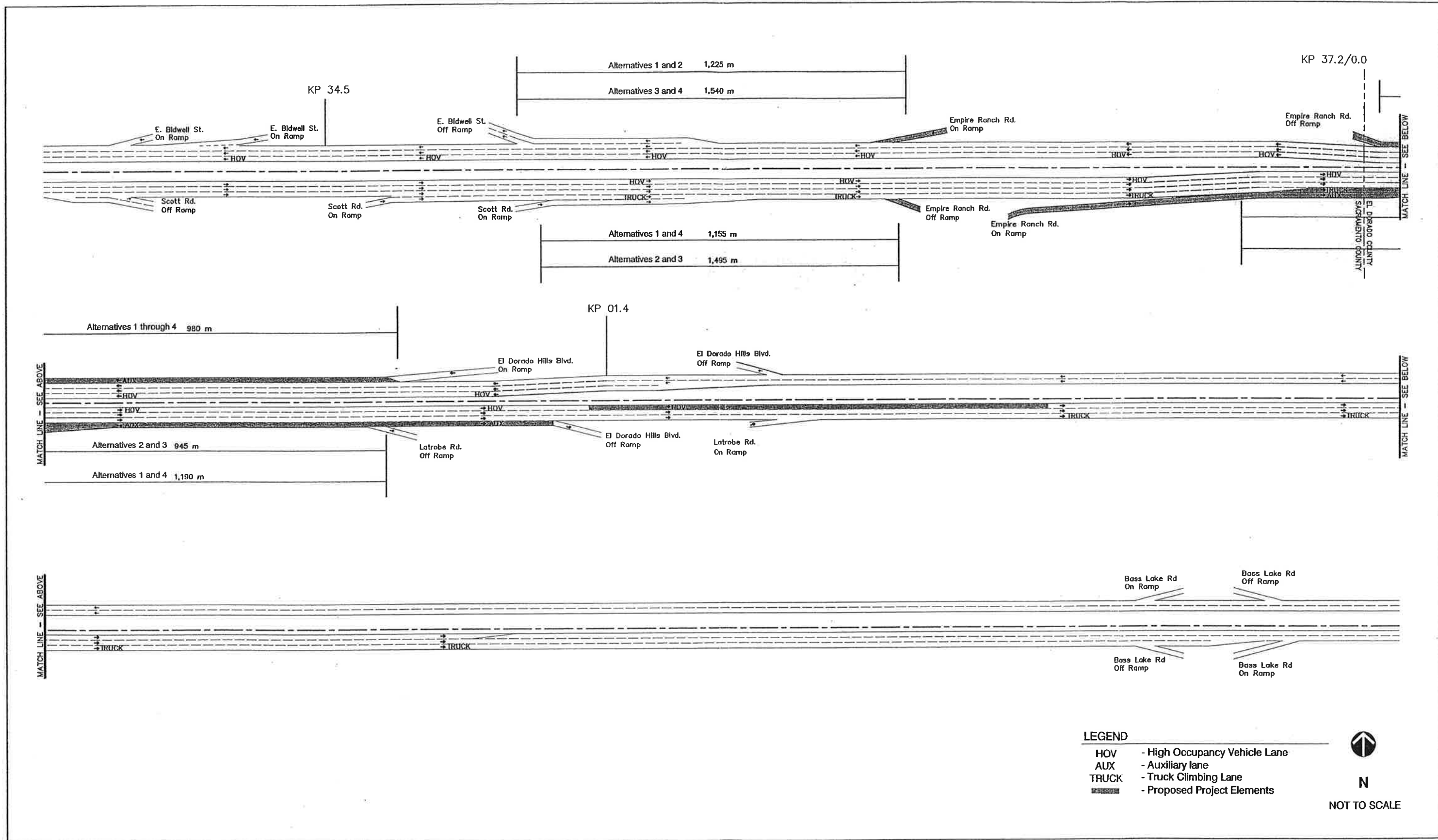
ALTERNATIVE 3

ALTERNATIVE 4



N

NOT TO SCALE



**LEGEND**  
 HOV - High Occupancy Vehicle Lane  
 AUX - Auxiliary lane  
 TRUCK - Truck Climbing Lane  
 - Proposed Project Elements

**N**  
 NOT TO SCALE

The major roadway improvements proposed in Alternative 1 are listed below.

- Eastbound Route 50 between Empire Ranch Road and El Dorado Hills Boulevard would be widened to a four-lane section including an HOV lane, two mixed-flow travel lanes, and an auxiliary lane (extension of the truck climbing lane exiting at Latrobe Road).
- Westbound Route 50 between El Dorado Hills Boulevard/Latrobe Road and Empire Ranch Road would be widened to a four-lane section including an HOV lane, two mixed-flow travel lanes, and an auxiliary lane. No improvements would be made on westbound Route 50 between Empire Ranch Road and East Bidwell Street.
- The Empire Ranch Road overcrossing would be constructed as a two-lane roadway with a four-lane ROW reserved for future need. North of this interchange, Empire Ranch Road would be constructed as a four-lane roadway and form a four-way signalized intersection with Iron Point Road approximately 700 feet north of the Empire Ranch Road/Westbound Route 50 Ramps intersection. Empire Ranch Road would terminate at a cul-de-sac south of Route 50. Traffic signal control at the westbound ramps and stop-control at the eastbound ramps would be installed at the two ramp terminal intersections.

For Alternative 1, the single lane eastbound diagonal off-ramp would include a deceleration length of 45 meters. The two-lane eastbound loop-on-ramp would include ramp metering (one metered lane plus one HOV bypass) and an auxiliary lane length of 1,190 meters, while the single lane westbound diagonal off-ramp would include an auxiliary lane length of 980 meters. The two-lane westbound diagonal on-ramp would include ramp metering (one metered lane plus one HOV bypass) and an acceleration lane length of 180 meters.

The interchange configuration analyzed would accommodate future extension of Empire Ranch Road south of Route 50, which would require a future project development and approval process, including CTC approval for break in access. The extension, if needed, would trigger widening the overcrossing structure, and construction of a westbound loop on-ramp and an eastbound diagonal on-ramp for a Type L-9 configuration. If an extension south of Route 50 occurs, special attention should be paid to the spacing between the eastbound ramp terminal intersection and the next signalized intersection to the south. A minimum spacing of 1,200 feet is desired.

## **Alternative 2**

Alternative 2 proposes to construct a combination of Type L-2 and Type L-8 partial cloverleaf interchange with a two-lane overcrossing (refer to Figure 3 for design plan). Under this alternative, all interchange configurations would be the same as in Alternative 1 (as shown in Table 9) with the following exceptions.

- The eastbound ramps would consist of a single lane loop off-ramp and a two-lane (one mixed-flow one HOV bypass) diagonal on-ramp with an approximately 950-meter auxiliary lane connected with the Latrobe Road off-ramp.
- The ramp terminal intersection of Empire Ranch Road and Eastbound Route 50 Ramps would also be reconfigured.

## **Alternative 3**

Alternative 3 proposes to construct a combination of Type L-7 and Type L-8 partial cloverleaf interchange with a two-lane overcrossing (refer to Figure 3 for design plan). Under this alternative, all interchange configurations would be the same as in Alternative 1 (as shown in Table 9) with the following exceptions.

- The eastbound ramps would be the same as Alternative 2.
- The westbound on-ramp would consist of a two-lane loop on-ramp (one mixed-flow and one HOV bypass) that merges to one lane prior to the Route 50 merge.
- The two ramp terminal intersections would be reconfigured.

## **Alternative 4**

Alternative 4 proposes to construct a standard Type L-7 partial cloverleaf interchange with a two-lane over-crossing (refer to Figure 3 for design plan). Under this alternative, all interchange configurations would be the same as in Alternative 1 (as shown in Table 9) with the following exceptions.

- The westbound ramps would be the same as Alternative 3.
- The westbound ramp terminal intersections would be reconfigured.

## 5. CONSTRUCTION YEAR (2006) OPERATIONS ANALYSIS

The 2006 operations analysis presents the physical and operational characteristics of the roadway system under construction year conditions.

### 5.1 PLANNED IMPROVEMENTS

As mentioned in Chapter 4, the following improvements as identified in the 2025 MTP were assumed in place under 2006 conditions.

- Phase 1 reconstruction of the El Dorado Hills Boulevard/Latrobe Road interchange is scheduled for completion by 2006. These improvements would include re-construction of the eastbound loop off-ramp, constructing a new two-lane westbound loop off-ramp, widening of El Dorado Hills Boulevard from five to six lanes from the Park Drive/Saratoga Way intersection to the Route 50 westbound ramps, and constructing a new two-lane extension of Saratoga Way from Park Drive to Arrowhead Drive (refer to Chapter 7 for further discussion of these improvements).
- Iron Point Road would be extended east of East Bidwell Street to the El Dorado County line.
- Empire Ranch Road would be constructed as a four-lane roadway from the El Dorado County line (connecting to Sophia Parkway) south to Iron Point Road.

No freeway mainline or ramp terminal intersection improvements were assumed under 2006 analysis conditions beyond completion of the Empire Ranch Road interchange project. As previously mentioned, the connection between Iron Point Road and Saratoga Way is not assumed to be in place by 2006.

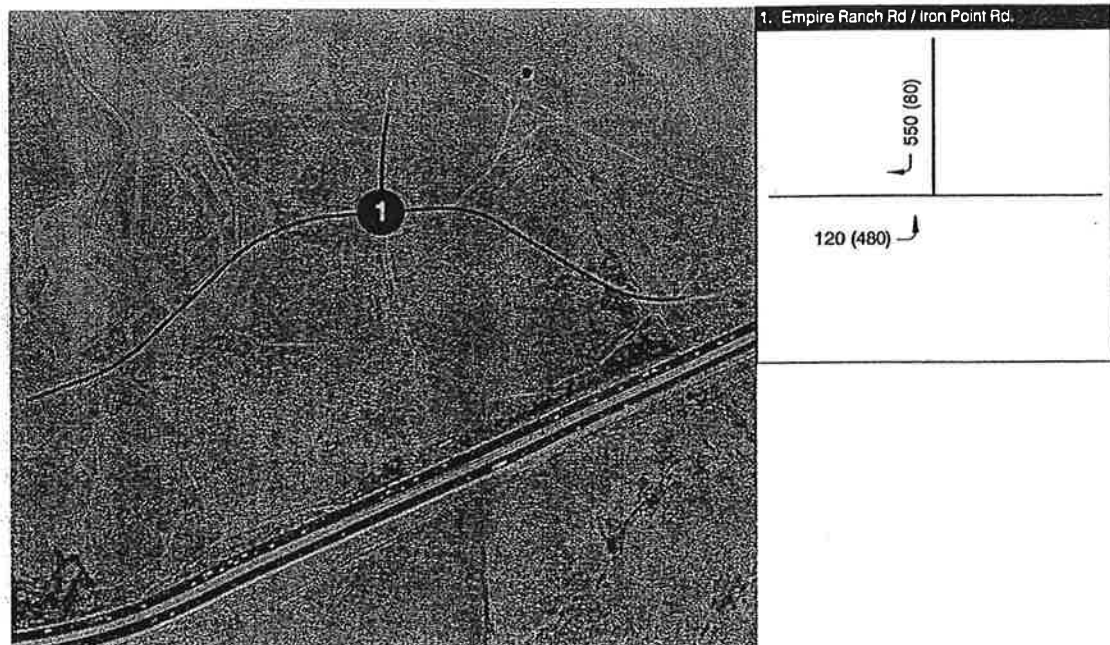
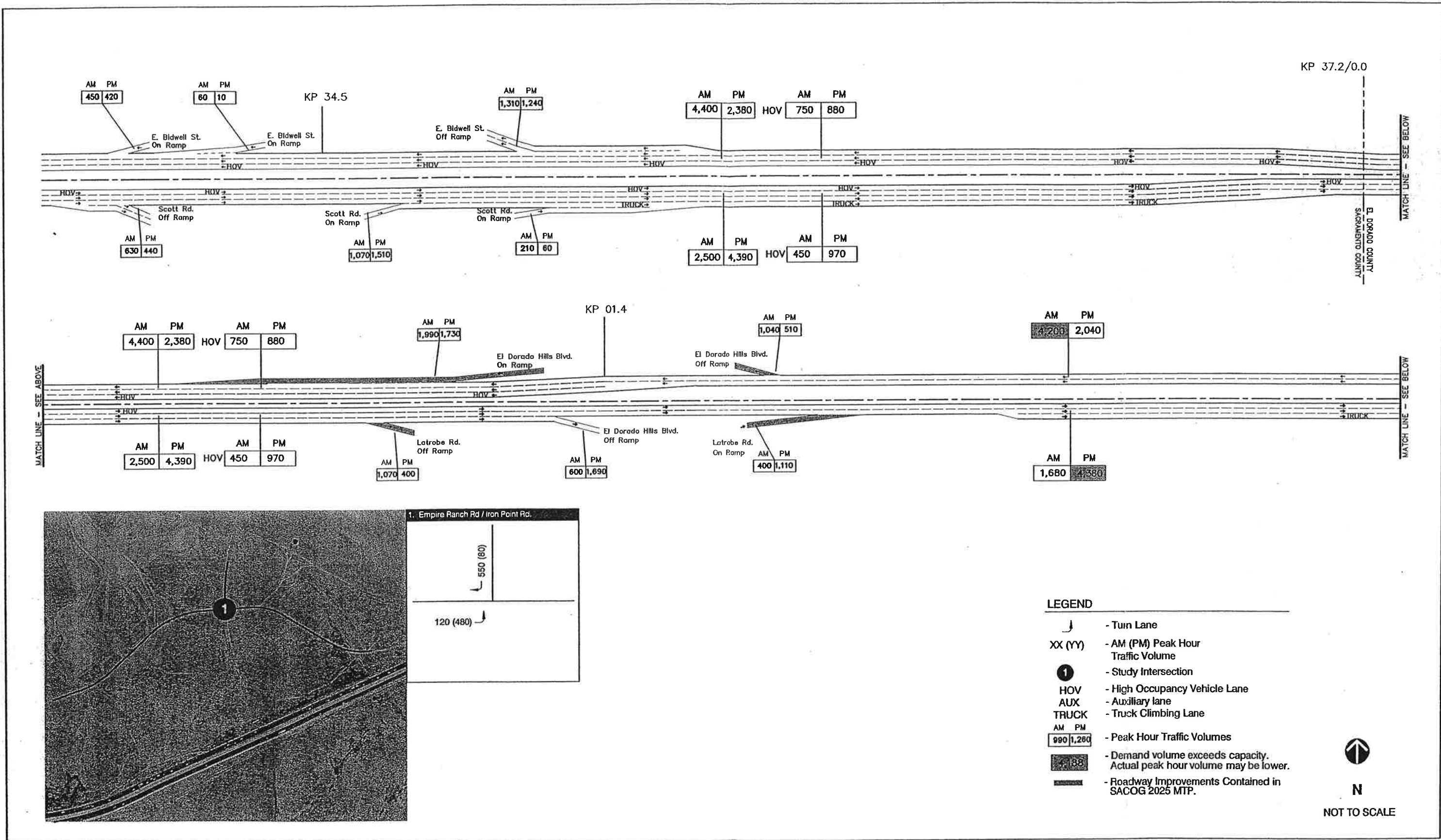
### 5.2 ALTERNATIVES

The 2006 traffic operations analysis was conducted for the freeway mainline, freeway ramp junctions, ramp terminal intersections, and ramp metering under the following alternatives.

- No Build
- Alternative 1
- Alternative 2
- Alternative 3
- Alternative 4

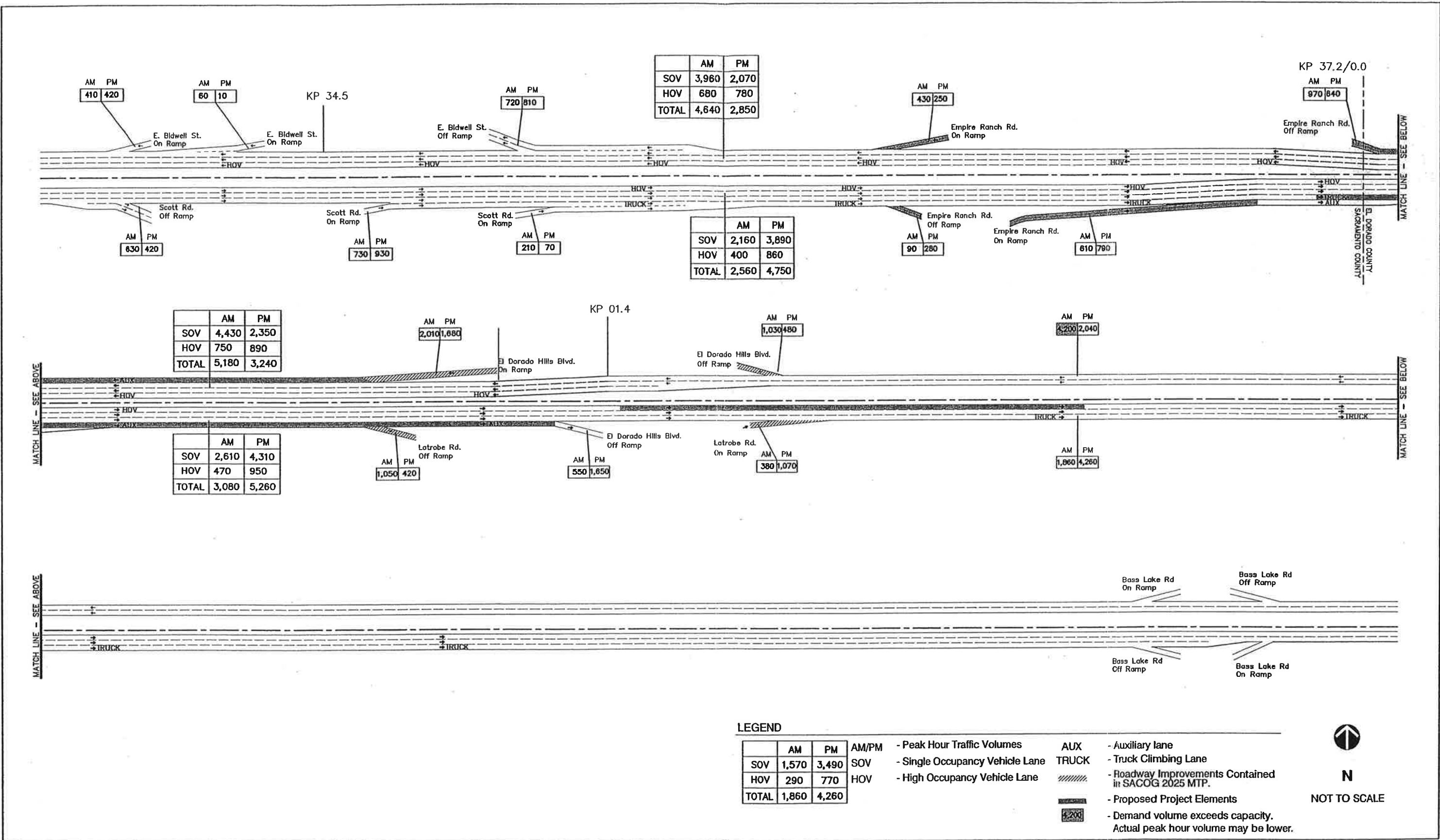
Figures 5 through 7 display the peak-hour traffic volumes, lane configurations, and traffic controls under construction year conditions for these analysis alternatives.

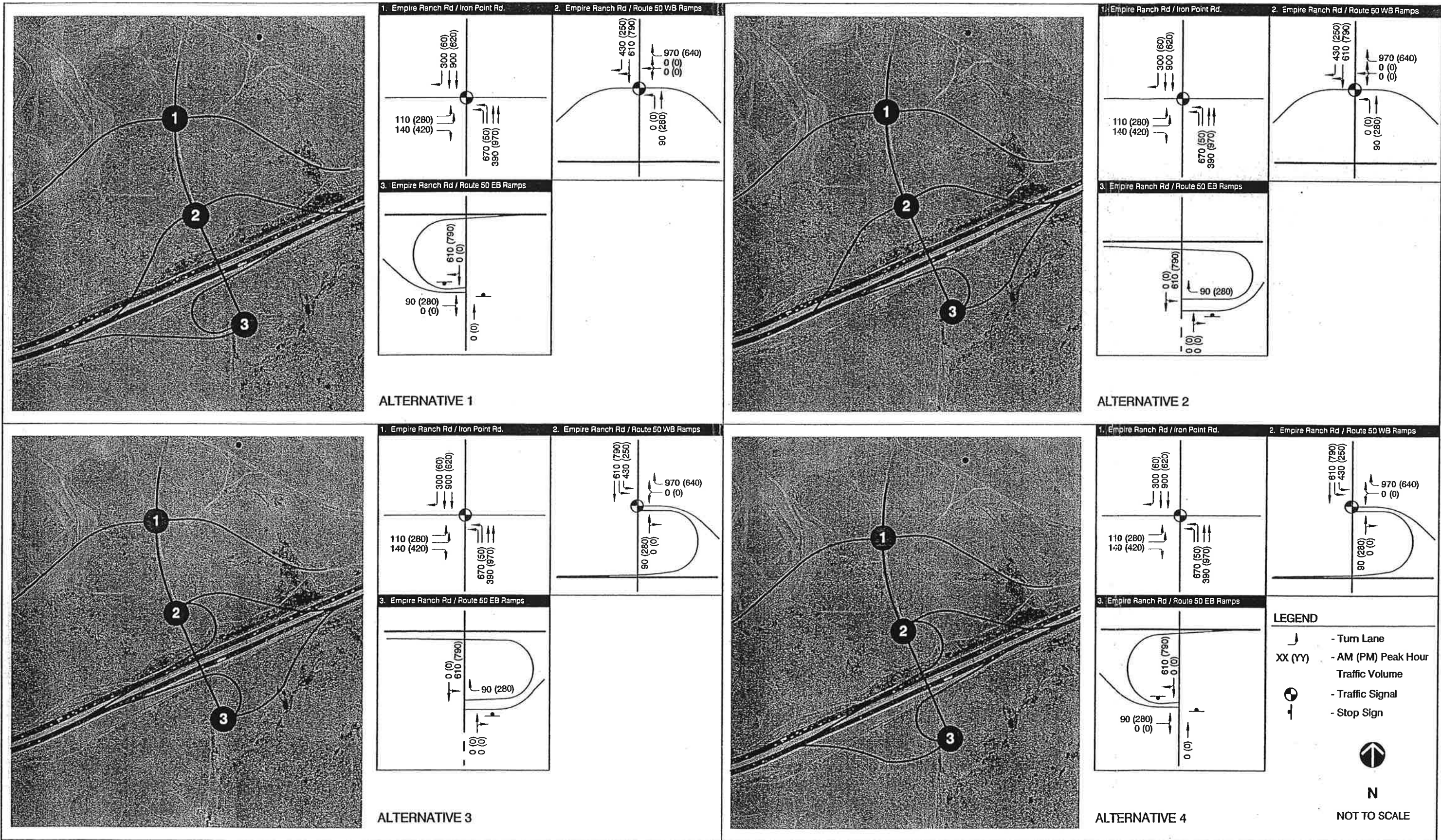




- LEGEND**
- Turn Lane
  - XX (YY) - AM (PM) Peak Hour Traffic Volume
  - Study Intersection
  - HOV - High Occupancy Vehicle Lane
  - AUX - Auxiliary lane
  - TRUCK - Truck Climbing Lane
  - AM PM  
990 1,280 - Peak Hour Traffic Volumes
  - Demand volume exceeds capacity. Actual peak hour volume may be lower.
  - Roadway Improvements Contained in SACOG 2025 MTP.

**N**  
 NOT TO SCALE





INTERSECTION PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS  
CONSTRUCTION YEAR (2006)  
ALTERNATIVES 1 THROUGH 4 CONDITIONS

FIGURE 7

### 5.3 STUDY LOCATIONS

The same freeway facilities analyzed under existing conditions were analyzed under the No Build Alternative. A complete list of the freeway and arterial facilities analyzed under 2006 conditions for the four Build Alternatives is presented below.

#### Freeway Mainline Sections

- Eastbound Route 50 – East Bidwell Street/Scott Road to Empire Ranch Road
- Eastbound Route 50 – Empire Ranch Road to El Dorado Hills Boulevard/Latrobe Road
- Westbound Route 50 – El Dorado Hills Boulevard/Latrobe Road to Empire Ranch Road
- Westbound Route 50 – Empire Ranch Road to East Bidwell Street/Scott Road

#### Ramp Junctions

- Eastbound Route 50 off-ramp to Empire Ranch Road
- Eastbound Route 50 on-ramp from Empire Ranch Road
- Westbound Route 50 off-ramp to Empire Ranch Road (functions as part of a 980-meter long weaving section with the westbound on-ramp from El Dorado Hills Boulevard but was analyzed as ramp junction<sup>1</sup>)
- Westbound Route 50 on-ramp from Empire Ranch Road

#### Intersections

- Empire Ranch Road/Route 50 Eastbound Ramps
- Empire Ranch Road/Route 50 Westbound Ramps
- Empire Ranch Road/Iron Point Road

#### Ramp Meters

- Westbound Route 50 on-ramp from Empire Ranch Road
- Eastbound Route 50 on-ramp from Empire Ranch Road

---

<sup>1</sup> HCM 2000 states that weaving section longer than 750 meters are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".

## 5.4 TRAFFIC GROWTH AND TRAVEL PATTERNS COMPARISON

To evaluate the impact of the Empire Ranch Road interchange project on traffic growth and travel patterns within the study area, the total volumes on the Route 50 ramps at the East Bidwell Street/Scott Road, Empire Ranch Road, and El Dorado Hills Boulevard/Latrobe Road interchanges were compared between the 2006 No Build and Build Alternatives. The results are summarized in Table 9.

<b>TABLE 9</b>					
<b>RAMP VOLUME COMPARISON – CONSTRUCTION YEAR (2006) CONDITIONS</b>					
<b>NO BUILD AND BUILD ALTERNATIVES</b>					
Ramps		No Build Alternative		Build Alternatives	
		AM	PM	AM	PM
Eastbound Off-ramp	East Bidwell Street	630	440	630	420
	Empire Ranch Road	0	0	90	280
	El Dorado Hills Boulevard	1,670	2,090	1600	2070
	<b>Total</b>	<b>2,300</b>	<b>2,530</b>	<b>2,320</b>	<b>2,770</b>
Eastbound On-ramp	East Bidwell Street	1,280	1,570	940	1000
	Empire Ranch Road	0	0	610	790
	El Dorado Hills Boulevard	400	1,110	380	1070
	<b>Total</b>	<b>1,680</b>	<b>2,680</b>	<b>1,930</b>	<b>2,860</b>
Westbound Off-ramp	East Bidwell Street	1,310	1,240	720	810
	Empire Ranch Road	0	0	970	640
	El Dorado Hills Boulevard	1,040	510	1030	480
	<b>Total</b>	<b>2,350</b>	<b>1,750</b>	<b>2,720</b>	<b>1,930</b>
Westbound On-ramp	East Bidwell Street	510	430	470	430
	Empire Ranch Road	0	0	430	250
	El Dorado Hills Boulevard	1,990	1,730	2010	1680
	<b>Total</b>	<b>2,400</b>	<b>2,110</b>	<b>2,910</b>	<b>2,360</b>
All Ramps	East Bidwell Street	3,630	3,630	2,760	2,660
	Empire Ranch Road	0	0	2,100	1,960
	El Dorado Hills Boulevard	5,100	5,440	5,020	5,300
	<b>Total</b>	<b>8,730</b>	<b>9,070</b>	<b>9,880</b>	<b>9,920</b>

Source: Fehr & Peers, 2003.

According to Table 9, approximately 25 percent of the ramp volume using the East Bidwell Street/Scott Road interchange would divert to the Empire Ranch Road interchange, and approximately two percent would divert from the El Dorado Hills Boulevard/Latrobe Road interchange. Overall, the Empire Ranch

Road interchange ramps are expected to carry approximately 21 percent of the total ramp volumes across the three interchanges under 2006 conditions.

In addition, the total volume of traffic at all three interchanges would increase by 1,150 vehicles during the a.m. peak hour and 850 vehicles during the p.m. peak hour under 2006 Build conditions when compared to 2006 No Build conditions. Therefore, construction of the Empire Ranch Road interchange project is expected to attract more traffic to Route 50 within the project area.

### 5.5 FREEWAY MAINLINE OPERATIONS

Freeway mainline analysis was conducted for the No Build and Build Alternatives under 2006 conditions. Traffic operations results for the study freeway segments are contained in Table 10 (see Appendix C for technical calculations).

<b>TABLE 10</b>				
<b>FREEWAY MAINLINE LOS – CONSTRUCTION YEAR (2006) CONDITIONS</b>				
<i>No Build and Build Alternatives</i>				
Freeway Mainline	AM Peak		PM Peak	
	V/C <sup>1</sup>	LOS <sup>2</sup>	V/C <sup>1</sup>	LOS <sup>2</sup>
<i>No Build</i>				
Eastbound Route 50: East Bidwell St. to El Dorado Hills Blvd.	0.62	C	<u>0.70</u>	<u>F</u>
Eastbound Route 50: El Dorado Hills Blvd. to Bass Lake Road	0.42	B	<u>0.09</u>	<u>F</u>
Westbound Route 50: Bass Lake Rd. to El Dorado Hills Blvd.	<u>0.05</u>	<u>F</u>	0.51	C
Westbound Route 50: El Dorado Hills Blvd. to East Bidwell St.	<u>1.10</u>	<u>F</u>	0.59	C
<i>Build (for all four alternatives)</i>				
Eastbound Route 50: East Bidwell St. to Empire Ranch Rd.	0.36	B	0.64	D
Eastbound Route 50: Empire Ranch Rd. to El Dorado Hills Blvd.	0.52	C	0.86	D
Eastbound Route 50: El Dorado Hills Blvd. to Bass Lake Rd.	0.39	B	0.87	D
Westbound Route 50: Bass Lake Rd. to El Dorado Hills Blvd.	<u>0.05</u>	<u>F</u>	0.51	C
Westbound Route 50: El Dorado Hills Blvd. to Empire Ranch Rd.	<u>0.38</u>	<u>F</u>	0.47	B
Westbound Route 50: Empire Ranch Rd. to East Bidwell St.	<u>0.99</u>	<u>EF</u>	0.52	C
Notes:				
(1) V/C is the volume to capacity ratio.				
(2) LOS based on the El Dorado County General Plan.				
Bold font with underline indicates unacceptable operations.				
Shading denotes that the expected LOS would be worse than the calculated LOS shown in the table due to downstream LOS F conditions propagating upstream.				
Source: <i>Fehr &amp; Peers, 2003.</i>				

Table 10 shows that under the 2006 No Build Alternative, Route 50 would continue to operate unacceptably at LOS F in the peak directions (i.e., westbound during the a.m. peak hour and eastbound during the p.m. peak hour) within the study area. The peak hour LOS F conditions would likely spread to additional hours and could adversely affect traffic operations on the major arterial roadways connecting to Route 50 such as El Dorado Hills Boulevard.

For the Build Alternatives, the results for the freeway mainline analysis are the same under all four alternatives. Unacceptable operations under build conditions would occur on westbound Route 50 from Bass Lake Road to East Bidwell Street. Insufficient mainline capacity would create bottlenecks at the segments listed below.

- Westbound Route 50 between Empire Ranch Road and East Bidwell Street
- Westbound Route 50 between Bass Lake Road and El Dorado Hills Boulevard

Congestion between Empire Ranch Road and East Bidwell Street (during the a.m. peak period) would cause mainline queuing that would extend upstream. The queuing may be severe enough to affect operations in the vicinity of the El Dorado Hills Boulevard interchange. Given that another bottleneck is projected to occur between Bass Lake Road and El Dorado Hills Boulevard, LOS F conditions on westbound Route 50 would likely extend at least from Bass Lake Road to Empire Ranch Road. It should be noted that this congestion and resultant queuing are improved compared to the "No Build" alternative due to a more balanced distribution of trips across three interchanges versus two interchanges under No Build conditions. For purposes of this study, a range of options was considered to evaluate potential operations improvements. Providing better a.m. peak hour LOS in the westbound direction would require one of the following improvements.

- Option 1. Greater utilization of the westbound HOV lane (only applies to the segment between Empire Ranch Road and East Bidwell Street for 2006 conditions)
- Option 2. Construction of continuous westbound auxiliary lanes between Bass Lake Road and East Bidwell Street
- Option 3. Construction of a third westbound mixed-flow lane between Bass Lake Road and East Bidwell Street.

The westbound Route 50 a.m. peak hour HOV utilization would need to increase from 15 to 20 percent to provide LOS D conditions for the segment between Empire Ranch Road and East Bidwell Street under Option 1 described above. Under Options 2 and 3, the a.m. peak hour LOS would improve as listed below.

- Westbound Route 50 between Bass Lake Road and El Dorado Hills Boulevard (Option 2 - LOS D, Option 3 – LOS C)
- Westbound Route 50 between El Dorado Hills Boulevard to Empire Ranch Road (Option 2 - LOS D, Option 3 – LOS D)
- Westbound Route 50 between Empire Ranch Road and East Bidwell Street (Option 2 - LOS D, Option 3 – LOS C)

Option 3 is consistent with the ultimate eight-lane mainline section recommended in the Caltrans Transportation Concept Report. Figures 8 and 9 display improvement Options 2 and 3, respectively, and the LOS comparison between “before” and “after” conditions.

### 5.6 FREEWAY RAMP JUNCTION OPERATIONS

Traffic operations for the ramp junctions were analyzed under 2006 conditions for the four Build Alternatives, and the results are summarized in Table 11 (see Appendix C for technical calculations). The results of ramp junction analyses are the same for all Build Alternatives.

<b>TABLE 11</b>				
<b>FREEWAY RAMP JUNCTION LOS – CONSTRUCTION YEAR (2006) CONDITIONS</b>				
<b>BUILD ALTERNATIVES</b>				
Freeway Ramp Junction	AM Peak		PM Peak	
	Density <sup>1</sup>	LOS <sup>2</sup>	Density <sup>1</sup>	LOS <sup>2</sup>
<i>Build (for all four alternatives)</i>				
Route 50 Eastbound Off-ramp to Empire Ranch Road	19	B	30	D
Route 50 Eastbound On-ramp from Empire Ranch Road	13	B	23	C
Route 50 Westbound Off-ramp to Empire Ranch Road	≥43	F	16	B
Route 50 Westbound On-ramp from Empire Ranch Road	37	E	21	C
Notes:				
(1) Density in passenger cars per mile per lane.				
(2) LOS calculations based on the HCM 2000 procedures.				
Source: <i>Fehr &amp; Peers</i> , 2003.				



The LOS F/E conditions for the Empire Ranch Road westbound ramps during the a.m. peak hour are due to the mainline capacity limits described above and are not associated with the interchange design itself. The ramp junction LOS would improve as listed below with any of the three options described above for the mainline (see Appendix D for technical calculations).

- Westbound off-ramp during the a.m. peak hour (Option 1 – LOS F, Option 2 – LOS F, Option 3 – LOS D)
- Westbound on-ramp during the a.m. peak hour (Option 1 – LOS E, Option 2 – LOS D, Option 3 – LOS C)

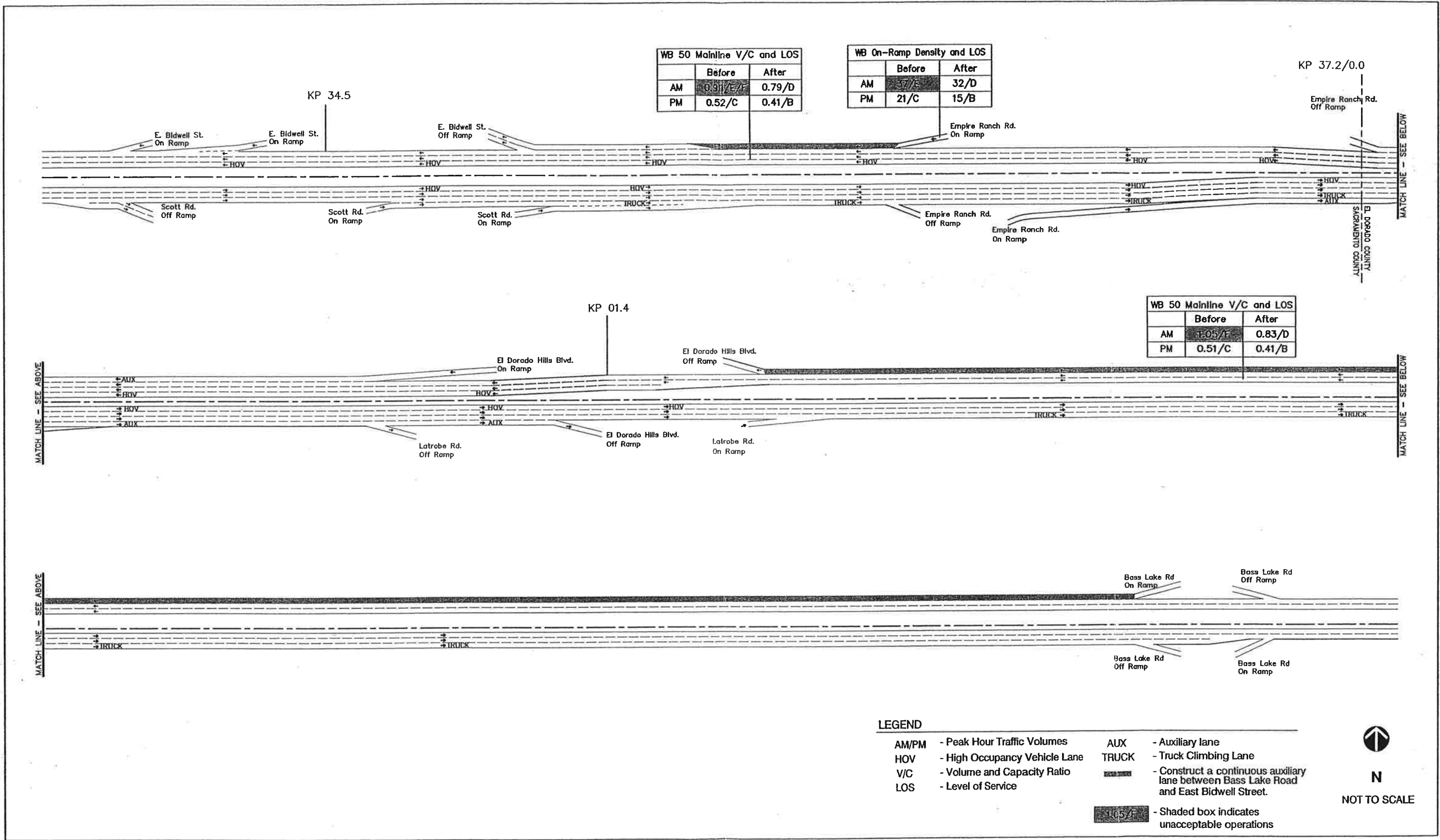
The LOS comparison between “before” and “after” conditions for ramp junctions under Options 2 and 3 are also shown in Figures 8 and 9.

## 5.7 INTERSECTION OPERATIONS

The study intersections were analyzed under 2006 conditions for both No Build and Build Alternatives. Under 2006 conditions, Iron Point Road east of Empire Ranch Road would not be connected with Saratoga Way and other local roadways, so no traffic was assumed to be carried on Iron Point Road between Empire Ranch Road and the county line. Therefore, the Iron Point Road/Empire Ranch Road intersection was analyzed as a “L” (two-way) unsignalized intersection under the No Build Alternative and a “T” (three-way) signalized intersection under the Build Alternatives. The results of the intersection operations analysis for the No Build and Build Alternatives are summarized in Table 12 (see Appendix C for technical calculations).

As shown in Table 12, the Empire Ranch Road/Iron Point Road intersection would operate acceptably at LOS C or better under both peak hours for the 2006 No Build Alternative. For the four Build Alternatives, all study intersections on Empire Ranch Road would operate acceptably at LOS C or better conditions during both peak hours.

Alternatives 3 and 4 include a Type L-7 configuration at the westbound ramps. In contrast to Alternatives 1 and 2, this configuration requires an additional signal timing phase for the loop on-ramp to serve southbound left-turning traffic heading westbound on Route 50 from Empire Ranch Road. Therefore, the westbound ramps would have higher delay under Alternatives 3 and 4 than Alternatives 1 and 2, although this intersection would still operate acceptably.



<b>TABLE 12</b>					
<b>INTERSECTION LOS – CONSTRUCTION YEAR (2006) CONDITIONS</b>					
<b>BUILD ALTERNATIVES</b>					
Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay <sup>1</sup>	LOS <sup>2</sup>	Delay <sup>1</sup>	LOS <sup>2</sup>
<b><i>No Build</i></b>					
Empire Ranch Road/Iron Point Road	Uncontrolled	0	A	0	A
<b><i>Build - Alternative 1</i></b>					
Empire Ranch Rd./Route 50 Eastbound Ramps	Side Street Stop	0	A	0	A
Empire Ranch Rd./Route 50 Westbound Ramps	Traffic Signal	27	C	20	B
Empire Ranch Road/Iron Point Road	Traffic Signal	17	B	15	B
<b><i>Build - Alternative 2</i></b>					
Empire Ranch Rd./Route 50 Eastbound Ramps	Side Street Stop	0	A	0	A
Empire Ranch Rd./Route 50 Westbound Ramps	Traffic Signal	27	C	20	B
Empire Ranch Road/Iron Point Road	Traffic Signal	17	B	15	B
<b><i>Build - Alternative 3</i></b>					
Empire Ranch Rd./Route 50 Eastbound Ramps	Side Street Stop	0	A	0	A
Empire Ranch Rd./Route 50 Westbound Ramps	Traffic Signal	32	C	22	C
Empire Ranch Road/Iron Point Road	Traffic Signal	17	B	15	B
<b><i>Build - Alternative 4</i></b>					
Empire Ranch Rd./Route 50 Eastbound Ramps	Side Street Stop	0	A	0	A
Empire Ranch Rd./Route 50 Westbound Ramps	Traffic Signal	32	C	22	C
Empire Ranch Road/Iron Point Road	Traffic Signal	17	B	15	B
Notes:					
(1) Control delay in seconds per vehicle.					
(2) LOS calculations based on the 2000 HCM procedures.					
Source: Fehr & Peers, 2003.					

Maximum queue lengths and available vehicle storage for critical movements at the study intersections are shown in Table 13 (see Appendix C for technical calculations). As shown, adequate vehicle storage would be provided under all Build Alternatives for the critical movements at each study intersection.

<b>TABLE 13</b>				
<b>INTERSECTION QUEUE SUMMARY – CONSTRUCTION YEAR (2006) CONDITIONS</b>				
<b>BUILD ALTERNATIVES</b>				
Intersection	Movement	Available Storage (ft)	Maximum Queue <sup>1</sup> (ft)	
			AM	PM
<b>Build - Alternative 1 &amp; 2</b>				
Empire Ranch Road/ Westbound Route 50 Ramps	Westbound Right	750	375	275
	Northbound Through	945 <sup>2</sup>	50	100
	Southbound	700	300	500
Empire Ranch Road/ Iron Point Road	Northbound Left	200	125	25
	Northbound Through	700	25	150
	Eastbound Left	300	50	100
<b>Build - Alternative 3 &amp; 4</b>				
Empire Ranch Road/ Westbound Route 50 Ramps	Westbound Right	500	325	225
	Northbound Through	1,020 <sup>2</sup>	100	175
	Southbound Left	350	200	100
	Southbound Through	650	275	450
Empire Ranch Road/ Iron Point Road	Northbound Left	200	175	50
	Northbound Through	650	25	150
	Eastbound Left	300	50	100
Notes:				
<sup>1</sup> The reported queue is the 95 <sup>th</sup> percentile queue, which is typically used to size storage bays.				
<sup>2</sup> The available storage between the eastbound and westbound Route 50 ramp terminal intersections.				
Source: <i>Fehr &amp; Peers, 2003.</i>				

## 5.8 RAMP METER ANALYSIS

A ramp metering analysis was conducted for the Build Alternatives under 2006 conditions to determine the most restrictive metering rate for the eastbound and westbound Route 50 on-ramps that could be applied before vehicle queues exceed the available storage capacity at Empire Ranch Road. The ramp meter type for the Empire Ranch Road on-ramps was assumed to be one metered lane plus an HOV bypass.

Table 14 summarizes the results of the ramp metering analysis under 2006 conditions (see Appendix C for technical calculations). The metered on-ramps would operate within the minimum and maximum metering rates (240 and 1,000 vehicles per hour per lane, respectively) with the available storage.

<b>TABLE 14</b>					
<b>RAMP METERING OPERATIONS – CONSTRUCTION YEAR (2006) CONDITIONS</b>					
<b>BUILD ALTERNATIVES</b>					
On-Ramp	Number of Lanes	AM Peak Hour		PM Peak Hour	
		Peak-Hour Volume (vph)	Minimum Metering Rate (vphpl)	Peak-Hour Volume (vph)	Minimum Metering Rate (vphpl)
Empire Ranch Road Eastbound On-ramp	1 Metered Lane 1 HOV Bypass Lane	610	520	790	640
Empire Ranch Road Westbound On-ramp	1 Metered Lane 1 HOV Bypass Lane	430	370	250	240
Note: vphpl = vehicles per hour per lane Source: <i>Fehr &amp; Peers, 2003.</i>					

## **6. DESIGN YEAR (2026) CONDITIONS ANALYSIS**

The design year analysis presents the physical and operational characteristics of the roadway system under 2026 conditions.

### **6.1 PLANNED IMPROVEMENTS**

As mentioned in Chapter 4, the following improvements as identified in the 2025 MTP were included in the 2026 analysis (refer to Chapter 7 for further discussion of these improvements):

- All roadway improvements assumed to be built by 2006 as described in Chapter 5.
- A new interchange on Route 50 at Silva Valley Parkway is scheduled for completion by Year 2008. This interchange would consist of one off-ramp and two on-ramps serving each direction of Route 50. These on- and off-ramps would be connected with the ramps at adjacent interchanges using auxiliary lanes (i.e., El Dorado Hills Boulevard/Latrobe Road interchange to the west and Bass Lake Road interchange to the east).
- HOV lanes on Route 50 between El Dorado Hills Boulevard/Latrobe Road and South Shingle Springs Road/Ponderosa Road are scheduled for completion by Year 2010.
- A four-lane roadway connection between Saratoga Way and Iron Point Road will be in place by 2018 per the 2025 MTP.

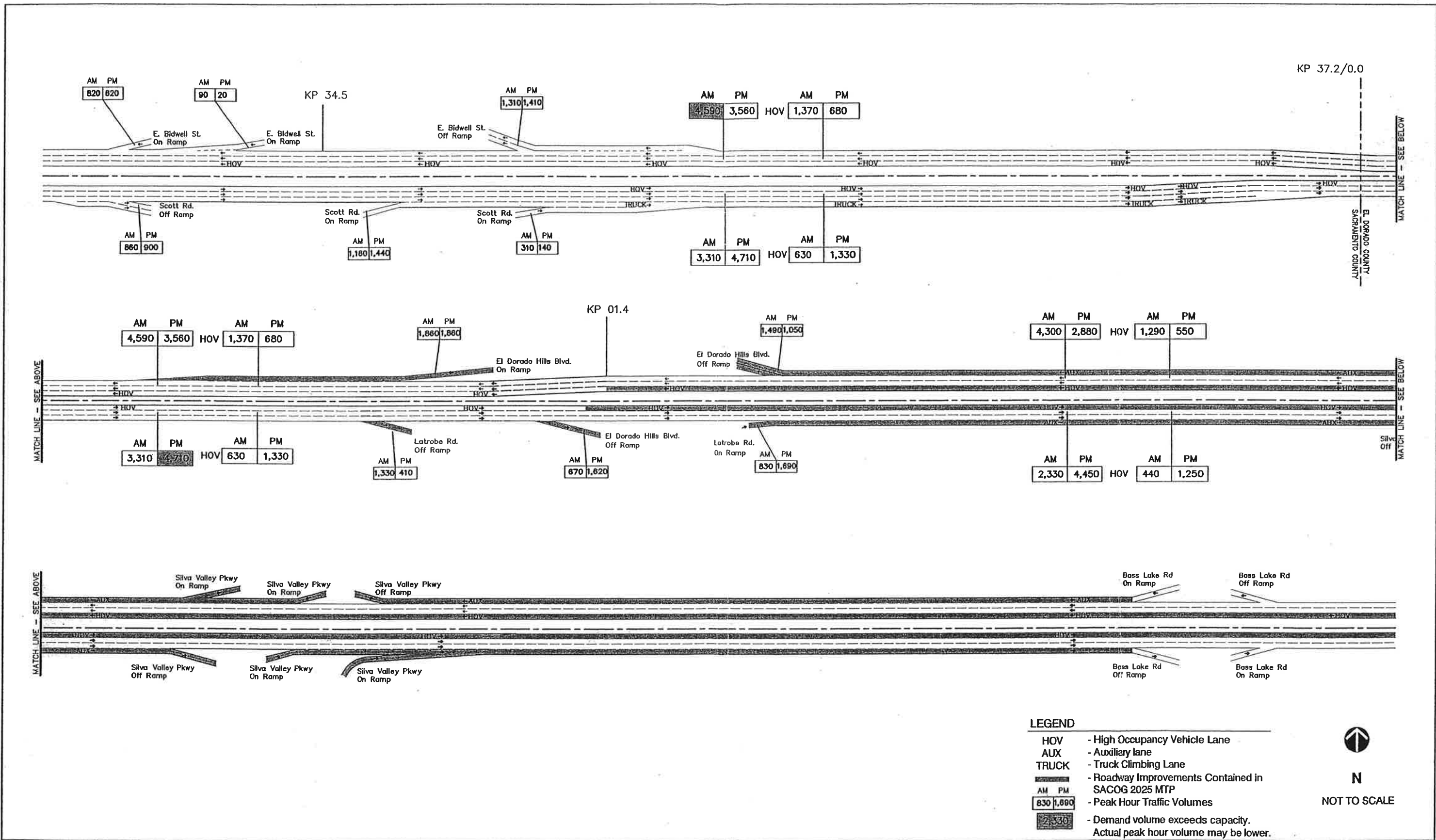
No other freeway mainline or ramp terminal intersection improvements were assumed under 2026 conditions beyond completion of the Empire Ranch Road interchange project.

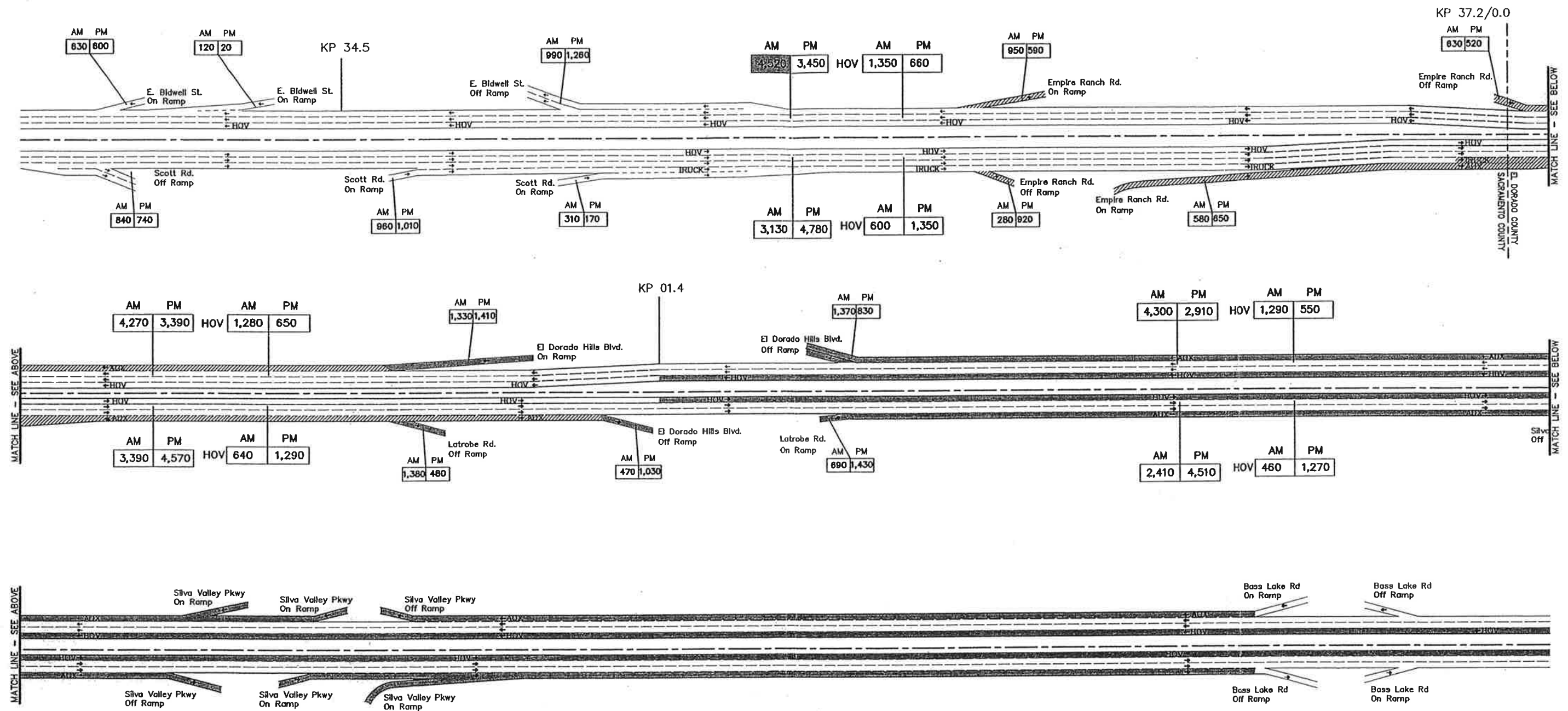
### **6.2 ALTERNATIVES**

The 2026 traffic operations analysis was conducted for the study freeway mainline, ramp junctions, and intersections under the following alternatives.

- No Build
- Alternative 1
- Alternative 2
- Alternative 3
- Alternative 4

Figures 10 through 13 display the peak-hour traffic volumes, lane configurations, and traffic controls under 2026 conditions for these alternatives.





**LEGEND**

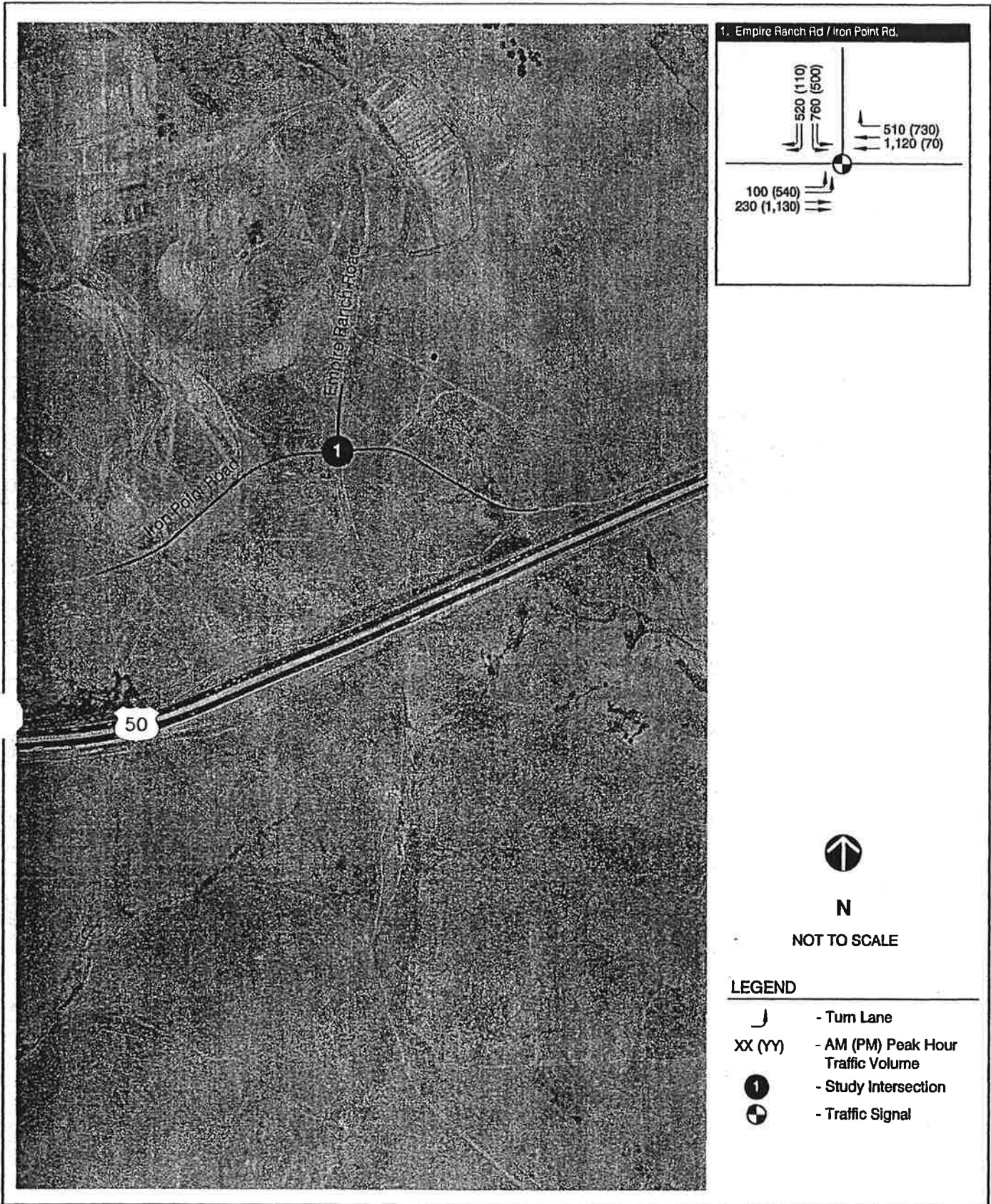
- HOV - High Occupancy Vehicle Lane
  - AUX - Auxiliary lane
  - TRUCK - Truck Climbing Lane
  - ▨ - Proposed Project Elements
  - ▩ - Roadway Improvements Contained in SACOG 2025 MTP
- |           |   |
|-----------|---|
| AM PM     | - Peak Hour Traffic Volumes   |
| 690 1,430 |   |
| 4,520     | - Demand volume exceeds capacity. Actual peak hour volume may be lower. |

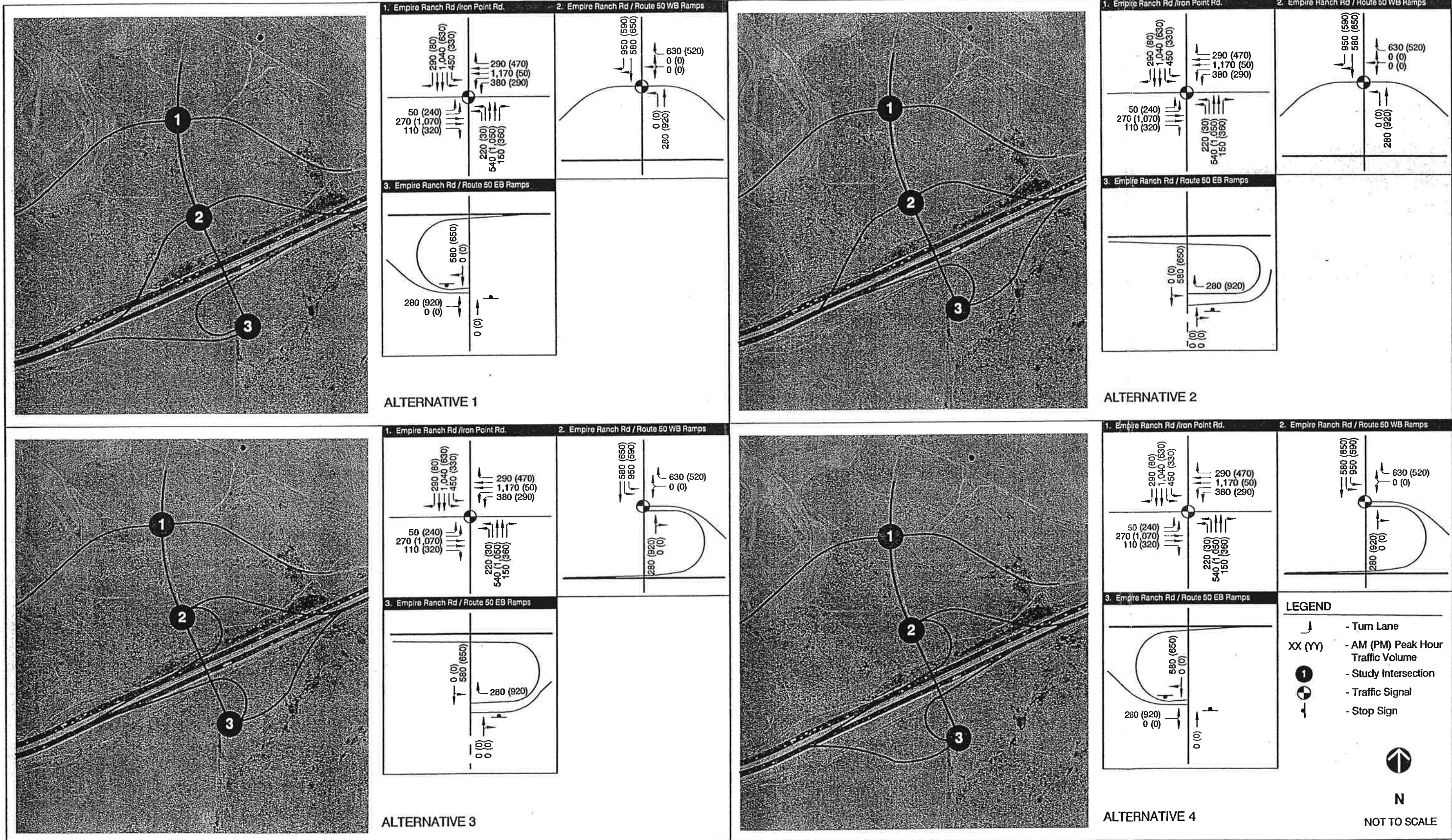


N

NOT TO SCALE







**INTERSECTION PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS  
DESIGN YEAR (2026)  
ALTERNATIVES 1 THROUGH 4 CONDITIONS**

**FIGURE 13**

## Study Locations

The study segment of Route 50 changes slightly for the 2026 conditions analysis since the Silva Valley Parkway interchange is assumed to be in place by this time. The freeway mainline sections analyzed under No Build and Build Alternatives for 2026 conditions are listed below. All other freeway facilities (ramp junctions, ramp terminal intersections, and ramp meter) analyzed under 2006 conditions were also analyzed under 2026 conditions.

### Freeway Mainline Sections – 2026 No Build Conditions

- Eastbound Route 50 – East Bidwell Street to El Dorado Hills Boulevard
- Eastbound Route 50 – El Dorado Hills Boulevard to Silva Valley Parkway
- Westbound Route 50 – Silva Valley Parkway to El Dorado Hills Boulevard
- Westbound Route 50 – El Dorado Hills Boulevard to East Bidwell Street

### Freeway Mainline Sections – 2026 Build Alternatives 1 through 4

- Eastbound Route 50 – East Bidwell Street to Empire Ranch Road
- Eastbound Route 50 – Empire Ranch Road to El Dorado Hills Boulevard
- Eastbound Route 50 – El Dorado Hills Boulevard to Silva Valley Parkway
- Westbound Route 50 – Silva Valley Parkway to El Dorado Hills Boulevard
- Westbound Route 50 – El Dorado Hills Boulevard to Empire Ranch Road
- Westbound Route 50 – Empire Ranch Road to East Bidwell Street

## 6.3 TRAFFIC GROWTH AND TRAVEL PATTERNS COMPARISON

To evaluate the impact of the Empire Ranch Road interchange project on traffic growth and travel patterns within the study area, the total volumes on the Route 50 ramps at the East Bidwell Street/Scott Road, Empire Ranch Road, and El Dorado Hills Boulevard/Latrobe Road interchanges were compared between the 2026 No Build and Build Alternatives. The results are summarized in Table 15.

<b>TABLE 15</b>					
<b>RAMP VOLUME COMPARISON – DESIGN YEAR (2026) CONDITIONS</b>					
<b>NO BUILD AND BUILD ALTERNATIVES</b>					
Ramps		No Build Alternative		Build Alternatives	
		AM	PM	AM	PM
Eastbound Off-ramp	East Bidwell Street	860	900	840	740
	Empire Ranch Road	0	0	280	920
	El Dorado Hills Boulevard	2,000	2,030	1,850	1,510
	<b>Total</b>	<b>2,860</b>	<b>2,930</b>	<b>2,970</b>	<b>3,170</b>
Eastbound On-ramp	East Bidwell Street	1,470	1,580	1,270	1,180
	Empire Ranch Road	0	0	580	650
	El Dorado Hills Boulevard	830	1,690	690	1,430
	<b>Total</b>	<b>2,300</b>	<b>3,270</b>	<b>2,540</b>	<b>3,260</b>
Westbound Off-ramp	East Bidwell Street	1,310	1,410	990	1,260
	Empire Ranch Road	0	0	630	520
	El Dorado Hills Boulevard	1,490	1,050	1,370	830
	<b>Total</b>	<b>2,800</b>	<b>2,460</b>	<b>2,990</b>	<b>2,610</b>
Westbound On-ramp	East Bidwell Street	910	640	750	620
	Empire Ranch Road	0	0	950	590
	El Dorado Hills Boulevard	1,860	1,860	1,330	1,410
	<b>Total</b>	<b>2,770</b>	<b>2,500</b>	<b>3,030</b>	<b>2,620</b>
All Ramps	East Bidwell Street	4,550	4,530	3,850	3,800
	Empire Ranch Road	0	0	2,440	2,680
	El Dorado Hills Boulevard	6,180	6,630	5,240	5,180
	<b>Total</b>	<b>10,730</b>	<b>11,160</b>	<b>11,530</b>	<b>11,660</b>

Source: Fehr & Peers, 2003.

Table 15 indicates that approximately 10 percent of the ramp volume using the East Bidwell Street would divert to the Empire Ranch Road interchange, and approximately 12 percent would divert from El Dorado Hills Boulevard to Empire Ranch Road interchange. Overall, the Empire Ranch Road interchange ramps are expected to carry approximately 22 percent of the total ramp volumes across the three interchanges. The addition of the Empire Ranch Road interchange would help to spread the distribution of trips among the interchanges so as not to overburden East Bidwell Street and El Dorado Hills Boulevard.

In addition, as shown in Table 15, the total volume of traffic at all three interchanges would increase by 800 vehicles during the a.m. peak hour and 500 vehicles during the p.m. peak hour under 2026 Build conditions when compared to 2026 No Build conditions. Therefore, construction of the Empire Ranch Road/Route 50 interchange project is expected to attract more traffic to Route 50 within the project area.

Table 15 also shows the 2026 traffic demand at the Empire Ranch Road eastbound on-ramp and westbound off-ramp would decrease compared to Year 2006 conditions. Drivers would use the connection between Saratoga Way and Iron Point Road (assumed to be in place by 2026) since it would provide a more direct connection between residential and commercial land uses in this area. Drivers would also use this connection as a bypass to avoid traffic congestion on Route 50 between El Dorado Hills and Folsom.

#### 6.4 FREEWAY MAINLINE OPERATIONS

Freeway mainline analysis was conducted for the No Build and Build Alternatives under 2026 conditions. Traffic operations results for the study freeway sections are contained in Table 16 (see Appendix D for technical calculations).

<b>TABLE 16</b>				
<b>FREEWAY MAINLINE LOS – DESIGN YEAR (2026) CONDITIONS</b>				
<i>No Build and Build Alternatives</i>				
Freeway Mainline	AM Peak		PM Peak	
	V/C <sup>1</sup>	LOS <sup>2</sup>	V/C <sup>1</sup>	LOS <sup>2</sup>
<i>No Build</i>				
Eastbound Route 50: East Bidwell St. to El Dorado Hills Blvd.	0.83	D	<u><b>1.17</b></u>	<u><b>F</b></u>
Eastbound Route 50: El Dorado Hills Blvd. to Silva Valley Pkwy.	0.46	B	0.88	D
Westbound Route 50: Silva Valley Pkwy. to El Dorado Hills Blvd.			0.57	C
Westbound Route 50: El Dorado Hills Blvd. to East Bidwell St.	<u><b>1.14</b></u>	<u><b>F</b></u>	0.89	D
<i>Build (for all four alternatives)</i>				
Eastbound Route 50: East Bidwell St. to Empire Ranch Rd.	0.52	C	0.79	D
Eastbound Route 50: Empire Ranch Rd. to El Dorado Hills Blvd.	0.67	C	<u><b>0.91</b></u>	<u><b>E</b></u>
Eastbound Route 50: El Dorado Hills Blvd. to Silva Valley Pkwy.	0.48	B	<u><b>0.90</b></u>	<u><b>E</b></u>
Westbound Route 50: Silva Valley Pkwy. to El Dorado Hills Blvd.			0.58	C
Westbound Route 50: El Dorado Hills Blvd. to Empire Ranch Rd.			0.67	C
Westbound Route 50: Empire Ranch Rd. to East Bidwell St.	<u><b>1.13</b></u>	<u><b>F</b></u>	0.86	D
Notes:				
(1) V/C is the volume to capacity ratio.				
(2) LOS based on the El Dorado County General Plan.				
Shading denotes that the expected LOS would be worse than the calculated LOS shown in the table due to downstream LOS F conditions propagating upstream. Bold font with underscore indicates unacceptable operations.				
Source: <i>Fehr &amp; Peers</i> , 2003.				

Table 16 shows that under the 2026 No Build Alternative, Route 50 would continue to operate unacceptably at LOS F in the peak directions (i.e., westbound during the a.m. peak hour and eastbound during the p.m. peak hour) between El Dorado Hills Boulevard/Latrobe Road and East Bidwell Street/Scott Road. The peak hour LOS F conditions would likely spread to additional hours and could adversely affect traffic operations on the major arterial roadways connecting to Route 50 such as El Dorado Hills Boulevard.

For the Build Alternatives, the results for the freeway mainline analysis are the same under all four alternatives. Unacceptable operations would continue under build conditions in the peak directions. Specifically, insufficient mainline capacity would create bottlenecks at the segments listed below.

- Westbound Route 50 between Empire Ranch Road and East Bidwell Street – AM peak
- Eastbound Route 50 between Empire Ranch Road and Silva Valley Parkway – PM peak

Congestion between Empire Ranch Road and East Bidwell Street would cause mainline queuing that would extend upstream (with or without the Empire Ranch Road interchange constructed). The queuing may be severe enough to affect operations in the vicinity of the El Dorado Hills Boulevard interchange. Given that another bottleneck is projected to occur between El Dorado Hills Boulevard and Bass Lake Road, LOS F conditions on westbound Route 50 would likely extend from Bass Lake Road to Empire Ranch Road. A range of alternatives was considered to evaluate potential operational improvements. Providing better peak hour LOS in the westbound direction would require one or more of the following improvements:

- Option 1 – Greater utilization of the westbound HOV lane (only applies to the segment between Empire Ranch Road and East Bidwell Street for 2026 conditions)
- Option 2 – Construction of a westbound auxiliary lane between the Empire Ranch Road on-ramp and the East Bidwell Street off-ramp
- Option 3 – Construction of a westbound mixed-flow lane between the Empire Ranch Road off-ramp and the East Bidwell Street off-ramp

Under Option 1, the westbound Route 50 a.m. peak hour HOV utilization would need to increase from 23 to 34 percent to provide acceptable LOS D operations for the segment between Empire Ranch Road and East Bidwell Street under design year conditions. Under Options 2 and 3 above, the a.m. peak hour LOS would improve as listed below.

- Westbound Route 50 between Empire Ranch Road and East Bidwell Street (Option 2 - LOS D/E, Option 3 – LOS D/E)

Improving the peak hour LOS in the eastbound direction during the p.m. peak hour under 2026 conditions would require one of the following improvements.

Option 4 - Greater utilization of the eastbound HOV lane between Empire Ranch Road and Silva Valley Parkway

Option 5 - Extension of the eastbound auxiliary lane to become a mixed-flow lane between Empire Ranch Road and Silva Valley Parkway

Under Option 4, the eastbound Route 50 p.m. peak hour HOV utilization would need to increase from 22 to 23 percent to provide LOS D conditions for the segment between Empire Ranch Road and Silva Valley Parkway under design year conditions. Under Option 5 above, the p.m. peak hour LOS would improve as listed below.

- Eastbound Route 50 between East Bidwell Street and Empire Ranch Road (Option 5 - LOS D)
- Eastbound Route 50 between El Dorado Hills Boulevard and Silva Valley Parkway (Option 5 - LOS D)

Figures 14 and 15 illustrate mitigation Options 2 and 3, respectively, and indicate the “before” and “after” LOS for each mitigation under Design Build conditions.

#### 6.5 FREEWAY RAMP JUNCTION OPERATIONS

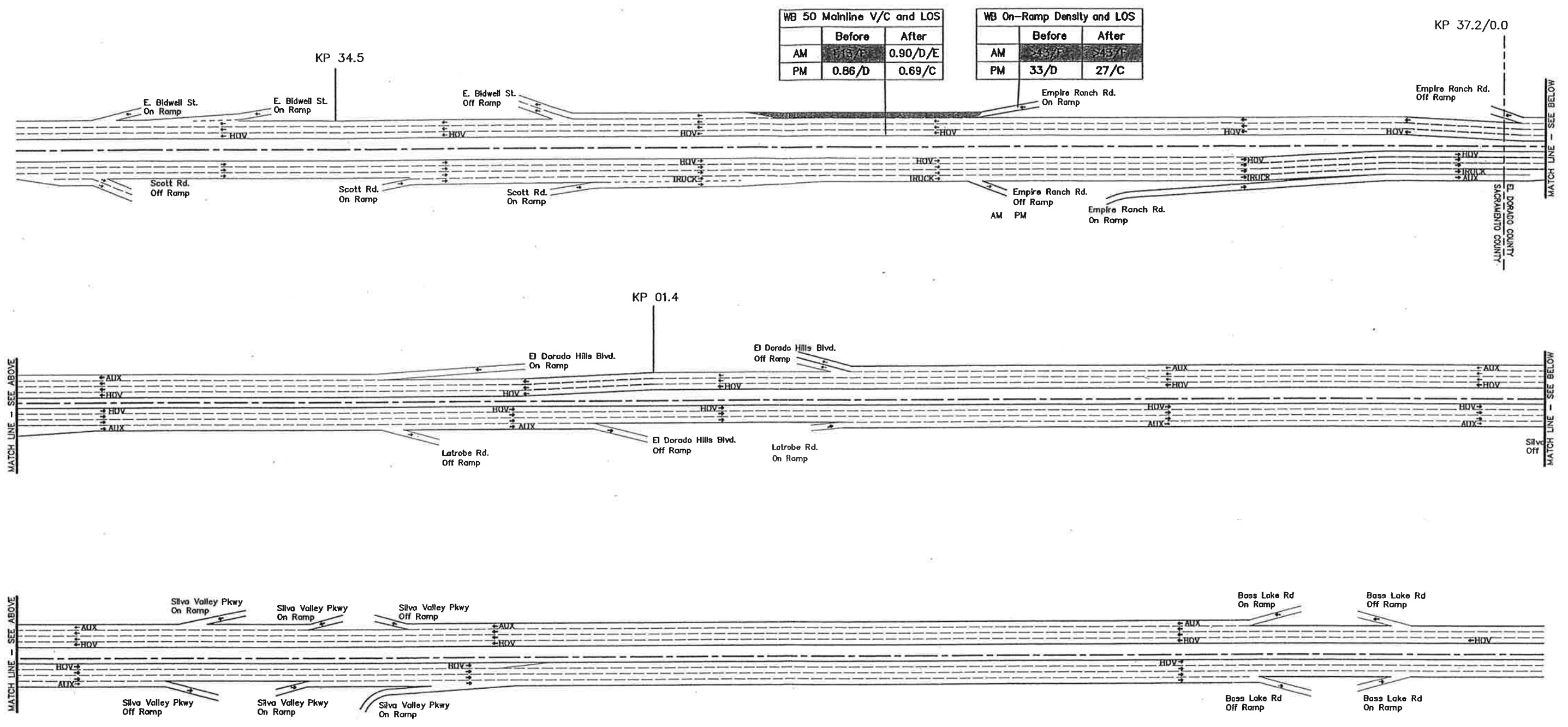
Traffic operations for the ramp junctions were analyzed under Year 2026 conditions for the four Build Alternatives, and the results are summarized in Table 17 (see Appendix D for technical calculations). The results of ramp junction analyses are the same under all four Build Alternatives.

Table 17 shows that all ramp junctions at Empire Ranch Road would operate at LOS D or better under 2026 Build conditions during both peak hours except for the following locations:

- The eastbound off-ramp would operate at LOS E during the p.m. peak hour due to the high volume on the ramp.
- The westbound off-ramp would operate unacceptably at LOS F during the a.m. peak hour due to the capacity constraint on the westbound Route 50 mainline segment between El Dorado Hills Boulevard and Empire Ranch Road.
- The westbound on-ramp would operate unacceptably at LOS F during the a.m. peak hour due to the capacity constraint on the westbound Route 50 mainline segment at the Empire Ranch Road interchange.

WB 50 Mainline V/C and LOS		
	Before	After
AM	0.86/D	0.90/D/E
PM	0.86/D	0.69/C

WB On-Ramp Density and LOS		
	Before	After
AM	33/D	27/F
PM	33/D	27/C



- LEGEND**
- HOV - High Occupancy Vehicle Lane
  - AUX - Auxiliary lane
  - TRUCK - Truck Climbing Lane
  - LOS - Level of Service
  - V/C - Volume and Capacity
  - Construct a westbound auxiliary lane from Empire Ranch Road on-ramp to East Bidwell Street off-ramp.
  - Shaded box indicates unacceptable operations.



NOT TO SCALE



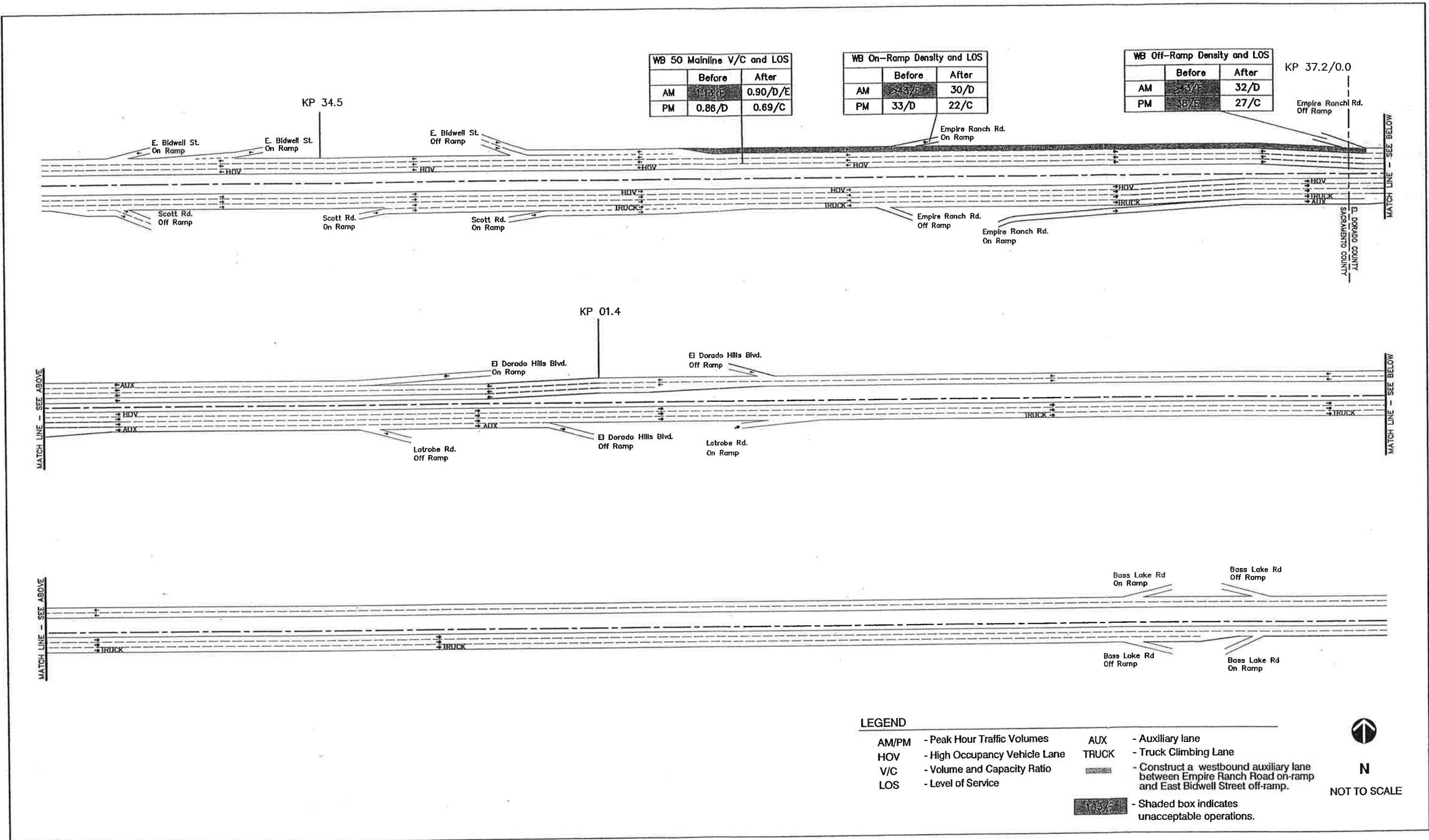
TABLE 17 FREEWAY RAMP JUNCTION LOS – DESIGN YEAR (2026) CONDITIONS BUILD ALTERNATIVES				
Freeway Ramp Junction	AM Peak		PM Peak	
	Density <sup>1</sup>	LOS <sup>2</sup>	Density <sup>1</sup>	LOS <sup>2</sup>
<i>Build (for all four alternatives)</i>				
Route 50 Eastbound Off-ramp to Empire Ranch Road	25	C	<b><u>36</u></b>	<b><u>E</u></b>
Route 50 Eastbound On-ramp from Empire Ranch Road	17	B	24	C
Route 50 Westbound Off-ramp to Empire Ranch Road	<b><u>≥43</u></b>	<b><u>F</u></b>	<b><u>38</u></b>	<b><u>E</u></b>
Route 50 Westbound On-ramp from Empire Ranch Road	<b><u>≥43</u></b>	<b><u>F</u></b>	33	D
Notes: (1) Density in passenger cars per mile per lane. (2) LOS calculations based on the HCM 2000 procedures. Bold font with underscore indicates unacceptable operations. Source: <i>Fehr &amp; Peers</i> , 2003.				

The LOS F conditions for the Empire Ranch Road westbound ramps during the a.m. peak hour are due to the mainline capacity limits described above and are not associated with the interchange design itself. Under Option 3 described above for the mainline segment (see Appendix E for technical calculations), operations at the westbound off-ramp would improve from LOS F to D during the a.m. peak hour and from LOS E to C during the p.m. peak hour. The westbound on-ramp would improve from LOS F to D during the a.m. peak hour under Option 3.

The eastbound off-ramp would improve to LOS D during the p.m. peak hour by extending the deceleration lane from 140 feet to 300 feet. Refer to Figures 14 and 15 for an illustration of the various mitigation options and the “before” and “after” LOS for each mitigation under Design Build conditions.

## 6.6 INTERSECTION OPERATIONS

The study intersections were analyzed under 2026 conditions for the four Build Alternatives. The results of the intersection operations analysis for each project alternative are summarized in Table 18 (see Appendix D for technical calculations).



**LEGEND**

- AM/PM - Peak Hour Traffic Volumes
- HOV - High Occupancy Vehicle Lane
- V/C - Volume and Capacity Ratio
- LOS - Level of Service
- AUX - Auxiliary lane
- TRUCK - Truck Climbing Lane
- Construct a westbound auxiliary lane between Empire Ranch Road on-ramp and East Bidwell Street off-ramp.
- Shaded box indicates unacceptable operations.



**N**

NOT TO SCALE

**RECOMMENDED ROADWAY IMPROVEMENTS FOR MITIGATION AND LOS COMPARISON (OPTION 3) - CONSTRUCTION YEAR (2006) BUILD CONDITIONS**

<b>TABLE 18</b>					
<b>INTERSECTION LOS - DESIGN YEAR (2026) CONDITIONS</b>					
<b>BUILD ALTERNATIVES</b>					
Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay <sup>1</sup>	LOS <sup>2</sup>	Delay <sup>1</sup>	LOS <sup>2</sup>
<b>No Build</b>					
Empire Ranch Road/Iron Point Road	Signal	18	B	30	C
<b>Build - Alternative 1</b>					
Empire Ranch Rd./Route 50 Eastbound Ramps	Side- Street Stop	0	A	0	A
Empire Ranch Rd./Route 50 Westbound Ramps	Signal	15	B	13	B
Empire Ranch Road/Iron Point Road	Signal	<u>44</u>	<u>D</u>	<u>57</u>	<u>E</u>
<b>Build - Alternative 2</b>					
Empire Ranch Rd./Route 50 Eastbound Ramps	Side- Street Stop	0	A	0	A
Empire Ranch Rd./Route 50 Westbound Ramps	Signal	15	B	13	B
Empire Ranch Road/Iron Point Road	Signal	<u>44</u>	<u>D</u>	<u>57</u>	<u>E</u>
<b>Build - Alternative 3</b>					
Empire Ranch Rd./Route 50 Eastbound Ramps	Side- Street Stop	0	A	0	A
Empire Ranch Rd./Route 50 Westbound Ramps	Signal	22	C	53	D
Empire Ranch Road/Iron Point Road	Signal	<u>43</u>	<u>D</u>	<u>54</u>	<u>D</u>
<b>Build - Alternative 4</b>					
Empire Ranch Rd./Route 50 Eastbound Ramps	Side- Street Stop	0	A	0	A
Empire Ranch Rd./Route 50 Westbound Ramps	Signal	22	C	53	D
Empire Ranch Road/Iron Point Road	Signal	<u>43</u>	<u>D</u>	<u>54</u>	<u>D</u>
Notes:					
(1) Delay in seconds per vehicle.					
(2) LOS calculations based on the 2000 HCM procedures.					
Bold font with underscore indicates unacceptable operations.					
Source: Fehr & Peers, 2003.					

As shown in Table 18, the Empire Ranch Road/Iron Point Road intersection would operate acceptably during both the a.m. and p.m. peak hours under No Build Alternative.

For the Build Alternatives, the two ramp terminal intersections would operate acceptably at LOS D or better during both peak hours for all four alternatives. Alternatives 3 and 4 include a Type L-7 configuration at the westbound ramps. In contrast to Alternatives 1 and 2, this configuration requires an additional signal timing phase for the loop on-ramp to serve southbound left turning traffic heading westbound on Route 50 from Empire Ranch Road. Therefore, the westbound ramps would have higher delay under Alternatives 3 and 4 than Alternatives 1 and 2, although this intersection would still operate acceptably.

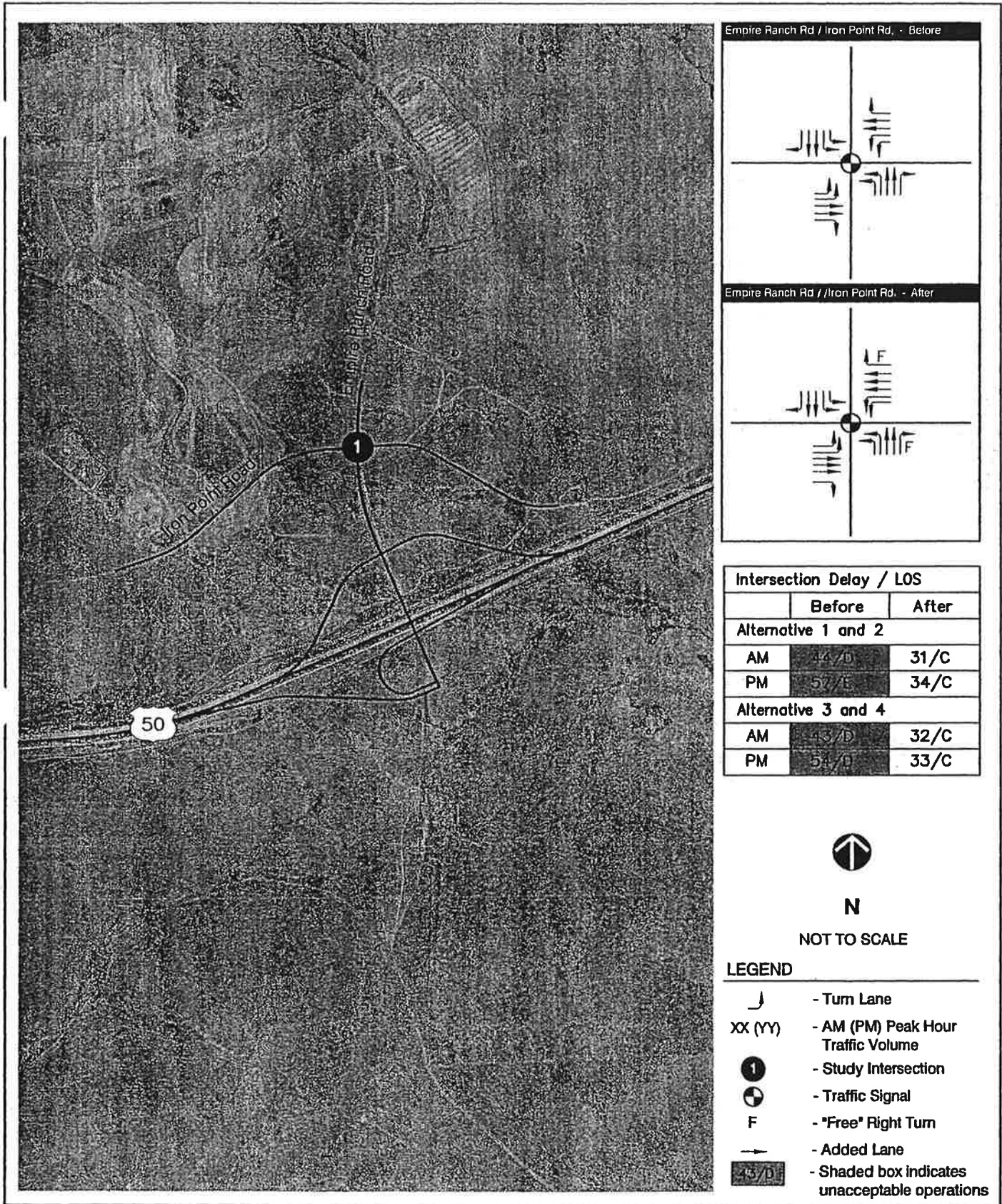
Unacceptable operations for the Build Alternatives would occur at the Iron Point Road/Empire Ranch Road intersection during both peak hours for all four alternatives. Although traffic volumes are the same among all four alternatives, the LOS differs as a result of the signal phasing at the westbound Route 50 ramps as mentioned previously.

- For Alternatives 1 and 2, LOS D and E conditions would occur during the a.m. and p.m. peak hours, respectively.
- For Alternatives 3 and 4, LOS D conditions would occur during both the a.m. and p.m. peak hours.

The following improvements are needed to provide acceptable LOS C at the Iron Point Road/Empire Ranch Road intersection during both peak hours.

- Provide a third through lane on Iron Point Road that extends a minimum of 1,000 feet in each direction (east and west) of Empire Ranch Road.
- Provide a “free” right-turn movement for the northbound and westbound approaches to the Iron Point Road/Empire Ranch Road intersection.

Refer to Figure 16 for an illustration of these improvements and the “before” and “after” LOS for each mitigation under 2026 Build conditions.



**RECOMMENDED INTERSECTION IMPROVEMENTS  
AND LOS COMPARISON -  
DESIGN YEAR (2026) BUILD CONDITIONS**

Maximum queue lengths and available vehicle storage for critical movements at the study intersections are shown in Table 19 (see Appendix D for technical calculations).

TABLE 19 INTERSECTION QUEUE SUMMARY – DESIGN YEAR (2026) CONDITIONS BUILD ALTERNATIVES				
Intersection	Movement	Available Storage (ft)	Maximum Queue <sup>1</sup> (ft)	
			AM	PM
<b>No Build</b>				
Empire Ranch Road/ Iron Point Road	Southbound Left	300	225	250
	Southbound Right	300	150	75
	Eastbound Left	300	50	275
<b>Build - Alternative 1 &amp; 2</b>				
Empire Ranch Road/ Westbound Route 50 Ramps	Westbound Right	750	300	125
	Northbound Through	945 <sup>3</sup>	125	575
	Southbound	700	75	75
Empire Ranch Road/ Iron Point Road	Northbound Left	200	125	25
	Northbound Through	700	225	600
	Northbound Right	250	100	250
	Southbound Left	300	225	225
	Eastbound Left	300	50	150
	Westbound Left	300	175	225
<b>Build - Alternative 3 &amp; 4</b>				
Empire Ranch Road/ Westbound Route 50 Ramps	Westbound Right	500	300	300
	Northbound Through	1,020 <sup>3</sup>	275	1,010
	Southbound Left	375	150	375
	Southbound Through	650	50	300
Empire Ranch Road/ Iron Point Road	Northbound Left	200	150	25
	Northbound Through	650	175	500
	Northbound Right	250	50	150
	Southbound Left	300	225	250
	Eastbound Left	300	50	150
	Westbound Left	300	175	225
Notes:				
(1) The reported queue is the 95 <sup>th</sup> percentile queue, which is typically used to size storage bays.				
(2) The available storage between the eastbound off-ramp exit point and the intersection stop line.				
(3) The available storage between the eastbound and westbound Route 50 ramp terminal intersections.				
Source: Fehr & Peers, 2003.				

As shown in Table 19, adequate vehicle storage would be provided for the critical movements at the Iron Point Road/Empire Ranch Road intersection under 2026 No Build conditions. For Build Alternatives 1 and 2, adequate vehicle storage would be provided for the critical movements at each study intersection.

Build Alternatives 3 and 4 include a Type L-7 configuration at the westbound ramps, which has high traffic volumes for the northbound through movement that would conflict with southbound left-turning traffic. Therefore, the maximum queue length for the northbound through and westbound right-turn movements would be longer for Alternatives 3 and 4 than for Alternatives 1 and 2. Table 19 shows that the 95<sup>th</sup> percentile queue for the northbound through movement during the p.m. peak hour is within the available storage under Build Alternatives 3 and 4 but the queue may extend up to the eastbound off-ramp intersection. However, these expected queues would not further extend from the eastbound off-ramp onto freeway mainline.

### 6.7 RAMP METER ANALYSIS

A ramp metering analysis was conducted for the Build Alternatives under 2026 conditions to determine the most restrictive metering rate that the eastbound and westbound Route 50 on-ramps from Empire Ranch Road could accommodate before the vehicle queue exceeds available storage capacity. The ramp meter type for Empire Ranch Road on-ramps was assumed to be one metered lane plus an HOV bypass.

Table 20 summarizes the results of the ramp metering analysis under 2026 conditions (see Appendix D for technical calculations). The metered on-ramps would operate within the minimum (240 vphpl) and maximum (1,000 vphpl) metering rates with the available storage assuming that Route 50 operates below capacity. Ramp queuing would be more extensive and may exceed available storage if Route 50 operates at LOS F.

<b>TABLE 20</b>					
<b>RAMP METERING OPERATIONS – DESIGN YEAR (2026) CONDITIONS</b>					
<b>NO BUILD AND BUILD ALTERNATIVES</b>					
On-Ramp	Number of Lanes	AM Peak Hour		PM Peak Hour	
		Peak-Hour Volume (vph)	Minimum Metering Rate (vphpl)	Peak-Hour Volume (vph)	Minimum Metering Rate (vphpl)
Empire Ranch Road Eastbound On-ramp	1 Metered Lane 1 HOV Bypass Lane	580	500	650	530
Empire Ranch Road Westbound On-ramp	1 Metered Lane 1 HOV Bypass Lane	950	820	590	470
Notes:					
vphpl = vehicles per hour per lane.					
Source: <i>Fehr &amp; Peers</i> , 2003.					

UTILIZATION PERFORMANCE

Interchange project is intended to improve accessibility to planned development in eastern Folsom and El Dorado Hills and to reduce congestion at other nearby Route 50 interchanges. Therefore, the project is expected to provide circulation benefits both regionally and locally. One quantitative measure of the area-wide benefits of a new interchange is the change in total travel distance and travel

time. This section summarizes the percent change in Year 2026 vehicle miles of travel (VMT) and vehicle hours of travel (VHT) at a local-area, sub-regional, and regional level. The boundaries for these areas are described below.

**Local-Area** – includes the area bounded by Riley Street (in Folsom) and Serrano Parkway (in El Dorado Hills) to the north, Route 50 to the south, Silva Valley Road to the east, and Oak Avenue to the west.

**Sub-Regional** – includes the area bounded by Natoma Street and Green Valley Road to the north, Rock Road to the south, Silva Valley Road to the east, and Folsom Boulevard to the west.

**Regional** – includes portions of El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba counties (the entire area covered in the 2002 version of the 2025 SACMET travel demand forecasting model).

TABLE 21  
PERCENT CHANGE IN VMT AND VHT - DESIGN YEAR (2026) CONDITIONS  
NO BUILD AND BUILD ALTERNATIVES

Measure	No Build	Build Alternative	Percent Difference
<b>Local-Area</b>			
VMT	1,048,600	1,057,100	0.81%
VHT	28,860	28,770	-0.30%
<b>Sub-Regional</b>			
VMT	2,457,200	2,466,500	0.38%
VHT	72,700	72,710	0%
<b>Regional</b>			
VMT	65,666,100	65,715,300	0.07%
VHT	1,842,650	1,841,980	-0.04%

Vehicle Miles of Travel  
Vehicle Hours of Travel  
Base Year: 2004.



As shown, the proposed project will slightly increase the total VMT at the local-area level, while the total VHT reduces. This indicates that the project may result in travel routes with a slightly longer distance; however, the project will provide some timesaving since these routes will have quicker travel times.

The proposed project will result in a smaller reduction in total VHT on a regional scale compared to the local-area scale. The slight change in regional VMT indicates that the proposed project is only a small part of the regional network (i.e., the six-county area). However, the reduction in VHT is measurable even on a regional scale, suggesting that the relatively minor connection (compared to total regional lane miles) is being located in a significantly congested location.

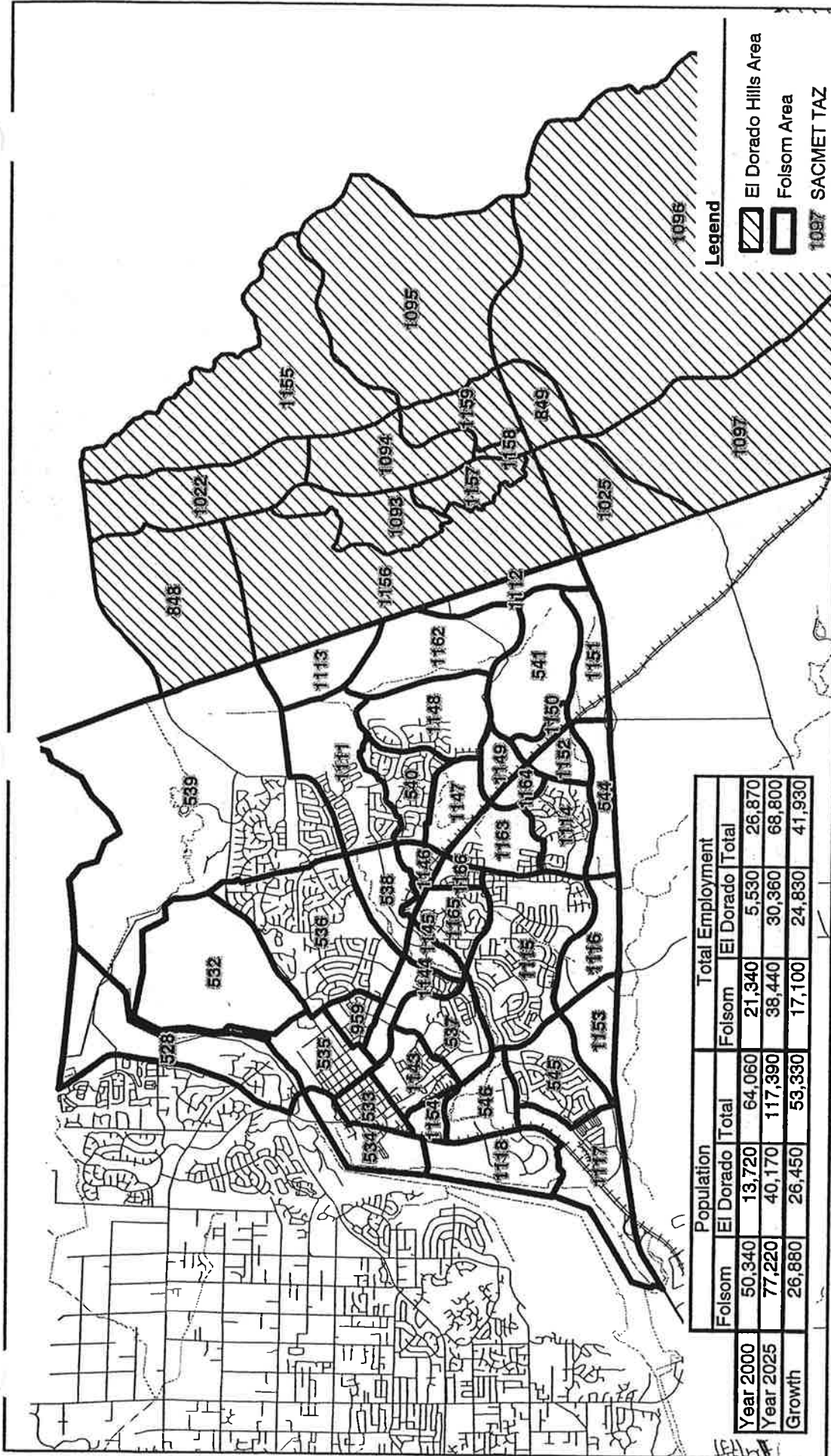
## 7. ROUTE 50 CORRIDOR IMPROVEMENT ISSUES

According to the *Metropolitan Transportation Plan (MTP) for 2025* (Sacramento Area Council of Governments, 2002), the population and employment of the Sacramento region is projected to increase substantially by 2025. Folsom and western El Dorado County will share in this growth. Figure 17 summarizes the projected population and employment growth for Folsom and the El Dorado Hills area of El Dorado County. As shown in the figure, Folsom will add 26,880 new residents and 17,100 new jobs between 2000 and 2025. This amount of growth represents a 53 percent increase in population and an 80 percent increase in employment. A similar level of growth is projected for the El Dorado Hills area, which will add 26,450 new people and 24,830 new jobs between 2000 and 2025. This amount of growth represents 193 percent and 449 percent increases in population and employment, respectively.

Accompanying this growth are planned improvements to Route 50 including the Empire Ranch Road interchange. The proposed Empire Ranch Road Interchange is one of four major projects along U.S. 50 near the Sacramento/El Dorado County line currently programmed to be constructed by 2010. These projects are listed below.

- Construct new Route 50 interchange at Empire Ranch Road
- Reconstruct the El Dorado Hills Boulevard Interchange
- Construct new Route 50 interchange at Silva Valley Parkway
- Extend HOV lanes from their current terminus at El Dorado Hills Boulevard/Latrobe Road to Shingle Springs/Ponderosa Road interchange

Figure 18 shows the relative timing of these projects based on SACOG's 2025 MTP as it relates to improvements to Route 50 mainline. The phasing shown is not consistent with the proposed phasing of the Empire Ranch Road interchange project. Rather, the intent of Figure 18 is to call attention to the potential difficulty in phasing of these projects during the long construction period from 2006 to 2010. Each interchange project includes auxiliary lanes that may extend the full length of Route 50 in both directions between East Bidwell Street and Bass Lake Road. The timing of these improvements is intended to match with the planned population and employment growth but may introduce implementation and construction challenges for Caltrans, the City of Folsom, and El Dorado County. Without a coordinated construction schedule, mainline Route 50 could be disrupted almost continually between about 2005 and 2010.



Source: SACMET Model

Note: Total population is derived from an average of 2.63 persons per household.

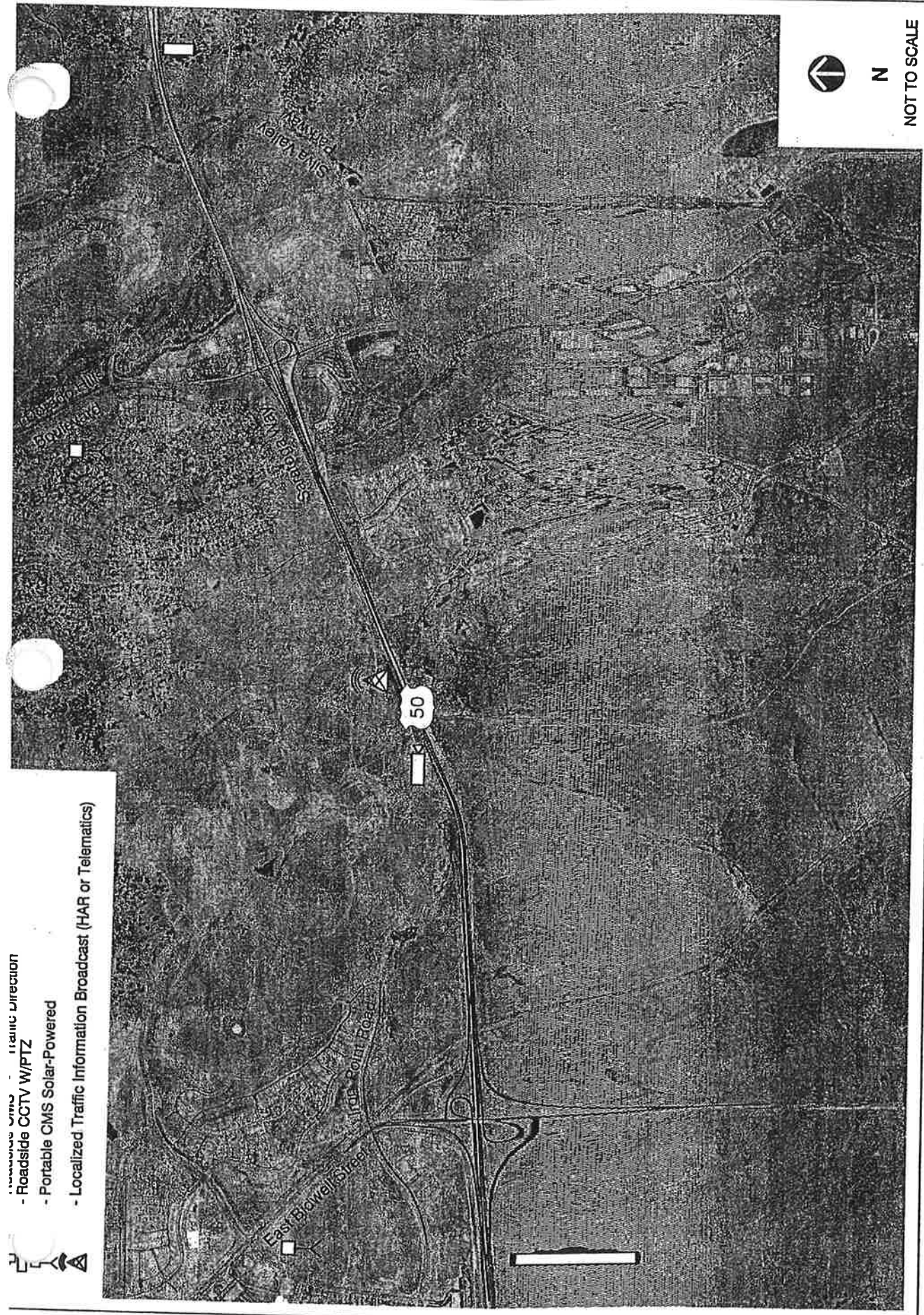
# BASE YEAR 2000 AND 2025 POPULATION AND EMPLOYMENT IN STUDY AREA

As previously specified, the proposed interchange project includes three elements: Element 1 includes the Empire Ranch Road interchange, Element 2 includes the auxiliary lanes between Empire Ranch Road and El Dorado Hills Boulevard/Latrobe Road, and Element 3 includes median widening to the Bass Lake Grade Truck Climbing Lane. The intent of Elements 2 and 3 are to mitigate impacts to the traffic operations on Route 50 due to the construction of the interchange. The likely order of construction based on current funding is Element 3, then 2, then 1. Interchange construction should also consider the need for alternative routes into El Dorado Hills when reconstruction of the El Dorado Hills Boulevard/Latrobe Road interchange begins. At a minimum, the planned improvement projects listed above should not be advanced through the final steps of the project development process as independent projects. Instead, the segment of Route 50 between Bass Lake Road and East Bidwell Street should be considered an integrated system when developing final construction phasing plans.

Even with a closely coordinated construction schedule, the high traffic demand in the study corridor and lack of alternative routes could cause potential congestion and safety issues on Route 50 in the near term. The steep and rolling terrain severely limits visibility in this area and construction activity would exacerbate these conditions. In addition, congestion on Route 50 would likely prohibit traffic merging onto the mainline from ramps and cause queues back onto arterials such as East Bidwell Street and El Dorado Hills Boulevard/Latrobe Road. To address these potential congestion and safety issues, other mitigation measures besides alternative routes need to be considered.

Caltrans should consider Intelligent Transportation System (ITS) improvements that would provide effective options to relieve congestion and improve safety by providing appropriate and timely information to drivers. In general, ITS improvements are expected to improve the mobility of Route 50 in the study area in the following aspects. An illustrative example of the ITS improvements is shown in Figure 19 and described below.

- ITS field elements will monitor traffic and provide real-time information to transportation officials. This information will enable them to effectively manage traffic, clear incidents, and inform drivers of potential delays.
- Real-time traffic information and video images of ramps and arterials in the project area can be posted on websites such as the Highway 50 Corridor site. This will enable drivers to assess traffic conditions and determine the best course of action before leaving their home or offices.



- Roadside CCTV W/PTZ
- Portable CMS Solar-Powered
- Localized Traffic Information Broadcast (HAR or Telematics)



N

NOT TO SCALE

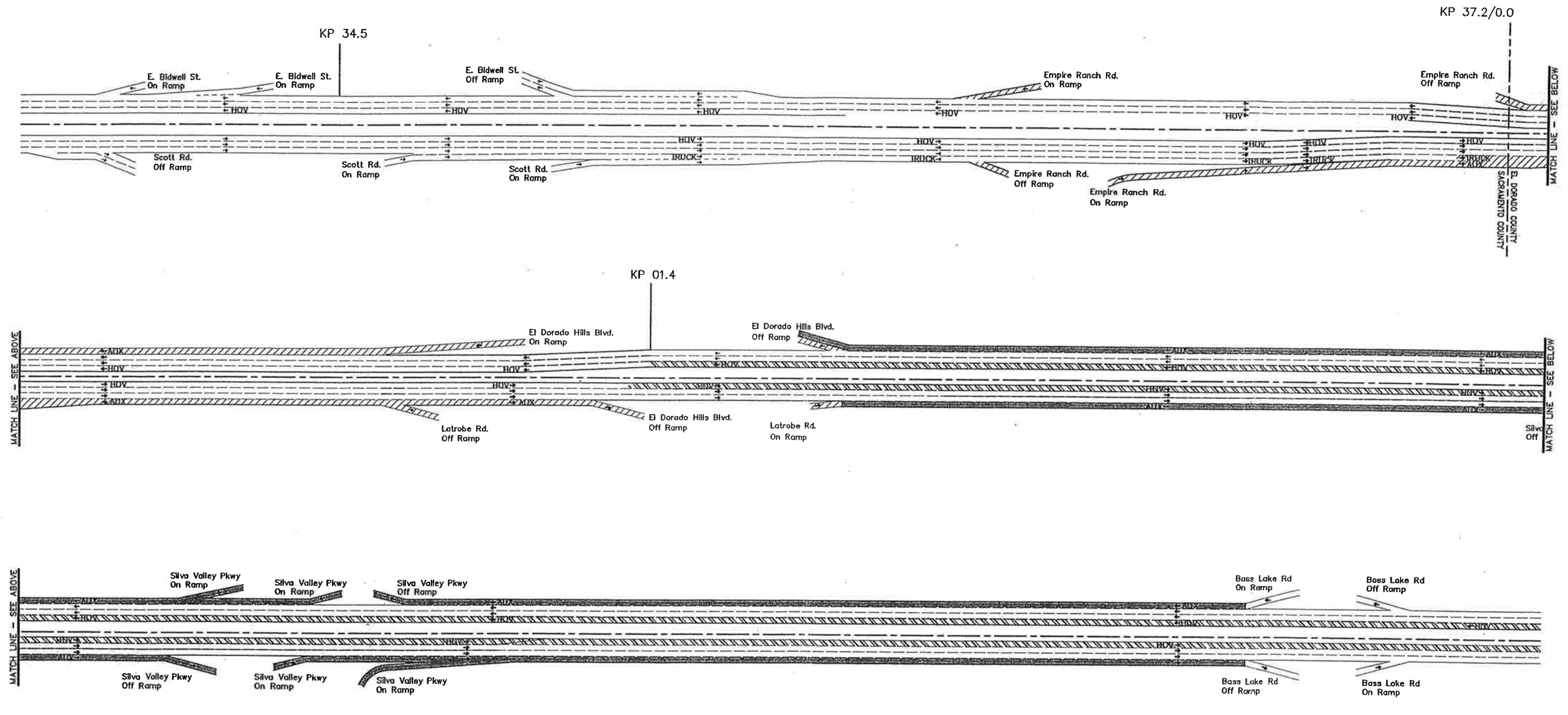


**FEHR & PEERS**  
 TRANSPORTATION CONSULTANTS

APR 28, 2004 MAF


N:\PROJECTS\1032\1792\_US50\_Empire\_Ranch\_Interchange\Graphics\Draft\_Report\_Graphics\_BW\fig19 ITS\_plan.dwg

**ILLUSTRATIVE ITS PLAN**  
**FIGURE 19**



**LEGEND**

HOV	- High Occupancy Vehicle Lane
AUX	- Auxiliary lane
TRUCK	- Truck Climbing Lane
////	- Completion of Construction by 2006
-----	- Completion of Construction by 2008
	- Completion of Construction by 2010

  
 N  
 NOT TO SCALE

- Traffic delay information can be posted on permanent or temporary changeable message signs located in advanced of key alternate routes (e.g., Iron Point Road) or Route 50 ramps. This is designed to provide adequate advanced notice in the event that traffic diversion is necessary.
- Traffic information can also be broadcast on local Highway Advisory Radio to provide in-vehicle information throughout the subject area. By 2006, information may also be broadcast using images to vehicles equipped with navigation systems.
- ITS improvement in the future may also take advantage of E911 capability to be available on cellular telephone network. This GPS-based service is expected to improve incident detection and response time.

**Appendix A**  
**Travel Demand Forecasts Technical Memorandum**

---





## MEMORANDUM

---

DATE: June 3, 2003

TO: Tim Fleming, Mark Thomas & Co., Inc.

FROM: Jason Isaac and Billy Park, Fehr & Peers Associates, Inc.

RE: *Travel Demand Forecasts for the U.S. 50/Empire Ranch Road Interchange*

---

Fehr & Peers has completed the draft travel demand forecasts for the U.S. 50/Empire Ranch Road Interchange Project Report (PR). This memorandum contains the forecasts and a brief description of how the forecasts were developed.

### **Travel Demand Model Modifications**

The travel demand forecasts were developed by Fehr & Peers using a modified version of the regional SACMET travel demand model. We obtained the latest version of the SACMET model used to prepare the 2002 Metropolitan Transportation Plan (MTP). Specific modifications made to the model are highlighted below.

- Refined the roadway network within study area to better match existing and planned roadway alignments.
- Changes the 2025 roadway network to be consistent with Tier 1 roadway improvements contained in the MTP. These improvements are likely to be funded with expected revenues.
- Split traffic analysis zones (TAZs) within the study area and correct land use estimates to improve trip distribution and assignment.

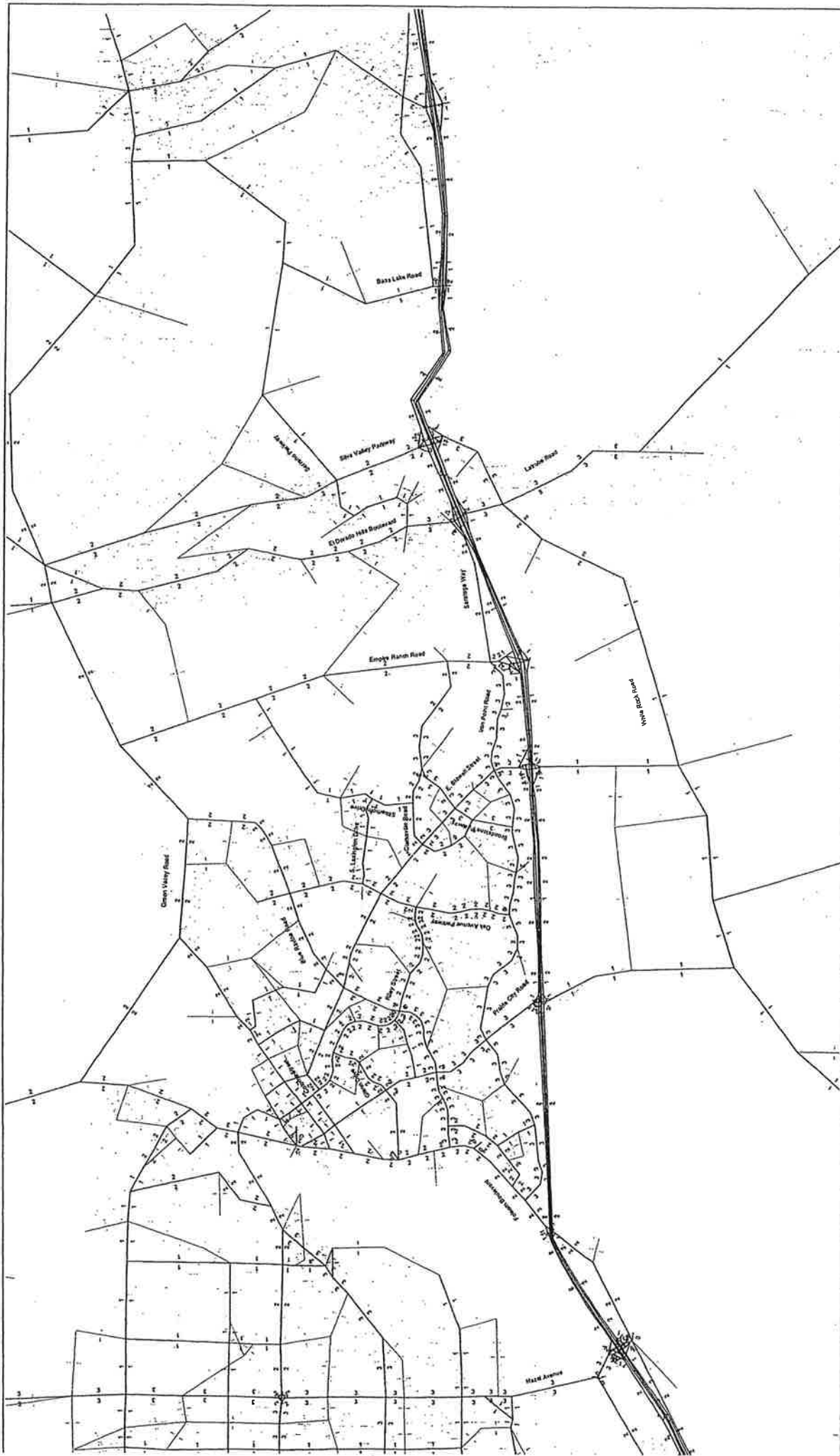
Exhibit 1 shows the original 2025 SACMET MTP network. Exhibit 2 shows the modified network. Specific changes are listed below in Table 1.



**LANES - ORIGINAL YEAR 2025 NETWORK  
EXHIBIT 1**

Licensed to Fehr & Peers Associates, Inc.





**LANES - MODIFIED YEAR 2025 NETWORK**  
**EXHIBIT 2**

Licensed to Fehr & Peers Associates, Inc.





**Table 1**  
**2025 SACMET Roadway Network Changes**

Roadway Segment	Number of Lanes in Both Directions		
	MTP or City of Folsom	Original SACMET	Modified SACMET
U.S. 50 – Sunrise Avenue to El Dorado Hills Boulevard	None	6 Mixed-Flow 2 HOV	4 Mixed-Flow 2 HOV
White Rock Road – Hazel Avenue to Sacramento/El Dorado Co. Line	None	4 Lanes	2 Lanes
White Rock Road – Latrobe Road to U.S. 50	4 Lanes	2 Lanes	6 Lanes <sup>(1)</sup>
White Rock Road - U.S. 50 Over-crossing	4 Lanes	2 Lanes	6 Lanes <sup>(1)</sup>
Hazel Avenue Extension – Folsom Boulevard to White Rock Road	None	4 Lanes	None
Latrobe Road – White Rock Road to Golden Foothill Parkway	6 Lanes	4 Lanes	6 Lanes
El Dorado Hills Boulevard – Park Drive to Serrano Parkway	6 Lanes	2 Lanes	6 Lanes
Folsom Dam Road – Folsom-Auburn Road to East Natoma Street	Closure	4 Lanes	None
New Bridge – Folsom-Auburn Road to East Natoma Street	4 Lanes	4 Lanes in different location	4 Lanes
Folsom Boulevard – Sutter Street to Natoma Street	4 Lanes	2 Lanes	4 Lanes
Oak Avenue Parkway Extension – East Natoma Street to Willow Creek Drive	None	4 Lanes	None
Riley Street – Coloma Street to Blue Ravine Road	4 Lanes	None	4 Lanes
Riley Street – Blue Ravine Road to Oak Avenue Parkway	4 Lanes	2 Lanes	4 Lanes
Prairie City Road – Glenn Drive to Blue Ravine Road	4 Lanes	2 Lanes	4 Lanes
Prairie City Road – Blue Ravine Road to U.S. 50	6 Lanes	2 or 4 Lanes	6 Lanes
Glenn Drive – Folsom Boulevard to Riley Street	4 Lanes	None	4 Lanes
Blue Ravine Road – Folsom Boulevard to Riley Street	6 Lanes	4 Lanes	6 Lanes
Natoma Station Drive – Folsom Boulevard to Blue Ravine Road	4 Lanes	None	4 Lanes
Orange Blossom – Natoma Station Drive to Iron Point Road	2 Lanes	None	2 Lanes
E. Bidwell Street – Blue Ravine Road to Oak Avenue Parkway	4 Lanes	6 Lanes	4 Lanes
E. Bidwell Street – Clarksville Road to U.S. 50	6 Lanes	2 or 4 Lanes	6 Lanes

**Table 1 (continued)**  
**2025 SACMET Roadway Network Changes**

Roadway Segment	Number of Lanes in Both Directions		
	MTP or City of Folsom	Original SACMET	Modified SACMET
Oak Avenue Parkway – E. Bidwell Street to Iron Point Road	4 Lanes	2 Lanes	4 Lanes
Broadstone Parkway – E. Bidwell Street to Golf Links Drive	6 Lanes	4 Lanes	6 Lanes
Broadstone Parkway – E. Bidwell Street to Iron Point Road	6 Lanes	None	6 Lanes
Clarksville Road (north of E. Bidwell St.) – E. Bidwell Street to Broadstone Parkway	4 Lanes	2 Lanes	4 Lanes
Clarksville Road (south of E. Bidwell St.) – E. Bidwell Street to Broadstone Parkway	4 Lanes	None	4 Lanes
Silberhorn Drive – Clarksville Road to Empire Ranch Road	2 Lanes	None	2 Lanes
S. Lexington Drive – Oak Avenue Parkway to Silberhorn Drive	2 Lanes	None	2 Lanes
Iron Point Road – E. Bidwell Street to Empire Ranch Road	6 Lanes	4 Lanes	6 Lanes
Francisco Drive – El Dorado Hills Boulevard to Green Valley Road	4 Lanes	2 Lanes	4 Lanes
El Dorado Hills Boulevard – Francisco Drive to Green Valley Road	2 Lanes	4 Lanes	2 Lanes
Silva Valley Parkway – Harvard Way to U.S. 50	4 Lanes	2 Lanes	4 Lanes

Note: <sup>(1)</sup> El Dorado County General Plan

The TAZ splits are shown in Exhibit 3 while the corresponding land use allocations are summarized in Tables 2 and 3 below. The base year land use estimates were verified based on a review of detailed aerial photography and field visits. Adjustments were made to the base year estimates to better match existing conditions from these reviews. After adjustment, the base year SACMET household estimates were increased from 10,063 to 16,221 for the affected TAZs while retail and non-retail employment did not change substantially.

#### Draft 2025 Travel Demand Forecasts

For 2025 conditions, we developed preliminary unadjusted travel demand forecasts for selected roadways in the study area. The resulting a.m. and p.m. peak hour roadway segment volumes are shown in Exhibit 4 and 5, respectively. Exhibits 6 and 7 focus on the a.m. and p.m. peak hour traffic forecasts at the proposed Empire Ranch Road Interchange. The travel demand model changes and preliminary traffic volume forecasts need to be reviewed and approved by the PDT prior to developing the detailed interchange forecasts and conducting the traffic operations analysis.



**LEGEND**  
 — Original SACMET TAZ Boundary  
 - - - Proposed SACMET TAZ Split

Table 2. Base Year Land Use Splits by TAZ

Original TAZ	Modified TAZ	HOUSEHOLDS		EMPLOYMENT		ENROLLMENT		K-12	PRODUCTIONS	ATTRACTIONS	PARKING COST	DAVIS INDICATOR	COMPOSITE PEF	DISTRICT	EMPLOYMENT				
		RETAIL	NON-RETAIL	COLLEGE	K-12	OFFICE	MEDICAL								EDUCATION	MANUF./OTHER			
537		1,646	1,430	1,586	0	146	100	0	0	100	0	0	0	0	290	324	133	639	
	Field Count	3,041	1,430	1,586	0	146	100	0	0	100	0	0	0	0	290	324	133	639	
		537	716	0	0	100	100	0	0	0	0	0	0	0	0	0	0	0	705
		1143	1,810	444	0	100	100	0	0	0	0	0	0	0	0	0	0	0	134
		1144	209	1,050	1,142	0	145	100	0	0	0	0	0	0	290	324	133	639	
	Modified Total	3,041	1,430	1,586	0	146	100	0	0	0	100	0	0	0	290	324	133	639	
540		1,207	37	425	3,380	6	100	0	0	100	0	0	0	0	56	16	253	100	
	Field Count	1,549	37	425	3,380	6	100	0	0	100	0	0	0	0	56	16	253	100	
		540	755	0	0	100	100	0	0	0	0	0	0	0	0	0	0	0	
		1146	352	0	0	100	100	0	0	0	0	0	0	0	0	0	0	0	
		1147	0	0	425	3,380	6	100	0	0	0	0	0	0	56	16	253	100	
	Modified Total	1,148	442	0	0	100	100	0	0	0	100	0	0	0	56	16	253	100	
541		0	0	0	0	0	100	0	0	100	0	0	0	0	0	0	0	0	
	Field Count	624	43	0	0	0	100	0	0	100	0	0	0	0	0	0	0	0	
		541	517	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	
		1148	107	43	0	0	100	0	0	0	0	0	0	0	0	0	0	0	
		1150	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	
	Modified Total	1,151	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	
544		0	0	0	0	0	100	0	0	100	0	0	0	0	0	0	0	0	
	Field Count	0	0	0	0	0	100	0	0	100	0	0	0	0	0	0	0	0	
		544	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		1152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		1153	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Modified Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
545		763	0	6,203	0	630	100	0	0	100	0	0	0	0	65	50	45	6,043	
	Field Count	634	0	6,203	0	630	0	0	0	0	0	0	0	0	65	50	45	6,043	
		545	834	16	0	630	100	0	0	0	0	0	0	0	65	50	45	6,043	
		1153	0	0	6,187	0	0	100	0	0	0	0	0	0	65	50	45	6,043	
		1154	0	0	6,203	0	630	0	0	0	0	0	0	0	65	50	45	6,043	
	Modified Total	634	0	6,203	0	630	0	0	0	0	0	0	0	0	65	50	45	6,043	
546		2	85	510	0	0	100	0	0	100	0	0	0	0	200	0	0	310	
	Field Count	2	85	510	0	0	100	0	0	100	0	0	0	0	200	0	0	310	
		546	0	85	510	0	0	100	0	0	0	0	0	0	187	0	0	310	
		1154	2	0	0	0	100	0	0	0	0	0	0	0	13	0	0	310	
		1155	0	0	0	0	100	0	0	0	0	0	0	0	200	0	0	310	
	Modified Total	1,154	2	0	0	100	0	0	0	0	0	0	0	0	200	0	0	310	

Table 2 (Continued). Base Year Land Use Splits by TAZ

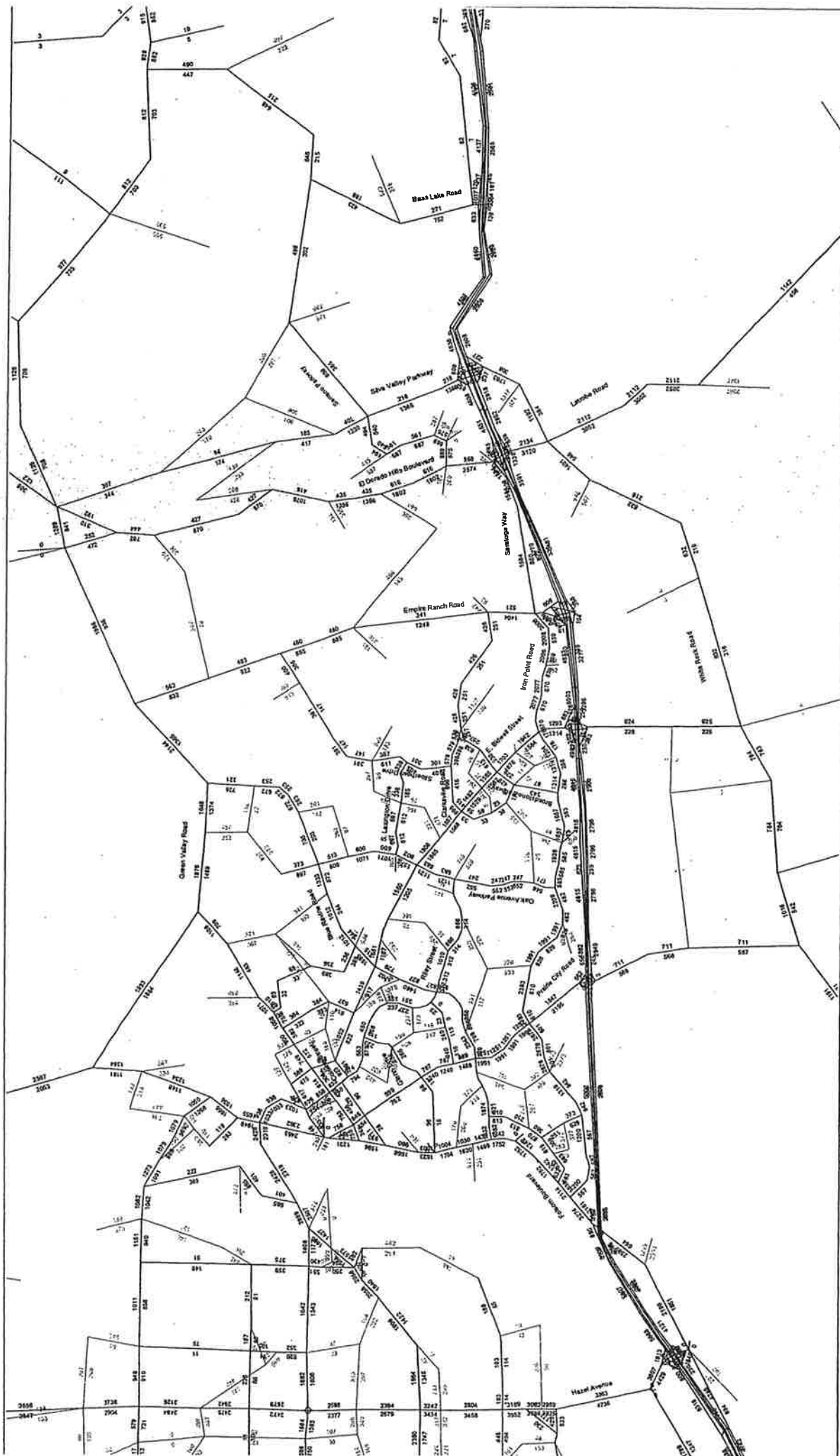
Original TAZ	Modified TAZ	HOUSEHOLDS			EMPLOYMENT		ENROLLMENT		K-12		AUTO TERMINAL TIME		PARKING		DAVIS		COMPOSITE		EMPLOYMENT			
		TAZ	RETAIL	NON-RETAIL	COLLEGE	K-12	PRODUCTIONS	ATTRACTIONS	COST	INDICATOR	PEF	DISTRICT	OFFICE	MEDICAL	EDUCATION	MANUF/OTHER						
1022	1022	1,816	85	646	0	1,225	100	100	0	0	0	12	160	45	111	333						
	Field Count	2,717	85	889	0	1,225	100	100	0	0	0	12	160	45	111	333						
	1022	1,292	20	48	0	1,225	100	100	0	0	0	12	5	0	111	0						
	1155	1,425	65	641	0	0	100	100	0	0	0	12	155	45	0	333						
	Modified Total	2,717	150	690	0	1,225	NA	NA	NA	NA	NA	NA	160	90	111	333						
1093	1093	1,533	1	329	0	400	100	100	0	0	0	12	160	13	28	120						
	Field Count	1,969	1	320	0	400	100	100	0	0	0	12	160	13	36	120						
	1093	468	0	0	0	0	100	100	0	0	0	12	0	0	0	0						
	1156	1,064	0	179	0	400	100	100	0	0	0	12	80	0	36	0						
	1157	437	1	150	0	0	100	100	0	0	0	12	80	13	0	120						
	Modified Total	3,980	2	499	0	400	NA	NA	NA	NA	NA	NA	160	26	36	120						
1094	1094	395	325	395	0	2,950	100	100	0	0	0	12	111	0	211	73						
	Field Count	538	325	395	0	2,950	100	100	0	0	0	12	111	0	211	73						
	1094	415	0	0	0	2,950	100	100	0	0	0	12	0	0	211	0						
	1158	0	325	395	0	0	100	100	0	0	0	12	111	0	0	73						
	1159	278	0	0	0	0	100	100	0	0	0	12	0	0	0	0						
	Modified Total	693	325	395	0	2,950	NA	NA	NA	NA	NA	NA	111	0	211	73						
1113	1113	0	0	0	0	0	100	100	0	0	0	0	0	0	0	0						
	Field Count	82	0	0	0	0	100	100	0	0	0	0	0	0	0	0						
	1113	512	0	0	0	0	100	100	0	0	0	1	0	0	0	0						
	1162	320	0	0	0	0	100	100	0	0	0	1	0	0	0	0						
	Modified Total	832	0	0	0	0	NA	NA	NA	NA	NA	NA	0	0	0	0						
1114	1114	752	280	68	0	350	100	100	0	0	0	1	0	0	45	23						
	Field Count	1,086	280	68	0	350	100	100	0	0	0	1	0	0	45	23						
	1114	719	0	30	0	350	100	100	0	0	0	1	0	0	45	0						
	1153	361	0	0	0	0	100	100	0	0	0	1	0	0	0	0						
	1184	0	280	38	0	0	100	100	0	0	0	1	0	0	0	0						
	Modified Total	1,086	280	68	0	350	NA	NA	NA	NA	NA	NA	0	0	45	23						
1115	1115	1,926	0	131	0	645	100	100	0	0	0	1	10	0	70	51						
	Field Count	2,876	0	131	0	645	100	100	0	0	0	1	10	0	70	51						
	1115	2,091	0	131	0	645	100	100	0	0	0	1	10	0	70	51						
	1185	518	0	0	0	0	100	100	0	0	0	1	0	0	0	0						
	1186	286	0	0	0	0	100	100	0	0	0	1	0	0	0	0						
	Modified Total	2,876	0	131	0	645	NA	NA	NA	NA	NA	NA	10	0	70	51						
SACMET Total	SACMET Total	10,063	2,243	10,296	3,380	6,331							1,052	448	904	7,892						
Difference	Difference	6,161	43	0	0	0							0	0	0	0						



Table 3. Year 2025 Land Use Splits by TAZ

Original TAZ	Modified TAZ	HOUSEHOLDS			EMPLOYMENT			ENROLLMENT			PARKING COST	DAVIS INDICATOR	COMPOSITE PEF	DISTRICT	EMPLOYMENT		
		TAZ	HOUSEHOLDS	RETAIL	NON-RETAIL	COLLEGE	K-12	PRODUCTIONS	ATTRACTIONS	OFFICE					MEDICAL	EDUCATION	MANUF/OTHER
537	1,703	1,762	1,855	0	228	100	100	100	100	0	0	0	0	570	324	133	539
	Field Count + Incremental Growth	3,096	3,096	0	228	100	100	100	100	0	0	0	0	570	324	133	539
	537	747	245	240	0	83	100	100	100	0	0	0	0	240	0	0	705
	1143	1,820	372	444	0	0	100	100	100	0	0	0	0	0	0	0	134
	1144	208	1,059	1,182	0	145	100	100	100	0	0	0	0	330	324	133	0
	1145	324	106	0	0	0	100	100	100	0	0	0	0	0	0	0	0
	Modified Total	3,096	3,096	0	228	100	100	100	100	0	0	0	0	570	324	133	539
540	2,153	120	890	12,880	700	100	100	100	100	0	0	0	0	130	48	290	192
	Field Count + Incremental Growth	2,415	660	12,880	700	100	100	100	100	0	0	0	0	130	48	290	192
	540	755	0	37	8,500	894	100	100	100	0	0	0	0	0	0	0	0
	1148	352	0	0	0	100	100	100	100	0	0	0	0	0	0	0	0
	1147	346	63	623	3,380	6	100	100	100	0	0	0	0	130	48	253	192
	1148	882	0	0	0	0	100	100	100	0	0	0	0	0	0	0	0
	Modified Total	2,415	660	12,880	700	100	100	100	100	0	0	0	0	130	48	290	192
541	2,404	370	2,298	0	1,000	100	100	100	100	0	0	0	0	1,900	0	133	285
	Field Count + Incremental Growth	3,028	2,298	0	1,000	100	100	100	100	0	0	0	0	1,900	0	133	285
	541	2,081	298	781	0	1,000	100	100	100	0	0	0	0	570	0	133	78
	1148	467	43	217	0	0	100	100	100	0	0	0	0	190	0	0	27
	1150	120	0	850	0	0	100	100	100	0	0	0	0	570	0	0	80
	1151	380	74	850	0	0	100	100	100	0	0	0	0	570	0	0	80
	Modified Total	3,028	2,298	0	1,000	100	100	100	100	0	0	0	0	1,900	0	133	285
544	545	1,500	1,447	0	0	100	100	100	100	0	0	0	0	1,200	47	0	200
	Field Count + Incremental Growth	545	1,500	1,447	0	0	100	100	100	0	0	0	0	1,200	47	0	200
	544	517	680	0	0	100	100	100	100	0	0	0	0	413	47	0	200
	1152	0	983	787	0	0	100	100	100	0	0	0	0	787	0	0	0
	Modified Total	545	1,500	1,447	0	0	100	100	100	0	0	0	0	1,200	47	0	200
546	783	200	10,095	0	700	100	100	100	100	0	0	0	0	300	50	45	10,100
	Field Count + Incremental Growth	834	200	10,095	0	700	100	100	100	0	0	0	0	300	50	45	10,100
	545	634	200	1,503	0	700	100	100	100	0	0	0	0	300	50	45	1,252
	1153	0	0	8,892	0	0	100	100	100	0	0	0	0	0	0	0	8,845
	Modified Total	834	200	10,095	0	700	100	100	100	0	0	0	0	300	50	45	10,100
548	216	225	1,725	0	0	100	100	100	100	0	0	0	0	1,200	0	0	525
	Field Count + Incremental Growth	216	225	1,725	0	0	100	100	100	0	0	0	0	1,200	0	0	525
	548	214	225	1,583	0	0	100	100	100	0	0	0	0	1,187	0	0	45
	1154	2	0	137	0	0	100	100	100	0	0	0	0	13	0	0	442
	Modified Total	216	225	1,725	0	0	100	100	100	0	0	0	0	1,200	0	0	525





**AM Volumes - YEAR 2025 SACMET MODEL  
EXHIBIT 4**

Licensee to Fehr & Peers Associates, Inc.

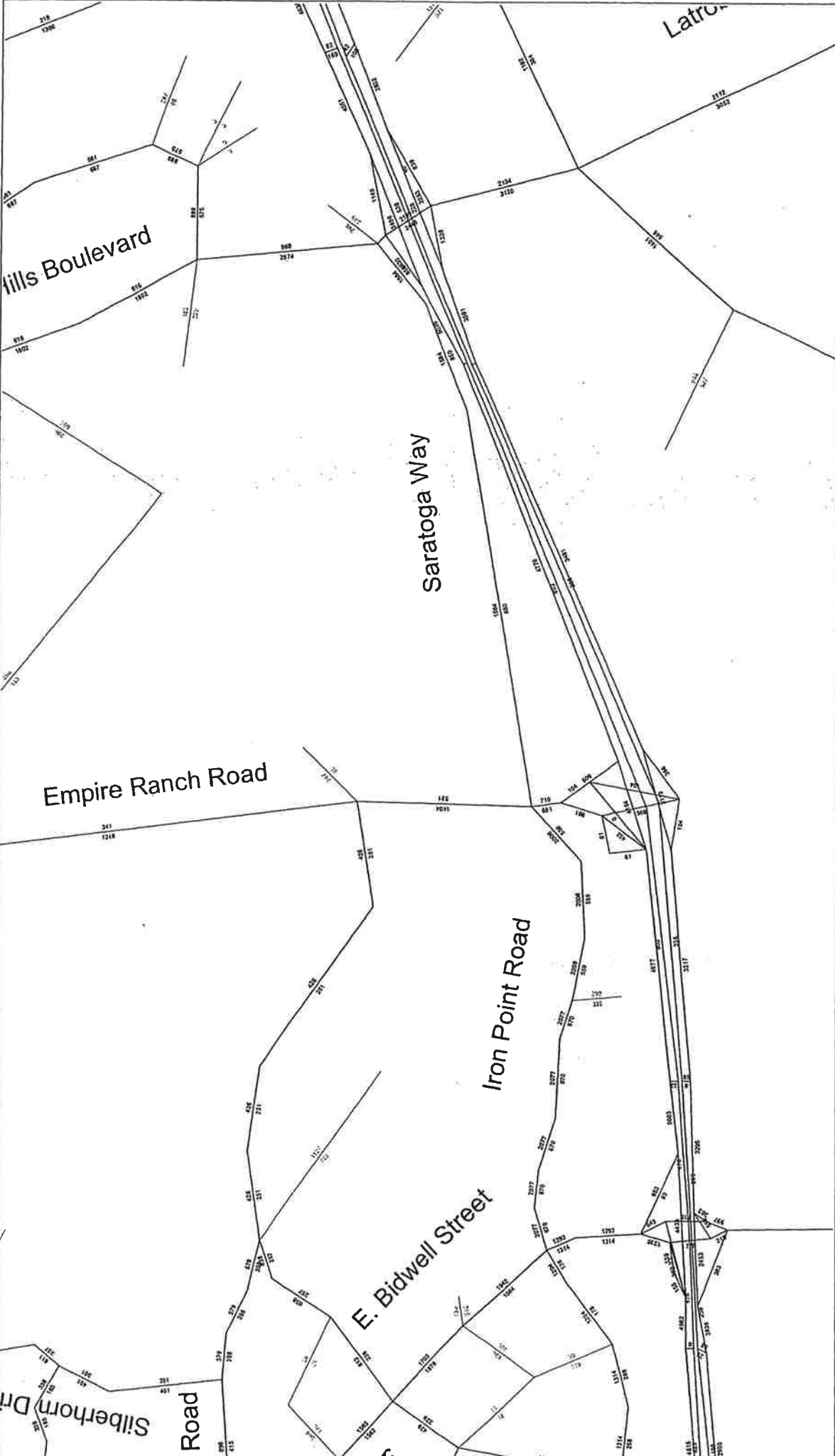




**PM Volumes - YEAR 2025 SACMET MODEL  
EXHIBIT 5**

Licensed to Fehr & Peers Associates, Inc.





Latro

Hills Boulevard

Empire Ranch Road

Saratoga Way

Iron Point Road

E. Bidwell Street

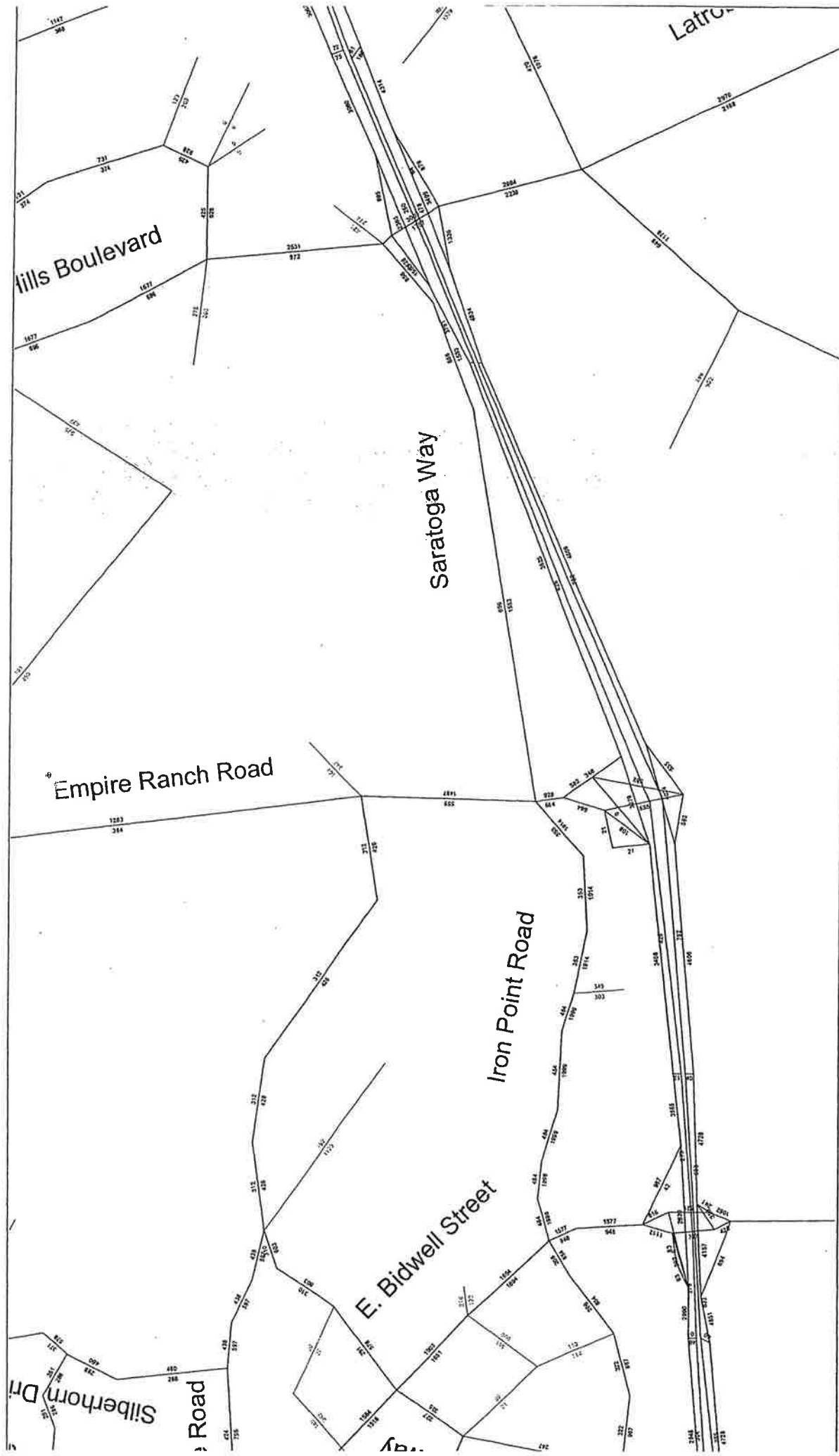
Silberhorn Dr

Road

AM Volumes - YEAR 2025 SACMET MODEL  
 EXHIBIT 6

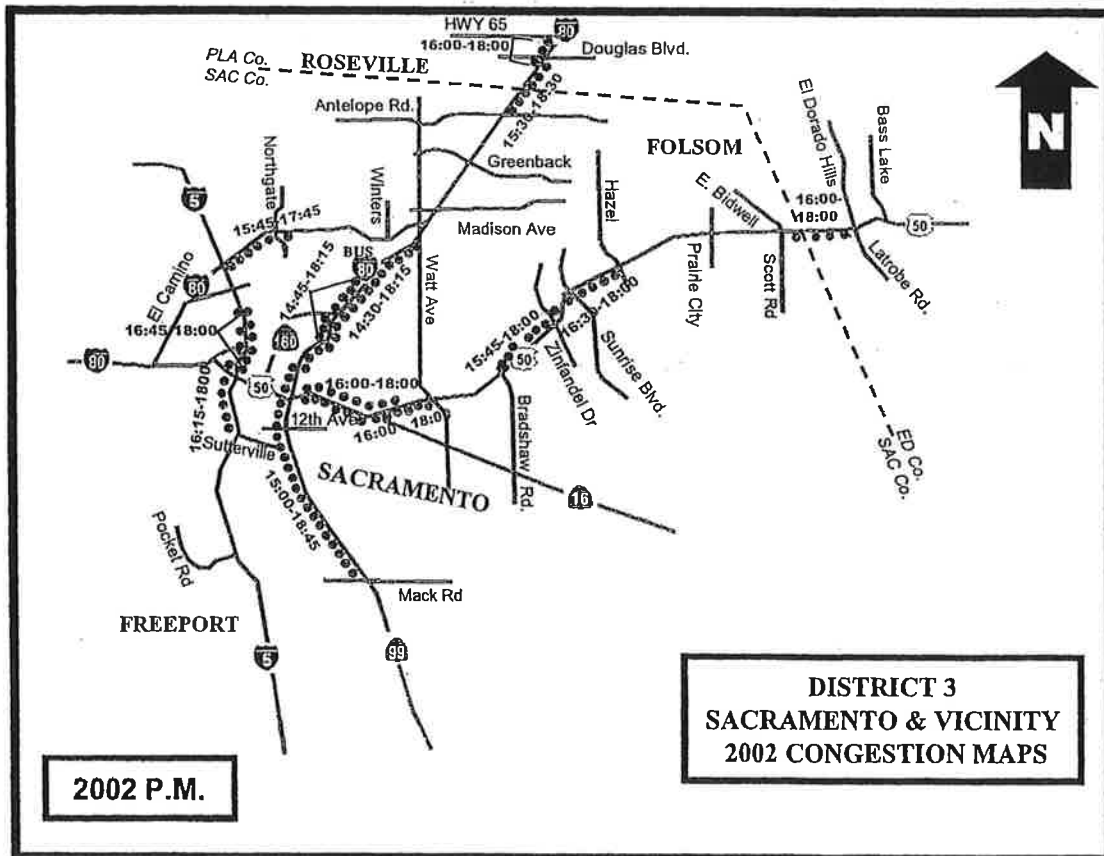
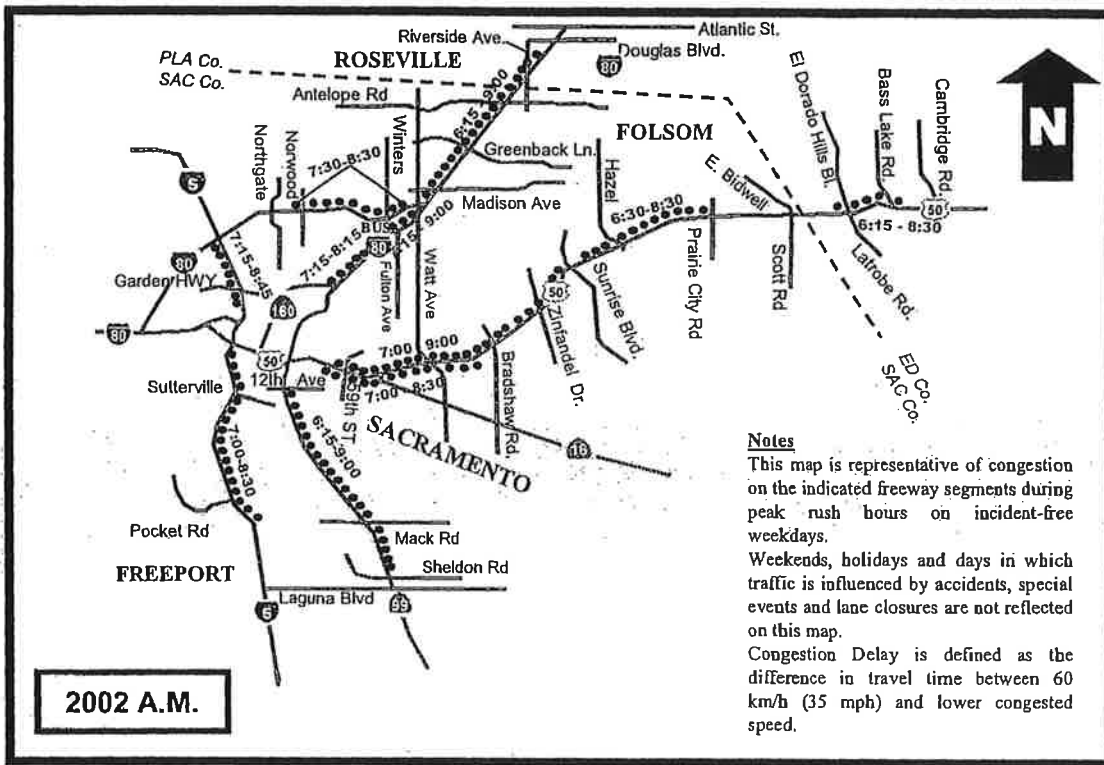
Licensed to Fehr & Peers Associates, Inc.





**Appendix B**  
**Existing Conditions**

---





**Appendix C  
Construction Year (2006) Conditions**

---

HCS2000: Ramps and Ramp Junctions Release 4.1c

Phone:

Fax:

E-mail:

Analysis

Diverge

Analyst: AL  
 Agency/Co.: Fehr & Peers Associates, Inc.  
 Date performed: 8/12/2003  
 Analysis time period: AM Peak Hour  
 Freeway/dir or travel: US 50 / Eastbound  
 Junction: Empire Ranch Rd. Off-ramp  
 Jurisdiction:  
 Analysis Year: 2006 With Project w/o Saratoga  
 Description: US 50/Empire Ranch Road Interchan

Data

Freeway

Type of analysis  
 Number of lanes in freeway  
 Free-flow speed on freeway  
 Volume on freeway

Diverge  
 3  
 70.0  
 2170

mph  
 vph

Data

Off Ramp

Sides of freeway  
 Number of lanes in ramp  
 Free-flow speed on ramp  
 Volume on ramp  
 Length of first accel./decel lane  
 Length of second accel./decel lane

Right  
 1  
 35.0  
 90  
 140

mph  
 vph  
 ft  
 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?  
 Volume on adjacent ramp  
 Position of adjacent ramp  
 Type of adjacent ramp  
 Distance to adjacent ramp

No

vph  
 ft

Conditions

Conversion to pc/h Under Base

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2170	90	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, v15	603	25	v
Trucks and buses	4	4	%
Recreational vehicles	0	0	%
Terrain type:			
Grade	6.00	4.00	%
Length	0.30	0.10	mi
Trucks and buses PCE, FT	3.0	1.5	
Recreational vehicle PCE, ER	6.0	1.2	
Heavy vehicle adjustment, fHV	0.925	0.980	
Driver population factor, fP	1.00	1.00	

Flow rate, vp

2604

102

pcph

Areas

Estimation of V12 Diverge

$L_d = 0.00$  (Equation 25-8 or 25-9)  
 $PQ = 0.690$  Using Equation 5  
 $FD = 12$   
 $V = V + (V - v) P = 1829$  pc/h  
 12 R F R FD

Checks

Capacity

	Actual	Maximum	LOS F?
V = V	2604	7200	No
F <sub>i</sub> F	1829	4400	No
V	12	7200	No
V = V - v	2502	2000	No
F <sub>O</sub> F R	102		No

Level of Service Determination (if not F)

Density,  $D = 4.252 + 0.0086 V - 0.009 L = 18.7$  pc/mi/ln  
 R 12 D  
 Level of service for ramp-freeway junction areas of influence B

Estimation

Speed

Intermediate speed variable,  $D = 0.437$   
 Space mean speed in ramp influence area,  $S = 58$  mph  
 Space mean speed in outer lanes,  $S^R = 76.8$  mph  
 Space mean speed for all vehicles,  $S^O = 62.4$  mph

HCS2000: Ramps and Ramp Junctions Release 4.1c

Phone:
E-mail:
Fax:

Analysis Merge

Analyst: M. Kehr & Peers Associates, Inc.
Agency/Co: 07/31/2003
Data performed: AM Peak Hour
Analysis time period: US 50/Eastbound
Freeway/dir of travel: Empire Ranch Road On-ramp
Jurisdiction:
Analysis year: 2006 With Project w/o Saratoga
Description: US 50/Empire Ranch Road Interchan

Data Freeway

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 70.0 mph
Volume on freeway 2080 vph

Data On Ramp

Sides of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 610 vph
Length of first accel/decel lane 1500 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 ft
Type of adjacent Ramp
Distance to adjacent Ramp

Conditions Conversion to pc/h Under Base

Table with columns: Junction Components, Freeway, Ramp, Adjacent Ramp, vph, Level, mi. Rows include Volume, V (vph), Peak-hour factor, PHF, Peak 15-min volume, V15, Trucks and buses, Recreational vehicles, Terrain type, Grade, Length, Trucks and buses PCE, ER, Heavy vehicle adjustment, fhv, Driver population factor, fp.

Flow rate, VP 2357 691 pcph

Areas Estimation of V12 Merge

L = 0.00 (Equation 25-2 or 25-3)
EQ = 0.619 Using Equation 1
FM
V = V (P) = 1460 pc/h
12 F FM

Checks Capacity

Actual Maximum LOS F?
V FO 3048 7200 No
V R12 2151 4600 No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 12.5 pc/mi/ln R 12 A

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

Estimation Speed

Intermediate speed variable, M = 0.250

Space mean speed in ramp influence area, S = 63.0 mph
Space mean speed in outer lanes, S = 68.6 mph
Space mean speed for all vehicles, S = 64.6 mph

HCS2000: Ramps and Ramp Junctions Release 4.1c

Phone:  
E-mail:  
Fax:

Analysis

Analyst: AL  
Agency/Co.: Fehr & Peers Associates, Inc.  
Date performed: 8/12/2003  
Analysis time period: AM Peak Hour  
Freeway/dir or travel: US 50 / Westbound  
Junction: Empire Ranch Rd., Off-ramp  
Jurisdiction:  
Analysis Year: 2006 With Project w/o Saratoga  
Description: US 50/Empire Ranch Road Interchan

Data

Type of analysis  
Number of lanes in freeway  
Free-flow speed on freeway  
Volume on freeway

Diverge  
2  
70.0  
4570

Data

Side of freeway  
Number of lanes in ramp  
Free-flow speed on ramp  
Volume on ramp  
Length of first accel./decel lane  
Length of second accel./decel lane

Right  
1  
35.0  
970  
1500

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?  
Volume on adjacent ramp  
Position of adjacent ramp  
Type of adjacent ramp  
Distance to adjacent ramp

No  
vph  
ft

Conditions

Junction Components  
Volume, V (vph)  
Peak-hour factor, PHF  
Peak 15-min volume, v15  
Trucks and buses  
Recreational vehicles  
Terrain type:  
Grade  
Length  
Trucks and buses PCE, ET  
Recreational vehicle PCE, ER  
Heavy vehicle adjustment, FHV  
Driver population factor, FP

Freeway	Ramp	Adjacent Ramp
4570	970	vph
0.90	0.90	
1269	269	V
4	4	%
0	0	%
Rolling	Rolling	Level
0.00	0.00	%
0.00	0.00	mi
2.5	2.5	mi
2.0	2.0	
0.943	0.943	
1.00	1.00	

Flow rate, vp

pcph

Areas

Estimation of V12 Diverge  
L = 0.00 (Equation 25-8 or 25-9)  
EQ  
P = 1.000 Using Equation 0  
FD  
V = v + (v - v) P = 5382 pc/h  
12 R F R FD

Checks

V = V	Actual	Maximum	LOS F7
Fi F	5382	4800	Yes
V 12	5382	4400	Yes
V = V - V	4240	4800	No
FO F R	1142	2000	No

Level of Service Determination (if not F)

Density, D = 4.252 + 0.0086 v - 0.009 L = 37.0 pc/mi/in  
12 D  
Level of service for ramp-freeway junction areas of influence F

Estimation

Intermediate speed variable, D = 0.531  
Space mean speed in ramp influence area, S = 55 mph  
Space mean speed in outer lanes, S = N/A mph  
Space mean speed for all vehicles, S = 55.1 mph

HCS2000: Ramps and Ramp Junctions Release 4.1c

Phone:
E-mail:
Fax:

Analysis Merge

Analyst: AL
Agency/Co.: Fehr & Peers Associates, Inc.
Date performed: 07/31/2003
Analysis time period: AM Peak Hour
Freeway/dir or travel: US 50/Westbound
Junction: Empire Ranch Road On-ramp (D)
Jurisdiction:
Analysis Year: 2006 With Project w/o Saratoga
Description: US 50/Empire Ranch Road Interchan

Data Freeway

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 70.0 mph
Volume on freeway 3600 vph

Data On Ramp

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 430 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane

Adjacent Ramp Data (if one exists)

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

Conditions Conversion to pc/h Under Base

Table with columns: Junction Components, Freeway, Ramp, Adjacent Ramp, Volume, V (vph), Peak-hour factor, PHF, Peak 15-min volume, v15, Trucks and buses, Recreational vehicles, Terrain type, Grade, Length, Trucks and buses PCF, ET, Recreational vehicle PCF, ER, Heavy vehicle adjustment, FHV, Driver population factor, FP.

Flow rate, VP 4080 487 pcph

Areas Estimation of V12 Merge

L = 0.00 (Equation 25-2 or 25-3)
EQ = 1.000 Using Equation 0
FM = v (P) = 4080 pc/h
12 F PM

Checks Capacity

v FO Actual Maximum LOS F?
v R12 4567 4800 NC
v R12 4567 4600 NO

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 37.2 pc/mi/ln

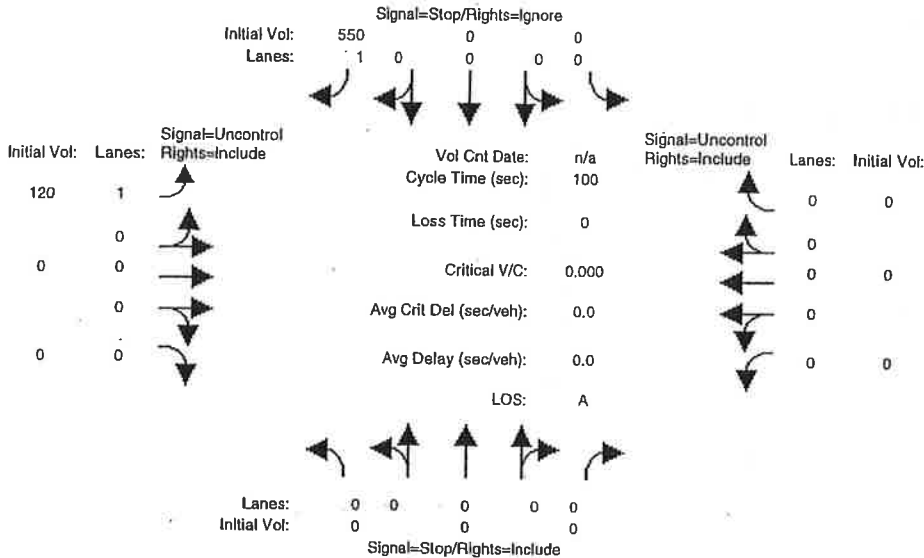
Level of service for ramp-freeway junction areas of influence E

Estimation Speed

Intermediate speed variable, M = 0.655
Space mean speed in ramp influence area, S = 51.7 mph
Space mean speed in outer lanes, S = N/A mph
Space mean speed for all vehicles, S = 51.7 mph

Level Of Service Computation Report  
2000 HCM Unsignalized (Base Volume Alternative)  
2006 No Project AM - Without Saratoga

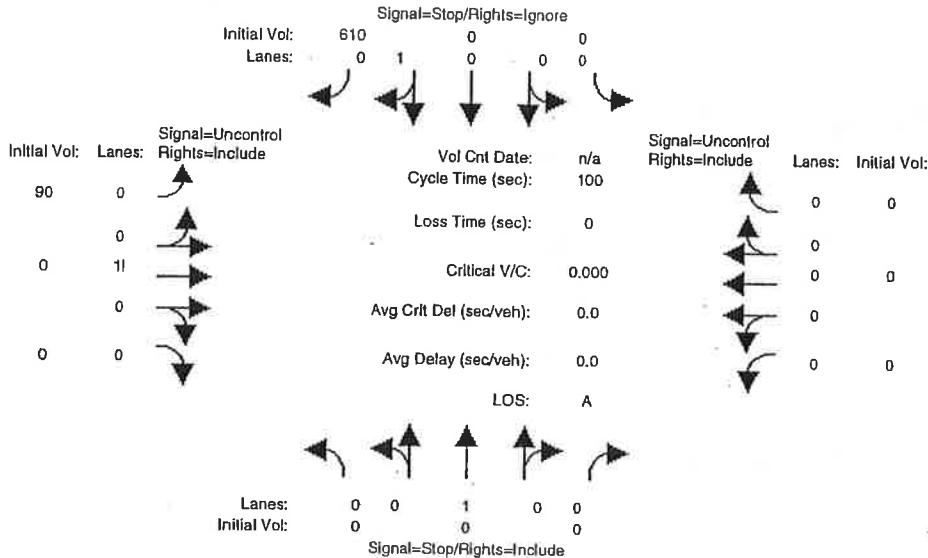
Intersection #1: Empire Ranch Road/Iron Point Road



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:	----- ----- ----- -----											
Base Vol:	0	0	0	0	0	550	120	0	0	0	0	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:	0	0	0	0	0	550	120	0	0	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	0	0	0	120	0	0	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol:	0	0	0	0	0	0	120	0	0	0	0	0
Critical Gap Module:	----- ----- ----- -----											
Critical Gp:	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	4.1	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
FollowUpTim:	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	2.2	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
Capacity Module:	----- ----- ----- -----											
Conflict Vol:	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	0	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
Potent Cap:	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	0	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
Move Cap:	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	0	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
Level of Service Module:	----- ----- ----- -----											
Stopped Del:	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	0.0	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
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	
Shared Cap:	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
Shrd StpDel:	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx	xxxxxx	xxxxxx	xxxxxx	xxxxxx	xxxxxx	xxxxxx	xxxxxx	xxxxxx	xxxxxx	xxxxxx	
ApproachLOS:	*	*	*	*	*	*	*	*	*	*	*	
HevVeh:	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Grade:	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Peds/Hour:	0	0	0	0	0	0	0	0	0	0	0	
Pedestrian Walk Speed:	4.00 feet/sec											
LaneWidth:	12 feet	12 feet	12 feet	12 feet	12 feet	12 feet	12 feet	12 feet	12 feet	12 feet	12 feet	
Time Period:	0.25 hour											

Level Of Service Computation Report  
 2000 HCM Unsignalized (Base Volume Alternative)  
 2006 AM - All 1&4 Without Saratoga

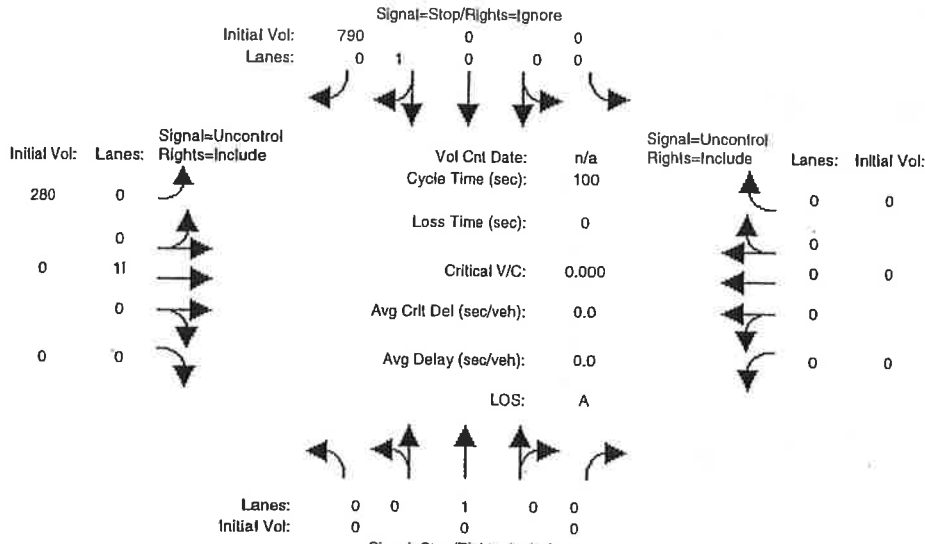
Intersection #1: Empire Ranch Road/Route 50 Eastbound Ramps



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:												
Base Vol:	0	0	0	0	0	610	90	0	0	0	0	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:	0	0	0	0	0	610	90	0	0	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volumes:	0	0	0	0	0	0	90	0	0	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	0	0	0	90	0	0	0	0	0
Critical Gap Module:												
Critical Gap:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Conflict Vol:	xxxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Potent Cap.:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Move Cap.:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Level of Service Module:												
Stopped Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd StpDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	*			*			*			*		
RevVeh:	0%			0%			0%			0%		
Grads:	0%			0%			0%			0%		
Peds/Hour:	0			0			0			0		
Pedestrian Walk Speed:	4.00 feet/sec											
LaneWidth:	12 feet			12 feet			12 feet			12 feet		
Time Period:	0.25 hour											

Level Of Service Computation Report  
 2000 HCM Unsignalized (Base Volume Alternative)  
 2006 PM - Alt 1&4 Without Saratoga

Intersection #1: Empire Ranch Road/Route 50 Eastbound Ramps



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:	----- ----- ----- -----											
Base Vol:	0	0	0	0	0	790	280	0	0	0	0	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:	0	0	0	0	0	790	280	0	0	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	0	0	0	280	0	0	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	0	0	0	280	0	0	0	0	0
Critical Gap Module:	----- ----- ----- -----											
Critical Gap:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	xxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	xxxx	xxxx	xxxxx
Capacity Module:	----- ----- ----- -----											
Conflict Vol:	xxxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx
Movr Cap.:	xxxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0	xxxx	xxxxx	xxxx	xxxx	xxxxx
Level Of Service Module:	----- ----- ----- -----											
Stopped Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
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	xxxxx	xxxx	xxxx	xxxxx
Shrd StpDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxxx	xxxxxxx	xxxxxxx	xxxxxxx	xxxxxxx	xxxxxxx	xxxxxxx	xxxxxxx	xxxxxxx	xxxxxxx	xxxxxxx	xxxxxxx
ApproachLOS:	*	*	*	*	*	*	*	*	*	*	*	*
HevVeh:	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade:	0	0	0	0	0	0	0	0	0	0	0	0
Peds/Hour:	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Walk Speed:	4.00 feet/sec											
LaneWidth:	12 feet			12 feet			12 feet			12 feet		
Time Period:	0.25 hour											



Queues  
 3: Iron Point Road & Empire Ranch Road Construction Year 2006 - Without Saratoga - ALT 1&2 - AM

Lane Group Flow (vph)	122	140	744	433	1000	300
Queue Length 95th (ft)	48	116	m113	m10	304	192
50th Up Block Time (%)						
Turn Bay Length (ft)	300	640	200		200	
95th Bay Block Time %		1%	25%	5%		

HCM Signalized Intersection Capacity Analysis  
 3: Iron Point Road & Empire Ranch Road Construction Year 2006 - Without Saratoga - ALT 1&2 - AM

Lane Configurations	TT	T	T	T	T	T	T
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
PHF	1.00	0.85					
Satd. Flow (prot)	3433	1583					
Satd. Flow (perm)	3433	1583					
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	122	0	140	0	0	744	433
Turn Type	Prot	custom	Prot	Prot	Prot	Perm	Perm
Permitted Phases	4						
Effective Green, g (s)	10.4	10.4			22.4	61.6	35.2
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0
Lane Grp Cap (vph)	446	206			981	2725	1557
w/s Ratio Perm		c0.09					0.19
Uniform Delay, d1	31.4	33.2			26.5	2.4	17.5
Incremental Delay, d2	0.3	8.6			3.1	0.1	2.0
Level of Service	C	D			B	A	B
Approach LOS	D A A B B						
HCM Average Control Delay	17.3 HCM Level of Service B						
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 12.0						



Queues  
3: Iron Point Road & Empire Ranch Road Construction Year 2006 - Without Saratoga - ALT 1&2 - PM

Lane Group Flow (vph)	311	373	56	1078	689	53
Queue Length 50th (ft)	80	236	m25	126	188	40
50th Up Block Time (%)	1%					
Turn Bay Length (ft)	300	640	200	200		
95th Bay Block Time %	1%					

HCM Signalized Intersection Capacity Analysis  
3: Iron Point Road & Empire Ranch Road Construction Year 2006 - Without Saratoga - ALT 1&2 - PM

Lane Configurations						
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Fr	1.00	0.85	1.00	1.00	1.00	0.85
Satd. Flow (prot)	3433	1583	3433	3539	3539	1583
Satd. Flow (perm)	3433	1583	3433	3539	3539	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	311	373	0	56	1078	689
Turn Type	Prot	Prot	custom	Prot	Prot	Perm
Permitted Phases	4					
Effective Green, g (s)	22.7	22.7	4.1	49.3	41.2	41.2
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	974	449	176	2181	1823	815
v/s Ratio Perm	c0.24					
Uniform Delay, d1	22.6	26.8	36.6	8.5	11.7	9.7
Incremental Delay, d2	0.2	12.3	1.0	0.7	0.6	0.2
Level of Service	C	D	D	A	B	A
Approach LOS	C			A	A	B
HCM Average Control Delay	15.3			HCM Level of Service B		
Actuated Cycle Length (s)	80.0					
Sum of lost time (s)	8.0					

Queues  
 3: Iron Point Road & Empire Ranch Road Construction Year 2006 - Without Saratoga - ALT 3&4 - AM

Lane Group Flow (vph)	122	140	744	433	1000	300
Queue Length 95th (ft)	48	116	161	m20	304	192
50th Up Block Time (%)						
Turn Bay Length (ft)	300	640	200			200
95th Bay Block Time %		4%		25%	5%	

HCM Signalized Intersection Capacity Analysis  
 3: Iron Point Road & Empire Ranch Road Construction Year 2006 - Without Saratoga - ALT 3&4 - AM

Lane Configurations	TT	T	T	T	TT	TT	TT	TT	TT	TT	TT
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Fr	1.00	0.85					1.00	1.00	1.00	1.00	0.85
Satd. Flow (prot)	3433	1583					3433	3539	3539	3539	1583
Satd. Flow (perm)	3433	1583					3433	3539	3539	3539	1583
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
Adj. Flow (vph)	122	0	140	0	0	0	744	433	0	1000	300
Turn Type	Prot	custom					Prot			Prot	Perm
Permitted Phases		4									6
Effective Green, g (s)	10.4	10.4					21.8	61.6		35.8	35.8
Clearance Time (s)	4.0	4.0					4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	446	206					935	2725		1584	708
v/s Ratio Perm		c0.09									0.19
Uniform Delay, d1	31.4	33.2					27.0	2.4		17.0	15.1
Incremental Delay, d2	0.3	8.6					4.1	0.1		1.9	1.9
Level of Service	C	D					B	A		B	B
Approach LOS		D					A			B	B
HCM Average Control Delay		16.8						HCM Level of Service		B	
Actuated Cycle Length (s)		80.0						Sum of lost time (s)		12.0	

c Critical Lane Group

**Queues**  
**3: Iron Point Road & Empire Ranch Road** Construction Year 2006 - Without Saratoga - ALT 3&4 - PM

↖ ↗ ↖ ↗
↖ ↗ ↖ ↗
↖ ↗ ↖ ↗
↖ ↗ ↖ ↗

Lane Group Flow (vph)	311	373	56	1078	689	53
Queue Length 95th (ft)	80	236	m23	145	188	40
95th Up Block Time (%)	1%					
Turn Bay Length (ft)	200					
95th Bay Block Time %	1%					

**HCM Signalized Intersection Capacity Analysis**  
**3: Iron Point Road & Empire Ranch Road** Construction Year 2006 - Without Saratoga - ALT 3&4 - PM

↖ ↗ ↖ ↗
↖ ↗ ↖ ↗
↖ ↗ ↖ ↗
↖ ↗ ↖ ↗

<b>Lane Configurations</b>	11			11			11		
Total Lost time (s)	4.0			4.0			4.0		
Fit	1.00			0.85			1.00		
Stand. Flow (prot)	3433			1583			3433		
Stand. Flow (perm)	3433			1583			3433		
Peak-hour factor, PHF	0.90			0.90			0.90		
Adj. Flow (vph)	311			0			53		
Turn Type	Prot			custom			Prot		
Permitted Phases	4								
Effective Green, g (s)	22.7			22.7			4.1		
Clearance Time (s)	4.0			4.0			4.0		
Lane Grp Cap (vph)	974			449			176		
v/s Ratio Perm	60.24								
Uniform Delay, d1	22.6			26.8			36.6		
Incremental Delay, d2	0.2			12.3			1.0		
Level of Service	C			D			D		
Approach LOS	C			C			A		

HCM Average Control Delay	15.1	HCM Level of Service	B
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Critical Lane Group			

RAMP METERING ANALYSIS										
Location:	US 50/Empire Ranch Road				Projected Peak Hour Volume:	610				
Ramp:	Empire Ranch Road to EB US 50				Projected Peak Period Volume:	1190				
Scenario:	2006 With Project Without Saratoga Way Connection - AM PEAK									
HOV Bypass (%):	14				Storage Length (m):	180				
Metered Volume (veh/hr):	525				Storage Length (ft):	600				
Metering Rate (veh/hr):	520				Storage Lanes:	1				
Discharge Rate (veh/15 min):	130				Maximum Storage (veh):	20				
Time	Estimated Arrival	Projected 15-Minute Volumes	Metered 15-Minute min flows	Excess Demand	Accumulated Vehicles	Total Delay (veh-hr)	Vehicles Delayed	Total Hourly Volume	Metered Hourly Volume	
7:00-7:15	12%	142	122	0	0	0.00	0			
7:15-7:30	12%	143	123	0	0	0.00	0			
7:30-7:45	12%	147	126	0	0	0.00	0			
7:45-8:00	14%	165	142	12	12	2.98	142	597	513	
8:00-8:15	12%	143	123	0	5	1.22	123	598	514	
8:15-8:30	12%	142	122	0	0	0.00	0	597	513	
8:30-8:45	13%	153	132	2	2	0.40	132	603	519	
8:45-9:00	13%	156	134	4	6	1.44	134	594	511	
Total Delay (veh-hr):	6				Maximum Queue (veh):	12				
Total Vehicles Delayed (veh):	531				Maximum Queue (m):	107				
Average Delay (hr):	0.01				Maximum Queue (ft):	351				
Average Delay (min):	0.68									
Location:	US 50/Empire Ranch Road				Projected Peak Hour Volume:	790				
Ramp:	Empire Ranch Road to EB US 50				Projected Peak Period Volume:	1460				
Scenario:	2006 With Project Without Saratoga Way Connection - PM PEAK									
HOV Bypass (%):	14				Storage Length (m):	180				
Metered Volume (veh/hr):	679				Storage Length (ft):	600				
Metering Rate (veh/hr):	640				Storage Lanes:	1				
Discharge Rate (veh/15 min):	160				Maximum Storage (veh):	20				
Time	Estimated Arrival	Projected 15-Minute Volumes	Metered 15-Minute min flows	Excess Demand	Accumulated Vehicles	Total Delay (veh-hr)	Vehicles Delayed	Total Hourly Volume	Metered Hourly Volume	
4:00-4:15	14%	198	170	10	10	2.57	170			
4:15-4:30	12%	169	145	0	0	0.00	0			
4:30-4:45	13%	188	162	2	2	0.42	162			
4:45-5:00	13%	194	167	7	9	2.13	167	749	644	
5:00-5:15	13%	194	167	7	15	3.84	167	745	641	
5:15-5:30	12%	176	151	0	7	1.68	151	752	647	
5:30-5:45	12%	174	150	0	0	0.00	0	738	635	
5:45-6:00	12%	168	144	0	0	0.00	0	712	612	
Total Delay (veh-hr):	11				Maximum Queue (veh):	15				
Total Vehicles Delayed (veh):	817				Maximum Queue (m):	138				
Average Delay (hr):	0.01				Maximum Queue (ft):	454				
Average Delay (min):	0.78									

**Appendix D**  
**Construction Year (2006) With Improvements Conditions**

---

HCS2000: Ramps and Ramp Junctions Release 4.1c

Phone: \_\_\_\_\_  
E-mail: \_\_\_\_\_  
Fax: \_\_\_\_\_

Analysis:                      Diverge

Analyst: \_\_\_\_\_  
Agency/Co:                      Fehr & Peers Associates, Inc.  
Data Performed:                      8/12/2003  
Analysis Time Period:                      AM Peak Hour  
Freeway/dir or travel:                      US 50 / Westbound  
Junction:                      Empire Ranch Rd. Off-ramp  
Jurisdiction:                      2006 With Project w/o Saratoga with Improvement #2  
Analysis Year:                      US 50/Empire Ranch Road Interchan  
Description:                     

Data:                      Freeway

Type of analysis:                      Diverge  
Number of lanes in freeway:                      2  
Free-flow speed on freeway:                      70.0 mph  
Volume on freeway:                      4570 vph

Data:                      Off Ramp

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:                      1500 ft  
Length of second accel/decel lane:                     

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

Conditions:                      Conversion to pc/h Under Base

Junction Components	Freeway	Ramp	Adjacent Ramp	vph
Volume, V (vph)	4570	970		
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, V15	1269	269		
Trucks and buses, %	4	4		
Recreational vehicles, %	0	0		
Terrain Type:				
Grade, %	0.00	0.00		
Length, mi	0.00	0.00		
Trucks and buses PCE, ET	2.5	2.5		
Recreational vehicle PCE, ER	2.0	2.0		
Heavy vehicle adjustment, FHV	0.943	0.943		
Driver population factor, FP	1.00	1.00		

Flow rate, vp

1142

pc/h

Areas:                      Estimation of V12 Diverge

L = 0.00 (Equation 25-8 or 25-9)  
EQ  
P = 1.000 Using Equation 0  
FD  
V = V + (V - V) P = 5382 pc/h  
12 R F R FD

Checks:                      Capacity

V = V	Actual	Maximum	LOS F?
F	5382	4800	Yes
V	5382	4400	Yes
12	4240	4800	No
F	1142	2000	No
R			

Level of Service Determination (if not F)

Density,  $D = 4.252 + 0.0086 V - 0.009 L = 37.0$  pc/ml/ln  
Level of service for ramp-freeway junction areas of influence F

Estimation:                      Speed

Intermediate speed variable,  $D = 0.531$   
Space mean speed in ramp influence area,  $S = 55$  mph  
Space mean speed in outer lanes,  $S = N/A$  mph  
Space mean speed for all vehicles,  $S = 55.1$  mph

HCS2000: Ramps and Ramp Junctions Release 4.1c

Phone:  
E-mail:

Fax:

Analysis Merge

Analyst: AL  
Agency/Co.: Fehr & Peers Associates, Inc.  
Date performed: 07/31/2003  
Analysis time period: AM Peak Hour  
Freeway/dir or travel: US 50/Westbound  
Junction: Empire Ranch Road On-ramp (D)  
Jurisdiction:  
Analysis Year: 2006 With project w/o Saratoga with Improvement #2  
Description: US 50/Empire Ranch Road Interchan

Data Freeway

Type of analysis Merge  
Number of lanes in freeway 2  
Free-flow speed on freeway 70.0 mph  
Volume on freeway 3600 vph

Data On Ramp

Side of freeway Right  
Number of lanes in ramp 1  
Free-flow speed on ramp 35.0 mph  
Volume on ramp 430 vph  
Length of first accel/decel lane 1500 ft  
Length of second accel/decel lane

Adjacent Ramp Data (if one exists)

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

Conditions Conversion to pc/h Under Base

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3600	430	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, V15	1000	119	v
Trucks and buses	4	4	%
Recreational vehicles	0	0	%
Terrain type:			
Grade	-6.00	4.00	Level
Length	0.10	0.10	mi
Trucks and buses PCE, FT	1.5	1.5	
Recreational vehicle PCE, FR	1.5	1.5	
Heavy vehicle adjustment, FHV	1.580	0.580	
Driver population factor, FP	1.00	1.00	

Flow rate, vp 4080 487 pcph

Areas Estimation of V12 Merge

L = 0.00 (Equation 25-2 or 25-3)  
BQ = 1.000 Using Equation 0  
FM = v (P) = 4080 pc/h  
12 F FM

Checks Capacity

Actual Maximum LOS F?  
V FO 4567 4800 No  
V R12 4567 4600 No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 31.5 pc/mi/in R 12 A

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

Estimation Speed

Intermediate speed variable, M = 0.591  
Space mean speed in ramp influence area, S = 53.4 mph  
Space mean speed in outer lanes, S<sub>0</sub> = N/A mph  
Space mean speed for all vehicles, S = 53.4 mph



HCS2000; Ramps and Ramp Junctions Release 4.ic

Phone:  
E-mail:

Fax:

Analysis

Analyst: AL  
Agency/Co.: Fehr & Peers Associates, Inc.  
Date Performed: 8/12/2003  
Analysis time period: AM Peak Hour  
Freeway/dir or travel: US 50 / Westbound  
Junction: Empire Ranch Rd. Off-ramp  
Jurisdiction:  
Analysis Year: 2006 With Project w/o Saratoga With Improvement #3  
Description: US 50/Empire Ranch Road Interchan

Data

Freeway  
Diverge  
Types of analysis  
Number of lanes in freeway  
Free-flow speed on freeway  
Volume on freeway

Data

Off Ramp  
Right  
Number of lanes in ramp  
Free-flow speed on ramp  
Volume on ramp  
Length of first accel/decel lane  
Length of second accel/decel lane

Does adjacent ramp exist?

Volume on adjacent ramp  
Position of adjacent ramp  
Type of adjacent ramp  
Distance to adjacent ramp

Conditions

Conversion to pc/h Under Base  
Junction Components  
Volume, V (vph)  
Peak-hour factor, PHF  
Peak 15-min volume, v15  
Trucks and buses  
Recreational vehicles  
Terrain type:  
Grade  
Length  
Trucks and buses PCE, ET  
Recreational vehicle PCE, ER  
Heavy vehicle adjustment, fhv  
Driver population factor, fp

Flow rate, vp

5382

1142

pcph

Areas

Estimation of V12 Diverge  
L = 0.00 (Equation 25-8 or 25-9)  
P<sub>FD</sub> = 0.573 Using Equation 5  
V<sub>FD</sub> = V<sub>R</sub> + (V<sub>R</sub> - V<sub>F</sub>) P<sub>FD</sub> = 3571 pc/h  
12 R F R FD

Checks

Capacity  
Actual Maximum LOS F?  
V = V F  
V<sub>FD</sub> = V<sub>R</sub> + (V<sub>R</sub> - V<sub>F</sub>) P<sub>FD</sub>  
V<sub>FD</sub> = V<sub>R</sub> + (V<sub>R</sub> - V<sub>F</sub>) P<sub>FD</sub>  
V<sub>FD</sub> = V<sub>R</sub> + (V<sub>R</sub> - V<sub>F</sub>) P<sub>FD</sub>  
V<sub>FD</sub> = V<sub>R</sub> + (V<sub>R</sub> - V<sub>F</sub>) P<sub>FD</sub>

Level of Service Determination (if not F)

Density, D = 4.252 + 0.0086 V<sub>R</sub> - 0.009 L<sub>D</sub> = 33.7 pc/mi/ln  
Level of service for ramp-freeway junction areas of influence D

Estimation

Intermediate speed variable, S<sub>D</sub> = 0.531  
Space mean speed in ramp influence area, S<sub>R</sub> = 55 mph  
Space mean speed in outer lanes, S<sub>O</sub> = 73.6 mph  
Space mean speed for all vehicles, S = 60.2 mph

HCS2000: Ramps and Ramp Junctions Release 4.1c

Phone:
E-mail:
Fax:

Analysis: Merge

Analyst: AL
Agency/Co.: Behr & Peers Associates, Inc.
Date performed: 07/31/2003
Analysis time period: AM Peak Hour
Freeway/dir or travel: US 50/Westbound
Junction: Empire Ranch Road On-ramp (D)
Jurisdiction:
Analysis Year: 2006 With Project w/o Saratoga With Improvement #3
Description: US 50/Empire Ranch Road Interchan

Data: Freeway

Type of analysis: Merge
Number of lanes in freeway: 3
Free-flow speed on freeway: 70.0 mph
Volume on freeway: 3600 vph

Data: On Ramp

Side of freeway: Right
Number of lanes in ramp: 1
Free-flow speed on ramp: 35.0 mph
Volume on ramp: 430 vph
Length of first accel/decel lane: 590 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: ft
Type of adjacent Ramp:
Distance to adjacent Ramp: ft

Conditions: Conversion to pc/h Under Base

Table with columns: Junction Components, Freeway, Ramp, Adjacent Ramp, Volume, V (vph), Peak-hour factor, FHP, Peak 15-min volume, V15, Trucks and buses, Recreational vehicles, Terrain type, Grade, Length, Trucks and buses PCE, ET, Recreational vehicle PCE, ER, Heavy vehicle adjustment, fHV, Driver population factor, fP.

Flow rate, VP: 4080 487 pcph

Areas: Estimation of V12 Merge

L = 0.00 (Equation 25-2 or 25-3)
EQ
P = 0.594 Using Equation 1
FM
V = V (P) = 2424 pc/b
12 F FM

Checks: Capacity

Table with columns: V, FO, V, RL2, Actual, Maximum, LOS F, No, No.

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 V + 0.0078 V - 0.00627 L = 24.3 pc/mi/ln

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

Estimation: Speed

Intermediate speed variable, M = 0.351

Space mean speed in ramp influence area, S = 60.2 mph

Space mean speed in outer lanes, S = 65.8 mph

Space mean speed for all vehicles, S = 62.1 mph

**Appendix E**  
**Design Year (2026) Conditions**

---

HCS2000: Ramps and Ramp Junctions Release 4.1c

Phone:
E-mail:
Fax:

Analysis Diverge

Agency/Co.: AL
Date performed: 8/12/2003
Analysis time period: AM Peak Hour
Freeway/dir of travel: US 50 / Eastbound
Junction: Empire Ranch Rd. Off-ramp
Jurisdiction:
Analysis Year: 2026 With Project
Description: US 50/Empire Ranch Road Interchan

Data Freeway

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 70.0 mph
Volume on freeway 3180 vph

Data Off Ramp

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 280 vph
Length of first accel/decel lane 140 ft
Length of second accel/decel lane

Adjacent Ramp Data (if one exists)

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

Conditions Conversion to pc/h Under Base

Table with columns: Junction Components, Freeway, Ramp, Adjacent Ramp, Volume, V (vph), Peak-hour factor, PHF, Peak 15-min volume, V15, Trucks and buses, Recreational vehicles, Terrain type, Grade, Length, Trucks and buses FCE, ET, Recreational vehicle FCE, ER, Heavy vehicle adjustment, FHV, Driver population factor, FP

Flow rate, vp 3816 317 pcph

Area Estimation of V12 Diverge

L = 0.00 (Equation 25-8 or 25-9)
EQ
P = 0.650 Using Equation 5
FD
V = v + (v - v) P = 2591 pc/h
12 R F R FD

Checks Capacity

Table with columns: V = V, V1, V12, V = V - V, V, R, Actual, Maximum, LOS F?, No

Level of Service Determination (if not F)

Density, D = 4.252 + 0.0086 v - 0.009 L = 25.3 pc/mi/ln
Level of service for ramp-freeway junction areas of influence C

Estimation Speed

Intermediate speed variable, D = 0.457
Space mean speed in ramp influence area, S = 57 mph
Space mean speed in outer lanes, S = 75.9 mph
Space mean speed for all vehicles, S = 62.1 mph

HCS2000: Ramps and Ramp Junctions Release 4.1c

Phone:
E-mail:
Fax:

Analysis: Merge

Analyst: AL
Agency/Co.: Fehr & Peers Associates, Inc.
Date performed: 07/31/2003
Analysis time period: AM Peak Hour
Freeway/dir or travel: US 50/Eastbound
Junction: Empire Ranch Road On-ramp
Jurisdiction:
Analysis Year: 2026 With Project
Description: US 50/Empire Ranch Road Interchan

Data: Freeway

Type of analysis
Number of lanes in freeway
Free-flow speed on freeway
Volume on freeway

Data: On Ramp

Side of freeway
Number of lanes in ramp
Free-flow speed on ramp
Volume on ramp
Length of first accel/decel lane
Length of second accel/decel lane

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?
Volume on adjacent Ramp
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp

Conditions: Conversion to pc/h Under Base

Table with columns: Junction Components, Volume, V (vph), Peak-hour factor, PHF, Peak 15-min volume, V15, Trucks and buses, Recreational vehicles, Terrain type, Grade, Length, Trucks and buses PCE, ET, Recreational vehicle PCE, ER, Heavy vehicle adjustment, FHV, Driver population factor, FP. Includes values for Freeway and Ramp.

Flow rate, VP 3287 657 pcph

Areas: Estimation of V12 Merge

L = 0.00 (Equation 25-2 or 25-3)
EQ
P = 0.619 Using Equation 1
FM
V = v (P ) = 2036 pc/h
12 F FM

Checks: Capacity

Actual Maximum LOS F?
V 3944 7200 NC
FO 2693 4600 NC
RL2

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 16.8

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

Estimation: Speed

Intermediate speed variable, M = 0.274

Space mean speed in ramp influence area, S = 62.3 mph

Space mean speed in outer lanes, S = 67.3 mph

Space mean speed for all vehicles, S = 63.8 mph

HCS2000: Ramps and Ramp Junctions Release 4.1c

Phone:
E-mail:
Fax:

Analysis

Analyst: Al.
Agency/Co.: Fahr & Peers Associates, Inc.
Date performed: 8/13/2003
Analysis time period: AM Peak Hour
Freeway/dir or travel: US 50 Westbound
Junction: Empire Ranch Rd. Off-ramp
Jurisdiction:
Analysis Year: 2026 With Project
Description: US 50/Empire Ranch Road Interchan

Data

Type of analysis
Number of lanes in freeway
Free-flow speed on freeway
Volume on freeway

Data

Side of freeway
Number of lanes in ramp
Free-flow speed on ramp
Volume on ramp
Length of first accel/decel lane
Length of second accel/decel lane

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?
Volume on adjacent ramp
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp

Conditions

Junction Components
Volume, V (vph)
Peak-hour factor, PHF
Peak 15-min volume, v15
Trucks and buses
Recreational vehicles
Terrain type:
Grade
Length
Trucks and buses PCE, ET
Recreational vehicle PCE, ER
Heavy vehicle adjustment, fhv
Driver population factor, fp

Flow rate, VP

Estimation of V12 Diverge

L = 0.00 (Equation 25-8 or 25-9)
P = 1.000 Using Equation 0
V = V + (V - V) P = 5206 pc/h

Checks

V = V
V1 F
V12
V = V - V
V F R
V R
Actual
Maximum
LOS F?
Yes
Yes
No
No

Level of Service Determination (if not F)

Density: D = 4.252 + 0.0086 V - 0.009 L = 47.8 pc/mi/ln
Level of service for ramp-freeway junction areas of influence F

Estimation

Intermediate speed variable, D = 0.495
Space mean speed in ramp influence area, S = 56 mph
Space mean speed in outer lanes, S = N/A mph
Space mean speed for all vehicles, S = 56.1 mph

HCS2000: Ramps and Ramp Junctions Release 4.1c

Phone:
E-mail:
Fax:

Analysis Merge

Analyst: AL
Agency/Co.: Fehr & Peers Associates, Inc.
Date performed: 07/31/2003
Analysis time period: AM Peak Hour
Freeway/dir or travel: US 50/Westbound
Junction: Empire Ranch Road On-ramp (D)
Jurisdiction:
Analysis Year: 2026 With Project
Description: US 50/Empire Ranch Road Interchan

Data Freeway

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 70.0 mph
Volume on freeway 3790 vph

Data On Ramp

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 950 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane

Does adjacent ramp exist? Adjacent Ramp Data (if one exists)

Volume on adjacent Ramp No
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp

Conditions Conversion to pc/h Under Base

Table with columns: Junction Components, Freeway, Ramp, Adjacent Ramp, Volume, V (vph), Peak-hour factor, PHF, Peak 15-min volume, v15, Trucks and buses, Recreational vehicles, Terrain type, Grade, Length, Trucks and buses PCE, ET, Recreational vehicle PCE, ER, Heavy vehicle adjustment, FHV, Driver population factor, FP.

Flow rate, vp 4295 1077 pcph

Areas Estimation of V12 Merge

L = 0.00 (Equation 25-2 or 25-3)
EQ = 1.000 Using Equation 0
FM = v (P) = 4295 pc/h
12 F FM

Checks Capacity

V FO Actual Maximum LOS F?
V R12 5372 4800 Yes
5372 4600 Yes

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 43.2 pc/mi/in

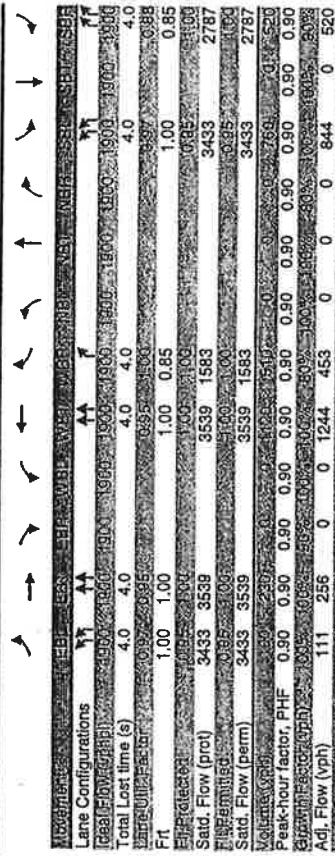
Level of service for ramp-freeway junction areas of influence F

Estimation Speed

Intermediate speed variable, M = 1.119
Space mean speed in ramp influence area, S = 38.7 mph
Space mean speed in outer lanes, S = N/A mph
Space mean speed for all vehicles, S = 38.7 mph

Empire Ranch Interchange  
 3: Iron Point Road & Empire Ranch Road

Design Year 2026 No Project - AM Peak Hour  
 HCM Signalized Intersection Capacity Analysis



Lane Group Flow (vph)	111	256	1244	453	844	520
Queue Length (ft)	42	35	4301	223	4202	136
50th Up Block Time (%)	38% 28% 28%					
Turn Bay Length (ft)	200					
95th Bay Block Time %	9%					

Queue shown is maximum after two cycles.

Lane Configurations	TT	TT	TT	TT	TT	TT
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Utilization Factor	0.99	0.95	0.95	0.95	0.97	0.88
Fit	1.00	1.00	1.00	0.85	1.00	0.85
Effective Satd. Flow (prot)	3433	3538	3539	1583	3433	2787
Volume (vph)	3433	3539	3539	1583	3433	2787
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Signalized Capacity (vph)	111	256	0	1244	453	0
Adj. Flow (vph)	111	256	0	1244	453	0
Lane Group Delay (s)	25.7	25.7	25.7	25.7	25.7	25.7
Turn Type	Prot	Prot	Perm	custom	custom	custom
Permitted Phases	8 6 6					
Actuated Green Time (s)	29.0	29.0	29.0	23.0	29.0	29.0
Effective Green, g (s)	2.9	29.9	23.0	23.0	17.4	17.4
Actuated Cycle Length (s)	60.0	60.0	60.0	60.0	60.0	60.0
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane Grp Cap (vph)	180	1913	1472	658	1080	877
Vis Ratio	0.00	0.00	0.00	0.00	0.00	0.00
vis Ratio Perm	0.00	0.00	0.29	0.29	0.25	0.19
Uniform Delay, d1	25.7	6.3	14.5	13.2	17.2	16.0
Proportion Factor	0.01	0.01	0.01	0.01	0.01	0.01
Incremental Delay, d2	6.2	0.0	4.7	3.0	3.7	1.1
Delay (s)	29.5	6.3	19.2	16.2	20.9	17.1
Level of Service	C	A	B	B	C	B
Approach Delay (s)	18.4					
Approach LOS	B					
HCM Average Control Delay	18.4					
HCM Level of Service	B					
Actuated Cycle Length (s)	55.3					
Sum of lost time (s)	12.0					

c Critical Lane Group



Empire Ranch Interchange  
 3: Iron Point Road & Empire Ranch Road

Design Year 2026 No Project - PM Peak Hour Queues

Lane Group Flow (vph)	600	1256	78	730	556	98
Queue Length 95th (ft)	#274	#173	23	#625	#244	51
50th Up Block Time (%)	19%	5%	42%	35%		
Turn Bay Length (ft)	200			200		
95th Bay Block Time %	28%	2%		19%		

Queue shown is maximum after two cycles.

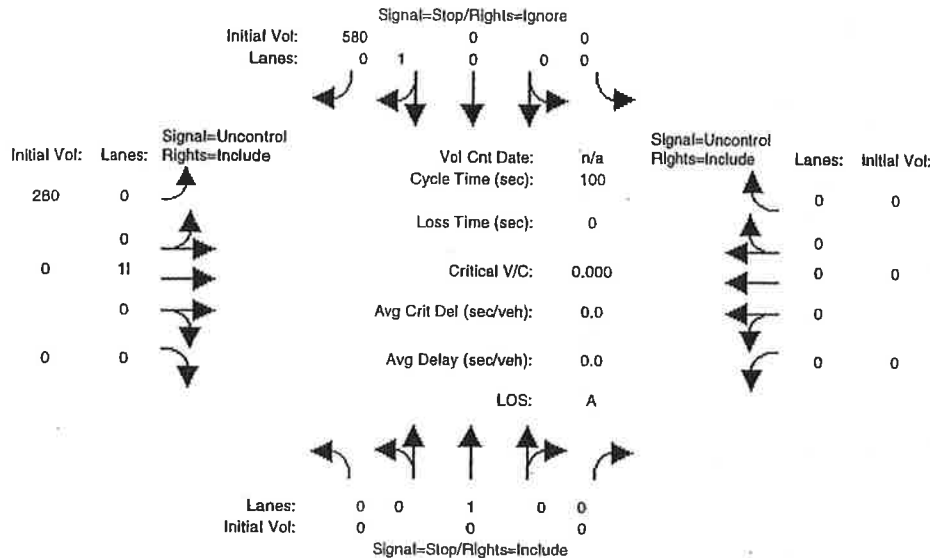
Empire Ranch Interchange  
 3: Iron Point Road & Empire Ranch Road

Design Year 2026 No Project - PM Peak Hour HCM Signalized Intersection Capacity Analysis

Lane Configurations	TT	TT	TT	TT	TT	TT
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Flt	1.00	1.00	1.00	0.65	1.00	0.85
Satd. Flow (prot)	3433	3539	3539	1583	3433	2787
Flt Permitted	3433	3539	3539	1583	3433	2787
Value of V <sub>pl</sub>	0.90	0.90	0.90	0.90	0.90	0.90
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Gravimetric Factor (GPF)	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	600	1256	0	78	730	0
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm
Permitted Phases	4	8	4	8	4	8
Effective Green, g (s)	16.6	62.1	41.5	41.5	16.2	16.2
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	660	2547	1702	761	644	523
V/C Ratio	0.33	0.33	0.05	0.05	0.16	0.04
Uniform Delay, d1	34.1	5.3	11.9	21.6	34.0	29.5
Incremental Delay, d2	16.4	0.2	0.0	22.8	11.5	0.2
Level of Service	D	A	B	D	D	C
Approach Delay (s)	29.0	29.0	29.0	29.0	29.0	29.0
Approach LOS	B	D	D	A	D	D
HCM Average Control Delay	29.7		HCM Level of Service	C		
Actuated Cycle Length (s)	86.3		Sum of lost time (s)	12.0		
c Critical Lane Group						

Level Of Service Computation Report  
 2000 HCM Unsignalized (Future Volume Alternative)  
 2026 AM - All 1&4

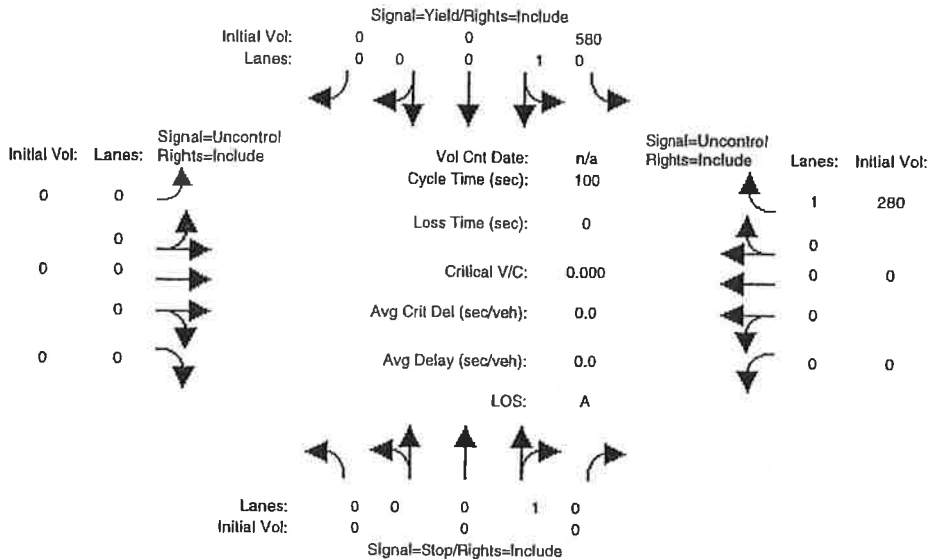
Intersection #1: Empire Ranch Road/Route 50 Eastbound Ramps



Approach:	North Bound			South Bound			East Bound			West Bound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:												
Base Vol:	0	0	0	0	0	580	280	0	0	0	0	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:	0	0	0	0	0	580	280	0	0	0	0	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	0	0	580	280	0	0	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	0	0	0	280	0	0	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol:	0	0	0	0	0	0	280	0	0	0	0	0
Critical Gap Module:												
Critical Op:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	4.1	xxxx	xxxx	xxxx	xxxx	xxxx
FollowUpTim:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	2.2	xxxx	xxxx	xxxx	xxxx	xxxx
Capacity Module:												
Cnflct Vol:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0	xxxx	xxxx	xxxx	xxxx	xxxx
Potent Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0	xxxx	xxxx	xxxx	xxxx	xxxx
Move Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
Stopped Del:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.0	xxxx	xxxx	xxxx	xxxx	xxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
Shrd StpDel:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	*			*			*			*		
HevVeh:	0%			0%			0%			0%		
Grade:	0%			0%			0%			0%		
Peds/Hour:	0			0			0			0		
Pedestrian Walk Speed:	4.00 feet/sec			12 feet			12 feet			12 feet		
LaneWidth:	12 feet			12 feet			12 feet			12 feet		
Time Period:	0.25 hour											

Level Of Service Computation Report  
 2000 HCM Unsignalized (Future Volume Alternative)  
 2026 AM - All 2&3

Intersection #1: Empire Ranch Road/Route 50 Eastbound Ramps



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Volume Module:												
Base Vol:	0	0	0	580	0	0	0	0	0	0	0	280
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	0	0	580	0	0	0	0	0	0	0	280
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserbyVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Pst:	0	0	0	580	0	0	0	0	0	0	0	280
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	0	0	580	0	0	0	0	0	0	0	280
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	580	0	0	0	0	0	0	0	280
Critical Gap Module:												
Critical Op:	xxxxx	xxxxx	xxxxx	6.4	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
FollowUpTim:	xxxxx	xxxxx	xxxxx	1.5	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
Capacity Module:												
Conflict Vol:	xxxxx	xxxxx	xxxxx	0	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
Potent Cap.:	xxxxx	xxxxx	xxxxx	0	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
Move Cap.:	xxxxx	xxxxx	xxxxx	0	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
Level Of Service Module:												
Stopped Del:	xxxxx	xxxxx	xxxxx	0.0	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
LOS by Move:	*	*	*	A	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxxx	xxxxx	0	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
Shrd StpDel:	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			0.0	xxxxxx			xxxxxx			xxxxxx	
ApproachLOS:	*			A	*			*			*	
HwyVeh:	0%			0%			0%			0%		
Grade:	0%			0%			0%			0%		
Peds/Hour:	0			0			0			0		
Pedestrian Walk Speed:	4.00 feet/sec											
LaneWidth:	12 feet			12 feet			12 feet			12 feet		
Time Period:	0.25 hour											

Queues  
3: Iron Point Road & Empire Ranch Road

Design Year 2026 - Alternatives 1&2 - AM Peak Hour

Empire Ranch Interchange  
Alternatives 1&2 - AM Peak Hour

	→	←	↔	↔	←	→	↔	↔	←	→		
Lane Group Flow (vph)	56	300	110	422	1300	258	244	600	133	500	1156	290
Queue Length 95th (ft)	36	115	83	165	#540	109	m#125	224	m82	#218	#491	183
50th Up Block Time (s)												
Turn Bay Length (ft)	300	300	300	500	200	250	300					200
50th Bay Block Time %					35%					10%		33%
Queue shown is maximum after two cycles.												
Queue shown is maximum after two cycles.												

HCM Signalized Intersection Capacity Analysis  
3: Iron Point Road & Empire Ranch Road

Design Year 2026 - Alternatives 1&2 - AM Peak Hour

Empire Ranch Interchange  
Alternatives 1&2 - AM Peak Hour

	→	←	↔	↔	←	→	↔	↔	←	→
Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Effective Green (s)	30.7	30.7	30.7	30.7	30.7	30.7	30.7	30.7	30.7	30.7
Effective Yellow (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Effective Red (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (prot)	3433	3539	1553	3367	3539	1553	3367	3471	1553	3433
Flow (perm)	3433	3539	1553	3367	3539	1553	3367	3471	1553	3433
Volume (veh)	3433	3539	1553	3367	3539	1553	3367	3471	1553	3433
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Flow (veh)	3090	3231	1400	3030	3231	1400	3030	3124	1400	3090
Adj. Flow (vph)	56	300	110	422	1300	258	244	600	133	500
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%	4%	4%	2%	2%
Protected Phases	7	4	5	3	8	1	5	2	3	1
Actuated Green, G (s)	4.0	21.8	28.8	15.2	33.0	48.6	7.0	21.4	36.6	15.6
Effective Green (s)	3.0	20.8	27.8	14.2	32.0	47.6	6.0	20.4	35.6	14.6
Actuated g/C Ratio	0.04	0.24	0.32	0.17	0.37	0.54	0.08	0.24	0.41	0.17
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
v/s Ratio Prot	0.02	0.08	0.02	0.03	0.07	0.05	0.07	0.17	0.03	0.03
v/c Ratio	0.37	0.35	0.19	0.74	1.00	0.28	0.93	0.73	0.19	0.84
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.17	0.69	0.85	1.00
Delay (s)	43.3	28.5	22.4	40.7	53.8	11.4	82.6	26.6	14.6	46.3
Approach Delay (s)	28.8			45.5			38.9			48.5
HCM Volume to Capacity Ratio										
Intersection Capacity Utilization										
ICU Level of Service										

Queues  
 3: Iron Point Road & Empire Ranch Road

Design Year 2026 - Alternatives 1&2 - PM Peak Hour

HCM Signalized Intersection Capacity Analysis  
 3: Iron Point Road & Empire Ranch Road

Design Year 2026 - Alternatives 1&2 - PM Peak Hour

Lane Group Flow (vph)	267	1189	356	322	56	522	33	1167	400	367	700	89
Queue Length 95th (ft)	137	#619	295	#219	31	444	m17	m#591	m244	#219	244	51
50th Up Block Time (%)	2%											
Turn Bay Length (ft)	300	300	300	300	500	200	500	200	250	300	200	200
95th Bay Block Time %	41%	5%	58%									

Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Fit	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Satd. Flow (prot)	3433	3539	1553	3367	3539	1583	3367	3471	1553	3433	3471	1583
Satd. Flow (perm)	3433	3539	1553	3367	3539	1583	3367	3471	1553	3433	3471	1583
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
Lane Group Flow (vph)	267	1189	356	322	56	522	33	1167	400	367	700	89
Turn Type	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov
Permitted Phases	4 8 2											
Effective Green, g (s)	20.6	35.8	39.8	10.0	25.2	38.2	4.0	35.2	45.2	13.0	44.2	64.8
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	643	1152	618	306	811	607	122	1111	695	406	1395	990
v/s Ratio Perm	0.21 0.23											
Uniform Delay, d1	39.4	37.1	28.3	50.0	33.2	33.4	51.6	37.4	25.0	47.9	24.7	9.8
Incremental Delay, d2	0.4	35.1	1.3	65.8	0.0	11.7	0.9	37.5	0.8	22.9	1.3	0.0
Level of Service	D	E	C	F	C	D	D	E	C	E	C	A
Approach LOS	E E E											

HCM Average Control Delay	57.2	HCM Level of Service	E
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
c Critical Lane Group			

HCM Average Control Delay	57.2	HCM Level of Service	E
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
c Critical Lane Group			

Queues  
3: Iron Point Road & Empire Ranch Road

Design Year 2026 - Alternatives 3&4 - AM Peak Hour

Empire Ranch Interchange  
3: Iron Point Road & Empire Ranch Road

Design Year 2026 - Alternatives 3&4 - AM Peak Hour

Lane Group Flow (vph)	56	300	110	422	1300	258	244	600	133	500	1156	290
Queue Length 95th (ft)	36	115	50	165	#540	81	m#159	161	m#44	#218	#491	153
50th Up Block Time (%)												380
Turn Bay Length (ft)	300	300	300	300	300	500	200	200	250	300	200	200
95th Bay Block Time %						35%		3%				33%

Queue shown is maximum after two cycles.  
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
3: Iron Point Road & Empire Ranch Road

Design Year 2026 - Alternatives 3&4 - AM Peak Hour

Empire Ranch Interchange  
3: Iron Point Road & Empire Ranch Road

Design Year 2026 - Alternatives 3&4 - AM Peak Hour

Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Effective Green (s)	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7
Satd. Flow (prot)	3433	3539	1553	3367	3539	1553	3367	3471	1553	3433	3471	1583
Satd. Flow (perm)	3433	3539	1553	3367	3539	1583	3367	3471	1553	3433	3471	1583
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)	56	300	110	422	1300	258	244	600	133	500	1156	290
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%	4%	4%	2%	4%	2%	4%
Protected Phases	7	4	4	5	3	8	1	5	2	2	3	1
Actuated Green, G (s)	4.0	21.8	28.8	15.2	33.0	49.0	7.0	21.0	36.2	16.0	30.0	34.0
Actuated g/C Ratio	0.04	0.24	0.32	0.17	0.37	0.54	0.08	0.23	0.40	0.18	0.33	0.38
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
v/s Ratio Prot	0.02	0.08	0.07	0.13	0.37	0.05	0.07	0.17	0.04	0.15	0.33	0.02
v/c Ratio	0.37	0.35	0.22	0.74	1.00	0.30	0.93	0.74	0.21	0.82	1.00	0.48
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.43	0.91	1.00	1.00	1.00
Delay (s)	43.3	28.5	22.6	40.7	53.8	11.4	72.7	18.6	16.2	44.1	56.2	22.0
Approach Delay (s)	28.9			45.9					31.8			48.0
HCM Volume to Capacity ratio												0.96
Intersection Capacity Utilization												91.5%
ICU Level of Service												E

Queue shown is maximum after two cycles.  
Queue shown is maximum after two cycles.

Queueues  
 3: Iron Point Road & Empire Ranch Road Design Year 2026 - Alternatives 3&4 - PM Peak Hour

Lane Group Flow (vph)	267	1189	284	322	56	470	33	1167	360	367	700	71
Queue Length 95th (ft)	137	#619	227	#219	31	390	m13	#492	m146	#231	244	42
50th Up Block Time (%)	41%											
Turn Bay Length (ft)	300	300	300	300	500	200	500	200	250	300	200	200
95th Bay Block Time (%)	30%											

HCM Signalized Intersection Capacity Analysis  
 3: Iron Point Road & Empire Ranch Road Design Year 2026 - Alternatives 3&4 - PM Peak Hour

Lane Configurations	<table border="1"> <tr> <td>←</td> <td>→</td> <td>↔</td> <td>↔</td> <td>↔</td> <td>↔</td> <td>↔</td> <td>↔</td> <td>↔</td> <td>↔</td> <td>↔</td> <td>↔</td> <td>↔</td> </tr> </table>												←	→	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
←	→	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔													
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0													
Flt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00													
Satd. Flow (prot)	3433	3539	1553	3367	3539	1553	3367	3471	1553	3433	3471	1583													
Satd. Flow (perm)	3433	3539	1553	3367	3539	1553	3367	3471	1553	3433	3471	1583													
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)	267	1189	284	322	56	470	33	1167	360	367	700	71													
Heavy Vehicles (%)	2%	2%	4%	4%	4%	2%	2%	4%	4%	4%	2%	2%													
Protected Phases	7	4	4	5	3	8	1	5	2	3	1	6													
Actuated Green, G (s)	20.6	35.8	43.8	10.0	25.2	37.2	4.0	36.2	46.2	12.0	44.2	64.8													
Actuated g/C Ratio	0.19	0.33	0.40	0.09	0.23	0.34	0.04	0.33	0.42	0.11	0.40	0.59													
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0													
v/s Ratio Prot	0.08	e0.34	0.18	e0.10	0.02	e0.09	0.01	e0.34	0.05	e0.11	0.20	0.01													
v/c Ratio	0.42	1.03	0.46	1.05	0.07	0.79	0.27	1.02	0.51	0.98	0.50	0.07													
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.15	0.91	0.58	1.00	1.00													
Delay (s)	39.8	72.2	24.9	115.8	33.2	40.1	59.9	57.1	13.8	89.2	25.9	9.7													
Approach Delay (s)	59.5																								
Approach Delay (s)	68.4																								
Approach Delay (s)	47.1																								
HCM Volume to Capacity ratio	0.99																								
Intersection Capacity Utilization	98.1%																								
ICU Level of Service	E																								

**RAMP METERING ANALYSIS**

Location:	US 50/Empire Ranch Road	Projected Peak Hour Volume:	580
Ramp:	Empire Ranch Road to EB US 50	Projected Peak Period Volume:	1130
Scenario:	2026 With Project - AM PEAK		
HOV Bypass (%):	14	Storage Length (m):	180
Metered Volume (veh/hr):	499	Storage Length (ft):	600
Metering Rate (veh/hr):	500	Storage Lanes:	1
Discharge Rate (veh/15 min):	125	Maximum Storage (veh):	20

Time Period	Estimated Arrival Distribution	Projected 15-Minute Volumes	Metered 15-Minute min flows	Excess Demand	Accumulated Vehicles	Total Delay (veh-hr)	Vehicles Delayed	Total Hourly Volume	Metered Hourly Volume
7:00-7:15	12%	134	115	0	0	0.00	0		
7:15-7:30	12%	135	116	0	0	0.00	0		
7:30-7:45	12%	140	120	0	0	0.00	0		
7:45-8:00	14%	157	135	10	10	2.51	135	566	487
8:00-8:15	12%	135	116	0	1	0.28	116	567	488
8:15-8:30	12%	135	116	0	0	0.00	0	567	488
8:30-8:45	13%	145	125	0	0	0.00	0	572	492
8:45-9:00	13%	148	127	2	2	0.57	127	563	484
<b>Total Delay (veh-hr):</b>			3						
<b>Total Vehicles Delayed (veh):</b>			378					<b>Maximum Queue (veh):</b>	10
<b>Average Delay (hr):</b>			0.01					<b>Maximum Queue (m):</b>	90
<b>Average Delay (min):</b>			0.53					<b>Maximum Queue (ft):</b>	296

Location:	US 50/Empire Ranch Road	Projected Peak Hour Volume:	650
Ramp:	Empire Ranch Road to EB US 50	Projected Peak Period Volume:	1200
Scenario:	2026 With Project - PM PEAK		
HOV Bypass (%):	14	Storage Length (m):	180
Metered Volume (veh/hr):	559	Storage Length (ft):	600
Metering Rate (veh/hr):	550	Storage Lanes:	1
Discharge Rate (veh/15 min):	133	Maximum Storage (veh):	20

Time Period	Estimated Arrival Distribution	Projected 15-Minute Volumes	Metered 15-Minute min flows	Excess Demand	Accumulated Vehicles	Total Delay (veh-hr)	Vehicles Delayed	Total Hourly Volume	Metered Hourly Volume
4:00-4:15	14%	162	139	7	7	1.71	139		
4:15-4:30	12%	139	120	0	0	0.00	0		
4:30-4:45	13%	155	133	1	1	0.20	133		
4:45-5:00	13%	160	138	5	6	1.48	138	616	530
5:00-5:15	13%	160	138	5	11	2.75	138	614	528
5:15-5:30	12%	145	125	0	3	0.80	125	620	533
5:30-5:45	12%	143	123	0	0	0.00	0	608	523
5:45-6:00	12%	138	119	0	0	0.00	0	586	504
<b>Total Delay (veh-hr):</b>			7						
<b>Total Vehicles Delayed (veh):</b>			673					<b>Maximum Queue (veh):</b>	11
<b>Average Delay (hr):</b>			0.01					<b>Maximum Queue (m):</b>	99
<b>Average Delay (min):</b>			0.62					<b>Maximum Queue (ft):</b>	325



**Appendix F**  
**Design Year (2026) With Improvements Conditions**

---

HGS2000: Ramps and Ramp Junctions Release 4.1c

Phone:  
E-mail:

Fax:

Analysis Merge

Analyst: AL  
Agency/Co.: Fehr & Peers Associates, Inc.  
Date performed: 07/31/2003  
Analysis time period: AM Peak Hour  
Freeway/dir or travel: US 50/Westbound  
Junction: Empire Ranch Road On-ramp (D)  
Jurisdiction:  
Analysis Year: 2026 With Project With Improvement Option 2  
Description: US 50/Empire Ranch Road Interchan

Data Freeway

Type of analysis Merge  
Number of lanes in freeway 2  
Free-flow speed on freeway 70.0 mph  
Volume on freeway 3790 vph

Data On Ramp

Side of freeway Right  
Number of lanes in ramp 1  
Free-flow speed on ramp 35.0 mph  
Volume on ramp 950 vph  
Length of first accel/decel lane 1500 ft  
Length of second accel/decel lane

Adjacent Ramp Data (if one exists)

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

Conditions Conversion to pc/h Under Base

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3790	950	vph
Peak-hour factor, PHF	0.90	0.90	
Peak 15-min volume, V15	1053	264	v
Trucks and buses	4	4	%
Recreational vehicles	0	0	%
Terrain type:	Grade	Grade	Level
Length	-6.00	-4.00	%
Trucks and buses PCE, ET	0.10	0.10	mi
Recreational vehicle PCE, ER	1.5	1.5	
Heavy vehicle adjustment, FHV	1.2	1.2	
Driver population factor, fp	0.980	0.980	
	1.00	1.00	

Flow rate, vp

4295

1077

pcph

Areas Estimation of V12 Merge

$L_{EQ} = 0.00$  (Equation 25-2 or 25-3)  
 $P_{FM} = 1.000$  Using Equation 0  
 $V_{12} = V_{FM} (P_{FM}) = 4295$  pc/h

Checks Capacity

V<sub>FO</sub> Actual 5372 Maximum 4800 LOS F? Yes  
V<sub>R12</sub> 5372 4600 Yes

Level of Service Determination (if not F)

Density,  $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 37.5$  pc/mi/ln

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

Estimation Speed

Intermediate speed variable,  $M = 1.056$   
Space mean speed in ramp influence area,  $S = 40.4$  mph  
Space mean speed in outer lanes,  $S_0 = N/A$  mph  
Space mean speed for all vehicles,  $S_0 = 40.4$  mph

HCS2000: Ramps and Ramp Junctions Release 4.1c

Phone:  
E-mail:

Fax:

Analysis Diverge

Analyst: AL  
Agency/Co.: Febr & Peers Associates, Inc.  
Date performed: 8/12/2003  
Analysis time period: AM Peak Hour  
Freeway/dir or travel: US 50 / Westbound  
Junction: Empire Ranch Rd. Off-ramp  
Jurisdiction:  
Analysis Year: 2026 With Project With Improvement Option 3  
Description: US 50/Empire Ranch Road Interchan

Data Freeway

Type of analysis  
Number of lanes in freeway  
Free-flow speed on freeway  
Volume on freeway

Diverge  
3  
70.0  
4420

Data Off Ramp

Side of freeway  
Number of lanes in ramp  
Free-Flow speed on ramp  
Volume on ramp  
Length of first accel/decel lane  
Length of second accel/decel lane

Right  
1  
35.0  
630  
140  
ft

Does adjacent ramp exist? Adjacent Ramp Data (if one exists)

Volume on adjacent ramp  
Position of adjacent ramp  
Type of adjacent ramp  
Distance to adjacent ramp

No  
vph  
ft

Conditions Conversion to pc/h Under Base

Junction Components  
Volume, V (vph)  
Peak-hour factor, PHF  
Peak 15-min volume, V15  
Trucks and buses  
Recreational vehicles  
Terrain type  
Grade  
Length  
Trucks and buses PCE, ET  
Recreational vehicle PCE, ER  
Heavy vehicle adjustment, HAV  
Driver population factor, EP

Freeway Ramp Adjacent Ramp  
4420 630  
0.90 0.90  
1228 175  
4 4  
0 0  
Rolling % Level %  
0.00 0.00  
0.00 mi 0.00 mi  
2.5 2.5  
2.0 2.0  
0.943 0.943  
1.00 1.00

Flow rate, vp

5206

742

pcph

Areas Estimation of V12 Diverge

$L = 0.00$  (Equation 25-8 or 25-9)  
 $PQ = 0.596$  Using Equation 5  
 $V = V + (V - V) P = 3401$  pc/h  
12 R F R PD

Checks Capacity

V = V  
F1 F  
V 12  
V = V - V  
FO F R  
V R

Actual Maximum  
5206 7200  
3401 4400  
4464 7200  
742 2000

LOS F?  
No  
No  
No  
No  
No

Level of Service Determination (if not F)

Density,  $D = 4.252 + 0.0086 V - 0.009 L = 32.2$  pc/mi/ln  
R 12 D  
Level of service for ramp-freeway junction areas of influence D

Estimation Speed

Intermediate speed variable,  $D = 0.495$   
Space mean speed in ramp influence area,  $S = 56$  mph  
Space mean speed in outer lanes,  $S = 73.7$  mph  
Space mean speed for all vehicles,  $S = 61.2$  mph

HCS2000: Ramps and Ramp Junctions Release 4.1c

Phone:  
E-mail:  
Fax:

Analysis: Merge

Analyst: AL  
Agency/Co.: Fehr & Peers Associates, Inc.  
Date performed: 07/31/2003  
Analysis time period: AM Peak Hour  
Freeway/dir or travel: US 50/Westbound  
Junction: Empire Ranch Road On-ramp (D)  
Jurisdiction:  
Analysis Year: 2026 With Project With Improvement Option 3  
Description: US 50/Empire Ranch Road Interchan

Data: Freeway

Type of analysis: Merge  
Number of lanes in freeway: 3  
Free-flow speed on freeway: 70.0 mph  
Volume on freeway: 3790 vph

Data: On Ramp

Side of freeway: Right  
Number of lanes in ramp: 1  
Free-flow speed on ramp: 35.0 mph  
Volume on ramp: 950 vph  
Length of first accel/decel lane: 590 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: ft  
Type of adjacent Ramp:  
Distance to adjacent Ramp:

Conditions: Conversion to pc/h Under Base

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3790	950	vph
Peak-hour factor, PHF	0.90	0.90	v
Peak 15-min volume, V15	1053	264	%
Trucks and buses	4	4	%
Recreational vehicles	0	0	%
Terrain type:	Grade	Grade	Level
Length	-6.00 %	-4.00 %	%
Trucks and buses PCB, BT	0.10 mi	0.10 mi	mi
Recreational vehicle PCB, ER	1.5	1.5	
Heavy vehicle adjustment, FHV	1.2	1.2	
Driver population factor, FP	0.980	0.980	
	1.00	1.00	

Flow rate, vp: 4295 1077 pcph

Areas: Estimation of V12 Merge

$L = 0.00$  (Equation 25-2 or 25-3)  
 $P_{EQ} = 0.594$  Using Equation 1  
 $V_{FM} = V(P) = 2551$  pc/h  
12 F FM

Checks: Capacity

	Actual	Maximum	LOS F?
V	5372	7200	No
V <sub>R12</sub>	3628	4600	No

Level of Service Determination (if not F)

Density, D =  $5.475 + 0.00734 V + 0.0078 V - 0.00627 L = 29.6$  pc/mi/ln

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

Estimation: Speed

Intermediate speed variable, M = 0.426  
Space mean speed in ramp influence area, S = 58.1 mph  
Space mean speed in outer lanes, S = 65.5 mph  
Space mean speed for all vehicles, S = 60.3 mph

HGS2000: Ramps and Ramp Junctions Release 4.1c

pcph

Phone:  
E-mail:

Fax:

Analysis: Diverge

Analyst: AL  
Agency/Co.: Fehr & Peers Associates, Inc.  
Date performed: 8/12/2003  
Analysis time period: AM Peak Hour  
Freeway/dir or travel: US 50 / Eastbound  
Junction: Empire Ranch Rd. Off-ramp  
Jurisdiction:  
Analysis Year: 2026 With Project With Improvement  
Description: US 50/Empire Ranch Road Interchan

Data: Freeway

Type of analysis Diverge  
Number of lanes in freeway 3  
Free-flow speed on freeway 70.0 mph  
Volume on freeway 3180 vph

Data: Off Ramp

Side of freeway Right  
Number of lanes in ramp 1  
Free-flow speed on ramp 35.0 mph  
Volume on ramp 280 vph  
Length of first accel/decel lane 300 ft  
Length of second accel/decel lane

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

Adjacent Ramp Data (if one exists)

Conditions: Conversion to pc/h Under Base

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3180	280	vph
Peak-hour factor, PHF	0.90	0.90	v
Peak 15-min volume, V15	883	78	%
Trucks and buses	4	4	%
Recreational vehicles	0	0	%
Terrain type:			
Grade	6.00	4.00	%
Length	0.30	0.10	mi
Trucks and buses PCE, ET	3.0	1.5	
Recreational vehicle PCE, ER	6.0	1.2	
Heavy vehicle adjustment, EHV	0.925	0.980	
Driver population factor, EP	1.00	1.00	

Flow rate, VP 3816 317

Areas: Estimation of V12 Diverge

$L = 0.00$  (Equation 25-8 or 25-9)  
 $PQ = 0.650$  Using Equation 5  
 $V = V + (V - V)P = 2591$  pc/h  
 $V_{12} = V_{12} + (V_{12} - V_{12})P$

Checks: Capacity

Actual	Maximum	LOS F?
3816	7200	No
2591	4400	No
3499	7200	No
317	2000	No

Level of Service Determination (if not F)

Density,  $D = 4.252 + 0.0086 V_{12} - 0.009 L_D = 23.8$  pc/mi/ln  
Level of service for ramp-freeway junction areas of influence C

Estimation: Speed

Intermediate speed variable,  $D = 0.457$   
Space mean speed in ramp influence area,  $S = 57$  mph  
Space mean speed in outer lanes,  $S = 75.9$  mph  
Space mean speed for all vehicles,  $S = 62.1$  mph

Queues

3: Iron Point Road & Empire Ranch Road

Design Year 2026 - Alternatives 1&2 Mitigation - AM

	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50						
Lane Group Flow (vph)	56	300	110	422	1300	258	244	600	133	500	1156	290																																						
Queue Length 95th (ft)	35	85	60	164	#350	0	m#113	167	m0	#218	392	88																																						
50th Up Block Time (%)												3%												17%																										
Turn Bay Length (ft)												300	300	500	200												250	300																						
95th Bay Block Time %												12%												3%												17%														

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

3: Iron Point Road & Empire Ranch Road

Design Year 2026 - Alternatives 1&2 Mitigation - AM

	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50						
Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT			
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		
sat	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	
Satd. Flow (prot)	3433	5085	1553	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085
Satd. Flow (perm)	3433	5085	1553	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	5085	1583	3367	
Volume (vph)	7	4	5	3	8	5	2	1	6	7	4	5	3	8	5	2	1	6	7	4	5	3	8	5	2	1	6	7	4	5	3	8	5	2	1	6	7	4	5	3	8	5	2	1	6	7	4	5		
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	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	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)	56	300	110	422	1300	258	244	600	133	500	1156	290																																						
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%	4%	2%	2%	4%	2%	4%	2%	2%	4%	2%	4%	2%	2%	4%	2%	4%	2%	4%	2%	2%	4%	2%	4%	2%	4%	2%	4%	2%	4%	2%	4%	2%	4%	2%	4%	2%	4%	2%	4%	2%	4%	2%		
Protected Phases	7	4	5	3	8	5	2	1	6	7	4	5	3	8	5	2	1	6	7	4	5	3	8	5	2	1	6	7	4	5	3	8	5	2	1	6	7	4	5	3	8	5	2	1	6	7	4	5		
Actuated Green, G (s)	5.0	10.4	18.4	19.6	25.0	90.0	8.0	28.0	90.0	16.0	96.0	41.0																																						
Effective Green Ratio	0.06	0.12	0.20	0.22	0.28	1.00	0.09	0.31	1.00	0.18	0.40	0.46																																						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0																																						
v/s Ratio Prot	0.02	0.06	0.03	0.13	0.26	0.07	0.17	0.15	0.33	0.02	0.03	0.02																																						
v/c Ratio	0.29	0.51	0.35	0.58	0.92	0.16	0.82	0.56	0.09	0.82	0.83	0.40																																						
Progression Delay (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.76	0.55	1.00	1.00	1.00																																						
Delay (s)	41.7	38.2	31.3	32.6	41.5	0.2	44.4	16.1	0.1	44.1	30.3	16.7																																						
Approach Delay (s)	37.0											34.2	21.0											31.8																										
Approach Sat	1.00											1.00	1.00											1.00																										
ICU Level of Service	E											E	E											D																										
ICU Volume to Capacity ratio	0.82												0.82																																					
Intersection Capacity Utilization	80.7%												80.7%																																					

Queues  
3: Iron Point Road & Empire Ranch Road

HCM Signalized Intersection Capacity Analysis  
3: Iron Point Road & Empire Ranch Road

Empire Ranch Interchange  
Design Year 2026 - Alternatives 1&2 Mitigation - PM

Lane Group Flow (vph)	267	1189	356	322	56	522	53	1167	400	367	700	89
Queue Length 95th (ft)	114	#337	274	#178	20	0	m14	#461	m0	#195	193	38
50th Up Block Time (%)	300	300	300	300	500	200	250	300	200	200	200	200
95th Up Block Time %	9%	1%	43%									

Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Fr	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85
Satd. Flow (prot)	3433	5085	1553	3367	5085	1583	3367	5085	1583	3367	5085	1583
Satd. Flow (perm)	3433	5085	1553	3367	5085	1583	3367	5085	1583	3367	5085	1583
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
Lane Group Flow (vph)	267	1189	356	322	56	522	53	1167	400	367	700	89
Turn Type	Prot	pm+ov	Prot	pm+ov	Prot	Free	Prot	Free	Prot	Free	Prot	pm+ov
Permitted Phases	4											
Effective Green, g (s)	21.2	23.6	27.6	9.0	11.4	90.0	4.0	31.4	90.0	10.0	37.4	58.6
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	809	1333	545	337	644	1583	150	1211	1553	381	1442	1101
v/s Ratio Perm	0.20	0.20	0.33			0.33			0.26			0.04
Uniform Delay, d1	28.5	32.0	27.1	40.3	34.7	0.0	41.5	28.7	0.0	39.8	19.3	5.8
Incremental Delay, d2	0.2	7.9	2.8	37.0	0.1	0.6	0.6	15.5	0.3	36.3	1.2	0.0
Level of Service	C	D	C	E	C	A	D	D	A	D	A	E
Approach LOS	D C C C C C C C C C C C											

HCM Average Control Delay	34.2	HCM Level of Service	C
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
c Critical Lane Group			

Queues  
 3: Iron Point Road & Empire Ranch Road

Design Year 2026 - Alternatives 3&4 Mitigation - AM

HCM Signalized Intersection Capacity Analysis  
 3: Iron Point Road & Empire Ranch Road

Design Year 2026 - Alternatives 3&4 Mitigation - AM

Lane Group Flow (vph)	56	300	110	422	1300	258	244	600	133	500	1156	290
Queue Length 95th (ft)	35	81	60	#191	#350	0	m#127	100	m0	#218	392	114
50th Up Block Time (%)												
Turn Bay Length (ft)	300	300	300	500	200	500	200	250	300	300	200	200
95th Bay Block Time %				12%								17%

Lane Configurations	→	→	→	←	←	←	←	←	←	←	←	←
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Fit	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Satd. Flow (prot)	3433	5085	1553	3367	5085	1583	3367	3471	1553	3433	3471	1553
Satd. Flow (perm)	3433	5085	1553	3367	5085	1583	3367	3471	1553	3433	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)	56	300	110	422	1300	258	244	600	133	500	1156	290
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%	4%	4%	4%	2%	4%	2%
Protected Phases	7	4	4	5	3	8	5	2	2	6	1	6
Actuated Green, G (s)	5.0	16.3	24.3	13.7	25.0	80.0	8.0	28.0	80.0	16.0	36.0	41.0
Actuated C/R Ratio	0.06	0.18	0.27	0.15	0.28	1.00	0.08	0.31	1.00	0.18	0.40	0.46
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
v/s Ratio Prot	0.02	0.06	0.07	0.13	0.26	0.07	0.17	0.07	0.15	0.15	0.33	0.02
v/s Ratio	0.29	0.33	0.26	0.82	0.92	0.16	0.82	0.56	0.09	0.82	0.83	0.40
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.34	1.00	1.00	1.00
Delay (s)	41.7	32.3	26.1	47.2	41.5	0.2	53.2	10.4	0.1	44.1	30.3	16.7
Approach Delay (s)	32.0		37.4		19.7					31.8		
HCM Volume to Capacity Ratio			0.82									
Intersection Capacity Utilization			80.7%									
ICU Level of Service			D									



Queues  
 3: Iron Point Road & Empire Ranch Road

Design Year 2026 - Alternatives 384 Mitigation - PM

Empire Ranch Interchange  
 Alternatives 384 Mitigation - PM

Lane Group Flow (vph)	267	1189	356	322	56	522	33	1167	400	367	700	89
Queue Length 95th (ft)	137	385	329	#196	23	0	m13	m367	m0	#219	223	45
50th Up Block Time (%)	15% 11%											
Turn Bay Length (ft)	300	300	300	300	500	200	200	250	300	200	200	200
95th Bay Block Time (%)	20%											
Queue shown is maximum after two cycles.												

HCM Signalized Intersection Capacity Analysis  
 3: Iron Point Road & Empire Ranch Road

Design Year 2026 - Alternatives 384 Mitigation - PM

Empire Ranch Interchange  
 Alternatives 384 Mitigation - PM

Lane Configurations	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Flow (vph)	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Satd. Flow (prot)	3433	5085	1553	3367	5085	1583	3367	3471	1553	3433	3471	1583
Satd. Flow (perm)	3433	5085	1553	3367	5085	1583	3367	3471	1553	3433	3471	1583
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
Lane Group Flow (vph)	267	1189	356	322	56	522	33	1167	400	367	700	89
Turn Type	Prot	Prot	pl+ov	Prot	Prot	Free	Prot	Free	Prot	Free	Prot	pl+ov
Permitted Phases	Free											
Effective Green, g (s)	19.6	28.8	36.8	12.0	21.2	110.0	4.0	40.2	110.0	13.0	49.2	68.8
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	612	1331	520	367	980	1583	122	1268	1553	406	1552	1048
v/s Ratio Perm	0.33											
Uniform Delay, d1	40.3	39.1	31.6	48.3	36.2	0.0	51.6	33.4	0.0	47.9	21.0	8.1
Incremental Delay, d2	0.5	8.0	3.7	20.3	0.0	0.6	0.6	6.5	0.2	22.9	0.9	0.0
Level of Service	D	D	D	E	D	A	E	C	A	E	C	A
Approach LOS	D C C C C C C C C C C C											
HCM Average Control Delay	32.7											
HCM Level of Service	C											
Actuated Cycle Length (s)	110.0											
Sum of lost time (s)	16.0											
Critical Lane Group	c											

*Right of Way Data Sheet /  
Utility Information Sheet*

---

**Attachment G**

## RIGHT OF WAY DATA SHEET

**To: Mr. Clark Peri**  
 Project Manager, Special Funded Projects  
 Department of Transportation, District 3

Date: January 27, 2006  
 03-Sac/ED-50  
 EA 1C9500  
 Proj. Desc.: Route 50/Empire  
 Ranch Road Interchange

***Subject: Right of Way Data Sheet – Project Element 1 (Interchange), Alternative 1***

Limiting Conditions and Assumptions: Partial acquisition from four parcels will be required to construct this project. Two parcels on the north side of Route 50 are owned by a development interest that is cooperating with the City for construction of this interchange. A portion of these parcels are subject to an irrevocable offer of dedication. The necessary right of way on these parcels outside of the IOD's will be dedicated by the development interest. The right of way on the south side of Route 50, which consists of grazing land, will need to be acquired for the interchange.

Property owners were contracted for the purposes of obtaining a right of entry for environmental field studies. The estimator determined the use of the subject parcels solely by observation of the subject parcels.

1. Right of Way Cost Estimate:  
 Contingency at 25%

	<u>Current Value</u> <u>(Future Use)</u>	<u>Escalation</u> <u>Rate/Year</u>	<u>Escalated</u> <u>Values</u>
Acquisition (including excess lands, damages, goodwill and easement acquisition)	\$ 6,766,800	5%	\$ 7,460,400
Utility Relocation (Project Cost)	\$ 29,000	5%	\$ 32,000
Clearance and/or Demolition	0	N/A	0
Relocation Assistance (RAP)	0	N/A	0
Environmental Mitigation	0	N/A	0
Title & Escrow Fees	\$ 4,000	N/A	\$ 4,000
Hazardous Waste Clean-up	0	N/A	0
 Total R/W Costs (Current Value)	 \$ 6,799,800		 SAY \$ 6,800,000
 Total R/W Costs (Escalated to 2008)			 \$ 7,496,400
			Say \$ 7,496,000
Construction Contract Work (unescaled)	\$ 0		

2. Anticipated Year of Right of Way Certification: January 2008

Parcel Data:

Type	Dual Appr.	Utilities	RR Involvement
X <u>      </u>		None	None <u>  X  </u>
A <u>  2  </u>		U4-1 <u>      </u>	C&M Agrmt
B <u>  2  </u>	B <u>      </u>	U4-2 <u>      </u>	Svc Contract
C <u>      </u>	C <u>      </u>	U4-3 <u>  2  </u>	Lic/RE/Clauses
D <u>      </u>	D <u>      </u>	U4-4 <u>      </u>	
		U5-7 <u>      </u>	Misc R/W Work
Total 4		U5-8 <u>      </u>	None <u>  X  </u>
		U5-9 <u>  2  </u>	RAP Displ
			Const. Perm.
			Condemnation <u>      </u>

Areas: R/W 9.48 HA (23.4 Ac) No. Excess Pcls   0   Excess   0   Easements   0  .

3. Are there any items of construction contract work?  
Yes   No   (If yes, explain)
4. Provide a general description of the right of way and excess land required (zoning, use major improvements, critical or sensitive parcels, etc.).

*The right of way acquisition from the south side of Route 50 is vacant land zoned for grazing purposes and would accommodate the interchange eastbound on and off ramps. The right of way acquisition on the north side of Route 50 was planned for as part of the master plan for the Empire Ranch development.*

5. Is there an effect on assessed valuation?  
Yes   Not Significant   No (If yes, explain)
6. Are utility facilities or rights of way affected?  
  Yes   No (If yes, attach Utility Information Sheet)
7. Are railroad facilities or rights of way affected?  
Yes   No   (If yes, attach Railroad Information Sheet)
8. Were any previously unidentified sites with hazardous waste and/or material found?  
Yes   None Evident    
(If yes, attach memorandum per Procedural Handbook Volume 1, Section 101.011)
10. Are RAP displacements required? Yes   No    
(If yes, provide the following information)  

No. of single family <u>      </u>	No. of business/nonprofit <u>      </u>
No. of multi-family <u>      </u>	No. of farms <u>      </u>

11. Are there material sites (imported borrow) and/or disposal sites required?  
Yes No (If yes, explain)
12. Are there potential relinquishments and/or vacations (abandonments)?  
Yes No (If yes, explain)
13. Are there any existing and/or potential Airspace sites?  
Yes No (If yes, explain)
14. Are there off-site environmental mitigation sites required?  
Yes No (If yes, explain)
15. Are there off-site park & ride sites required?  
Yes No (If yes, explain)
16. Indicate the anticipated Right of Way schedule and lead time requirements.  
(Discuss if District proposes less time than PMCS lead time and/or if significant pressures for project advancement are anticipated.)

*Right of Way lead time is calculated at 16 months after environmental clearance to Right of Way Certification. All utility relocations are expected to be performed prior to or during construction.*

17. Is it anticipated that any Right of Way work would be performed by Caltrans staff?  
Yes No (If no, discuss)

*The City of Folsom will be the lead agency for right of way acquisition, with Caltrans providing oversight.*

Evaluation prepared by:

Signed David E. Melis 01-31-06  
Name: David E. Melis, Mark Thomas & Co. Inc. Date

I have personally reviewed this Right of Way Data Sheet. It is my opinion that the probable Highest and Best Use, estimated values, escalation rates, and assumptions are reasonable and proper, subject to the limiting conditions set forth, and find this Data Sheet to be complete.

---

LINDY K. LEE Date  
Chief, North Region Right of Way

**RIGHT OF WAY DATA SHEET**

**To: Mr. Clark Peri**  
 Project Manager, Special Funded Projects  
 Department of Transportation, District 3

Date: January 27, 2006  
 03-Sac/ED-50  
 EA 1C9500  
 Proj. Desc.: Route 50/Empire  
 Ranch Road Interchange

**Subject: Right of Way Data Sheet – Project Element 2 (Auxiliary Lanes), Alternative 2**

Limiting Conditions and Assumptions: Partial acquisition from seven parcels will be required to construct the auxiliary lanes by widening to the outside of the existing lanes of Route 50 between the proposed Empire Ranch Road interchange in the City of Folsom and the existing interchange at El Dorado Hills Blvd/Latrobe Road in El Dorado County.

Right of way acquisition will consist of sliver takes adjacent to the existing right of way on either side of Route 50.

Property owners were contracted for the purposes of obtaining a right of entry for environmental field studies. The estimator determined the use of the subject parcels solely by observation of the subject parcels.

1. Right of Way Cost Estimate:  
 Contingency at 25%

	<u>Current Value</u> <u>(Future Use)</u>	<u>Escalation</u> <u>Rate/Year</u>	<u>Escalated</u> <u>Values</u>
Acquisition (including excess lands, damages, goodwill and easement acquisition)	\$ 549,600	5%	\$ 606,000
Utility Relocation (Project Cost)	\$ 146,000	5%	\$ 161,000
Clearance and/or Demolition	0	N/A	0
Relocation Assistance (RAP)	0	N/A	0
Environmental Mitigation	0	N/A	0
Title & Escrow Fees	\$ 7,000	N/A	\$ 7,000
Hazardous Waste Clean-up	0	N/A	0
<b>Total R/W Costs (Current Value)</b>	<b>\$ 702,600</b>		<b>SAY \$ 703,000</b>
<b>Total R/W Costs (Escalated to 2008)</b>			<b>\$ 774,000</b>
			<b>Say \$ 774,000</b>
Construction Contract Work (unescalated)	\$ 0		

2. Anticipated Year of Right of Way Certification: January 2008

Parcel Data:

Type	Dual Appr.	Utilities	RR Involvement
X <u>      </u>		None	None <u>  X  </u>
A <u>      </u>		U4-1 <u>      </u>	C&M Agrmt
B <u>  7  </u>	B <u>      </u>	U4-2 <u>      </u>	Svc Contract
C <u>      </u>	C <u>      </u>	U4-3 <u>  2  </u>	Lic/RE/Clauses
D <u>      </u>	D <u>      </u>	U4-4 <u>      </u>	
		U5-7 <u>      </u>	Misc R/W Work
Total 7		U5-8 <u>      </u>	None <u>  X  </u>
		U5-9 <u>  2  </u>	RAP Displ
			Const. Perm.
			Condemnation <u>      </u>

Areas: R/W 3.40 HA (8.4 Ac) No. Excess Pcls   0   Excess   0   Easements   0  

3. Are there any items of construction contract work?

Yes   No   (If yes, explain)

4. Provide a general description of the right of way and excess land required (zoning, use major improvements, critical or sensitive parcels, etc.).

*The right of way acquisition from either side of Route 50 is vacant land adjacent to the existing highway right of way.*

5. Is there an effect on assessed valuation?

Yes   Not Significant   No (If yes, explain)

6. Are utility facilities or rights of way affected?

  Yes   No (If yes, attach Utility Information Sheet)

7. Are railroad facilities or rights of way affected?

Yes   No   (If yes, attach Railroad Information Sheet)

8. Were any previously unidentified sites with hazardous waste and/or material found?

Yes   None Evident  

(If yes, attach memorandum per Procedural Handbook Volume 1, Section 101.011)

10. Are RAP displacements required? Yes   No  

(If yes, provide the following information)

No. of single family        No. of business/nonprofit       

No. of multi-family        No. of farms       

11. Are there material sites (imported borrow) and/or disposal sites required?

Yes   No   (If yes, explain)

12. Are there potential relinquishments and/or vacations (abandonments)?  
Yes No (If yes, explain)
13. Are there any existing and/or potential Airspace sites?  
Yes No (If yes, explain)
14. Are there off-site environmental mitigation sites required?  
Yes No (If yes, explain)
15. Are there off-site park & ride sites required?  
Yes No (If yes, explain)
16. Indicate the anticipated Right of Way schedule and lead time requirements.  
(Discuss if District proposes less time than PMCS lead time and/or if significant pressures for project advancement are anticipated.)

*Right of Way lead time is calculated at 16 months after environmental clearance to Right of Way Certification. All utility relocations are expected to be performed prior to or during construction.*

17. Is it anticipated that any Right of Way work would be performed by Caltrans staff?  
Yes No (If no, discuss)

*The City of Folsom will be the lead agency for right of way acquisition, with Caltrans providing oversight. The City will need to enter into a memorandum of understanding with El Dorado County for the acquisition of right of way within El Dorado County.*

Evaluation prepared by:

Signed David E. Melis 01-31-06  
Name: David E. Melis, Mark Thomas & Co. Inc. Date

I have personally reviewed this Right of Way Data Sheet. It is my opinion that the probable Highest and Best Use, estimated values, escalation rates, and assumptions are reasonable and proper, subject to the limiting conditions set forth, and find this Data Sheet to be complete.

LINDY K. LEE  
Chief, North Region Right of Way

Date



## Utility Information

Date: January 30, 2006

03-Sac-50 KP 36.1/37.2

03-ED-50 KP 0/3.1

EA 1C9500

Empire Ranch Road/Route 50 Interchange Draft Project Report

*Viabile Alternatives for Project Element 1 (Empire Ranch Road Interchange) and Project Element 2 (Auxiliary Lanes between Empire Ranch Road and El Dorado Hills Blvd).*

### Introduction

The project proposes to construct a new interchange on Route 50 between East Bidwell/Scott Road in Folsom and El Dorado Hills Blvd/Latrobe Road in El Dorado County. The project will also construct auxiliary lanes between the new interchange and the existing interchange at El Dorado Hills Blvd by widening to the outside of the existing lanes of Route 50.

### Utilities within the project area

In general, the existing overhead poles along the south side of Route 50 will be impacted by the widening of eastbound Route 50 for the construction of the auxiliary lane. The construction of the interchange on Route 50 at Empire Ranch Road will also impact a number of overhead utility poles.

### Impacts to existing utilities

Based on preliminary research, it appears the only utilities impacted by the proposed improvements are the existing utility poles within the state right of way on the south side of the freeway between the truck climbing lane and El Dorado Hills Blvd. It is estimated that 23 poles will be relocated as part of the proposed project (the interchange and the eastbound auxiliary lane). Attached is the *Utility Information Sheet* for the proposed project.

### Costs for relocation

Costs were determined based on other similar projects and conversations with Tadj Ratajczak of Caltrans District 3. The project cost for utility relocations within the state right of way will be 50% of the relocation costs, based on the Master Agreement.

Unit costs for utility relocations are as follows:

- \$9,000 each for telephone or electrical only pole relocations.
- \$13,500 each for telephone and electrical pole relocations.

Estimated Costs = 8 x \$9,000 = \$72,000

Estimated Costs = 15 x \$13,500 = \$202,500

Project Costs = 50% x (\$72,000 + \$202,500) = \$137,250

Contingency (25%) = \$34,312

Grand Total = \$171,562

**SAY \$175,000**

A 5% escalation rate has been assumed.

# UTILITY INFORMATION SHEET

Date: January 30, 2006

03-Sac-50 KP 36.1/37.2

03-ED-50 KP 0.0/3.1

EA 1C9500

Empire Ranch Road/Route 50 Interchange –  
Draft Project Report

*Viable Alternatives for Project Element 1  
(Empire Ranch Road Interchange) and Project  
Element 2 (Auxiliary Lanes btwn Empire Ranch  
Road and El Dorado Hills Blvd)*

1. Utility Relocation (Project Cost): \$175,000

Escalation Rate: 5%

2. Utility involvement:

U 4-1	_____	U 5-7	_____
-2	_____	-8	_____
-3	<u>  2  </u>	-9	<u>  2  </u>
-4	_____		

Involvement = PG&E electric  
SBC telephone

3. Name of utility companies involved in project:

Pacific Gas & Electric (PG&E)  
SBC (Formerly Pacific Bell Telephone)

4. Type of facilities and agreements required:

Electric: Notice & Agreement possible  
Telephone: Notice & Agreement possible

Pole relocations due to improvement conflicts are as follows:

- 5 poles at proposed Empire Ranch Road interchange (PG&E)
- 3 poles at proposed eastbound auxiliary lane.  
(SBC)
- 15 joint poles at proposed eastbound auxiliary lane. (PG&E, SBC)

5. Additional information concerning utility involvements on this project:

Assume that poles are within state right of way and that the project share for relocation costs will be 50%.

PREPARED BY:

David E. Melis 01-30-06  
(Signature)

Name: David E. Melis

Date: 01/30/06

Organization: Mark Thomas & Company, Inc.

## RIGHT OF WAY DATA SHEET

**To: Mr. Clark Peri**  
 Project Manager, Special Funded Projects  
 Department of Transportation, District 3

Date: January 27, 2006  
 03-Sac/ED-50  
 EA 1C9500  
 Proj. Desc.: Route 50/Empire  
 Ranch Road Interchange

**Subject: Right of Way Data Sheet – Project Element 1 (Interchange), Alternative 2**

Limiting Conditions and Assumptions: Partial acquisition from four parcels will be required to construct this project. Two parcels on the north side of Route 50 are owned by a development interest that is cooperating with the City for construction of this interchange. A portion of these parcels are subject to an irrevocable offer of dedication. The necessary right of way on these parcels outside of the IOD's will be dedicated by the development interest. The right of way on the south side of Route 50, which consists of grazing land, will need to be acquired for the interchange.

Property owners were contracted for the purposes of obtaining a right of entry for environmental field studies. The estimator determined the use of the subject parcels solely by observation of the subject parcels.

1. Right of Way Cost Estimate:  
 Contingency at 25%

	<u>Current Value</u> <u>(Future Use)</u>	<u>Escalation</u> <u>Rate/Year</u>	<u>Escalated</u> <u>Values</u>
Acquisition (including excess lands, damages, goodwill and easement acquisition)	\$ 6,910,800	5%	\$ 7,619,200
Utility Relocation (Project Cost)	\$ 29,000	5%	\$ 32,000
Clearance and/or Demolition	0	N/A	0
Relocation Assistance (RAP)	0	N/A	0
Environmental Mitigation	0	N/A	0
Title & Escrow Fees	\$ 4,000	N/A	\$ 4,000
Hazardous Waste Clean-up	0	N/A	0
<b>Total R/W Costs (Current Value)</b>	<b>\$ 6,943,800</b>		<b>SAY \$ 6,944,000</b>
<b>Total R/W Costs (Escalated to 2008)</b>			<b>\$ 7,655,200</b>
			<b>Say \$ 7,655,000</b>
Construction Contract Work (unescalated)	\$ 0		

2. Anticipated Year of Right of Way Certification: January 2008

Parcel Data:

Type	Dual Appr.	Utilities	RR Involvement
X <u>    </u>		None	None <u>  X  </u>
A <u>  2  </u>		U4-1 <u>    </u>	C&M Agrmt
B <u>  2  </u>	B <u>    </u>	U4-2 <u>    </u>	Svc Contract
C <u>    </u>	C <u>    </u>	U4-3 <u>  2  </u>	Lic/RE/Clauses
D <u>    </u>	D <u>    </u>	U4-4 <u>    </u>	
		U5-7 <u>    </u>	Misc R/W Work
Total 4		U5-8 <u>    </u>	None <u>  X  </u>
		U5-9 <u>  2  </u>	RAP Displ
			Const. Perm.
			Condemnation <u>    </u>

Areas: R/W 10.64 HA (26.3 Ac) No. Excess Pcls   0   Excess   0   Easements   0  

3. Are there any items of construction contract work?  
Yes   No   (If yes, explain)
4. Provide a general description of the right of way and excess land required (zoning, use major improvements, critical or sensitive parcels, etc.).

*The right of way acquisition from the south side of Route 50 is vacant land zoned for grazing purposes and would accommodate the interchange eastbound on and off ramps. The right of way acquisition on the north side of Route 50 was planned for as part of the master plan for the Empire Ranch development.*

5. Is there an effect on assessed valuation?  
Yes   Not Significant   No (If yes, explain)
6. Are utility facilities or rights of way affected?  
  Yes   No (If yes, attach Utility Information Sheet)
7. Are railroad facilities or rights of way affected?  
Yes   No   (If yes, attach Railroad Information Sheet)
8. Were any previously unidentified sites with hazardous waste and/or material found?  
Yes   None Evident    
(If yes, attach memorandum per Procedural Handbook Volume 1, Section 101.011)
10. Are RAP displacements required? Yes   No    
(If yes, provide the following information)  

No. of single family <u>    </u>	No. of business/nonprofit <u>    </u>
No. of multi-family <u>    </u>	No. of farms <u>    </u>

11. Are there material sites (imported borrow) and/or disposal sites required?  
Yes No (If yes, explain)
12. Are there potential relinquishments and/or vacations (abandonments)?  
Yes No (If yes, explain)
13. Are there any existing and/or potential Airspace sites?  
Yes No (If yes, explain)
14. Are there off-site environmental mitigation sites required?  
Yes No (If yes, explain)
15. Are there off-site park & ride sites required?  
Yes No (If yes, explain)
16. Indicate the anticipated Right of Way schedule and lead time requirements.  
(Discuss if District proposes less time than PMCS lead time and/or if significant pressures for project advancement are anticipated.)

*Right of Way lead time is calculated at 16 months after environmental clearance to Right of Way Certification. All utility relocations are expected to be performed prior to or during construction.*

17. Is it anticipated that any Right of Way work would be performed by Caltrans staff?  
Yes No (If no, discuss)

*The City of Folsom will be the lead agency for right of way acquisition, with Caltrans providing oversight.*

Evaluation prepared by:

Signed

*David E. Melis*

*01-31-06*

Name: David E. Melis, Mark Thomas & Co. Inc.

Date

I have personally reviewed this Right of Way Data Sheet. It is my opinion that the probable Highest and Best Use, estimated values, escalation rates, and assumptions are reasonable and proper, subject to the limiting conditions set forth, and find this Data Sheet to be complete.

---

LINDY K. LEE

Date

Chief, North Region Right of Way

## RIGHT OF WAY DATA SHEET

**To: Mr. Clark Peri**  
 Project Manager, Special Funded Projects  
 Department of Transportation, District 3

Date: January 27, 2006  
 03-Sac/ED-50  
 EA 1C9500  
 Proj. Desc.: Route 50/Empire  
 Ranch Road Interchange

**Subject: Right of Way Data Sheet – Project Element 1 (Interchange), Alternative 3**

Limiting Conditions and Assumptions: Partial acquisition from four parcels will be required to construct this project. Two parcels on the north side of Route 50 are owned by a development interest that is cooperating with the City for construction of this interchange. A portion of these parcels are subject to an irrevocable offer of dedication. The necessary right of way on these parcels outside of the IOD's will be dedicated by the development interest. The right of way on the south side of Route 50, which consists of grazing land, will need to be acquired for the interchange.

Property owners were contracted for the purposes of obtaining a right of entry for environmental field studies. The estimator determined the use of the subject parcels solely by observation of the subject parcels.

1. Right of Way Cost Estimate:  
 Contingency at 25%

	<u>Current Value</u> <u>(Future Use)</u>	<u>Escalation</u> <u>Rate/Year</u>	<u>Escalated</u> <u>Values</u>
Acquisition (including excess lands, damages, goodwill and easement acquisition)	\$ 6,910,800	5%	\$ 7,619,200
Utility Relocation (Project Cost)	\$ 29,000	5%	\$ 32,000
Clearance and/or Demolition	0	N/A	0
Relocation Assistance (RAP)	0	N/A	0
Environmental Mitigation	0	N/A	0
Title & Escrow Fees	\$ 4,000	N/A	\$ 4,000
Hazardous Waste Clean-up	0	N/A	0
<b>Total R/W Costs (Current Value)</b>	<b>\$ 6,943,800</b>		<b>SAY \$ 6,944,000</b>
<b>Total R/W Costs (Escalated to 2008)</b>			<b>\$ 7,655,200</b>
			<b>Say \$ 7,655,000</b>
Construction Contract Work (unescalated)	\$ 0		

2. Anticipated Year of Right of Way Certification: January 2008



Parcel Data:

Type	Dual Appr.	Utilities	RR Involvement
X _____		None	None <u>X</u>
A <u>2</u>		U4-1 _____	C&M Agrmt _____
B <u>2</u>	B _____	U4-2 _____	Svc Contract _____
C _____	C _____	U4-3 <u>2</u>	Lic/RE/Clauses _____
D _____	D _____	U4-4 _____	
		U5-7 _____	Misc R/W Work
Total 4		U5-8 _____	None <u>X</u>
		U5-9 <u>2</u>	RAP Displ _____
			Const. Perm. _____
			Condemnation _____

Areas: R/W 10.64 HA (26.3 Ac) No. Excess Pcls 0 Excess 0 Easements 0

3. Are there any items of construction contract work?  
Yes No (If yes, explain)
4. Provide a general description of the right of way and excess land required (zoning, use major improvements, critical or sensitive parcels, etc.).

*The right of way acquisition from the south side of Route 50 is vacant land zoned for grazing purposes and would accommodate the interchange eastbound on and off ramps. The right of way acquisition on the north side of Route 50 was planned for as part of the master plan for the Empire Ranch development.*

5. Is there an effect on assessed valuation?  
Yes Not Significant No (If yes, explain)
6. Are utility facilities or rights of way affected?  
Yes No (If yes, attach Utility Information Sheet)
7. Are railroad facilities or rights of way affected?  
Yes No (If yes, attach Railroad Information Sheet)
8. Were any previously unidentified sites with hazardous waste and/or material found?  
Yes None Evident  
(If yes, attach memorandum per Procedural Handbook Volume 1, Section 101.011)
10. Are RAP displacements required? Yes No  
(If yes, provide the following information)  

No. of single family _____	No. of business/nonprofit _____
No. of multi-family _____	No. of farms _____

11. Are there material sites (imported borrow) and/or disposal sites required?  
Yes No (If yes, explain)
12. Are there potential relinquishments and/or vacations (abandonments)?  
Yes No (If yes, explain)
13. Are there any existing and/or potential Airspace sites?  
Yes No (If yes, explain)
14. Are there off-site environmental mitigation sites required?  
Yes No (If yes, explain)
15. Are there off-site park & ride sites required?  
Yes No (If yes, explain)
16. Indicate the anticipated Right of Way schedule and lead time requirements.  
(Discuss if District proposes less time than PMCS lead time and/or if significant pressures for project advancement are anticipated.)

*Right of Way lead time is calculated at 16 months after environmental clearance to Right of Way Certification. All utility relocations are expected to be performed prior to or during construction.*

17. Is it anticipated that any Right of Way work would be performed by Caltrans staff?  
Yes No (If no, discuss)

*The City of Folsom will be the lead agency for right of way acquisition, with Caltrans providing oversight.*

Evaluation prepared by:

Signed David E. Melis 01-31-06  
Name: David E. Melis, Mark Thomas & Co. Inc. Date

I have personally reviewed this Right of Way Data Sheet. It is my opinion that the probable Highest and Best Use, estimated values, escalation rates, and assumptions are reasonable and proper, subject to the limiting conditions set forth, and find this Data Sheet to be complete.

---

LINDY K. LEE Date  
Chief, North Region Right of Way

## RIGHT OF WAY DATA SHEET

**To: Mr. Clark Peri**  
 Project Manager, Special Funded Projects  
 Department of Transportation, District 3

Date: January 27, 2006  
 03-Sac/ED-50  
 EA 1C9500  
 Proj. Desc.: Route 50/Empire  
 Ranch Road Interchange

**Subject: Right of Way Data Sheet – Project Element 1 (Interchange), Alternative 4**

Limiting Conditions and Assumptions: Partial acquisition from four parcels will be required to construct this project. Two parcels on the north side of Route 50 are owned by a development interest that is cooperating with the City for construction of this interchange. A portion of these parcels are subject to an irrevocable offer of dedication. The necessary right of way on these parcels outside of the IOD's will be dedicated by the development interest. The right of way on the south side of Route 50, which consists of grazing land, will need to be acquired for the interchange.

Property owners were contracted for the purposes of obtaining a right of entry for environmental field studies. The estimator determined the use of the subject parcels solely by observation of the subject parcels.

1. Right of Way Cost Estimate:  
 Contingency at 25%

	<u>Current Value</u> <u>(Future Use)</u>	<u>Escalation</u> <u>Rate/Year</u>	<u>Escalated</u> <u>Values</u>
Acquisition (including excess lands, damages, goodwill and easement acquisition)	\$ 6,766,800	5%	\$ 7,460,400
Utility Relocation (Project Cost)	\$ 29,000	5%	\$ 32,000
Clearance and/or Demolition	0	N/A	0
Relocation Assistance (RAP)	0	N/A	0
Environmental Mitigation	0	N/A	0
Title & Escrow Fees	\$ 4,000	N/A	\$ 4,000
Hazardous Waste Clean-up	0	N/A	0
<b>Total R/W Costs (Current Value)</b>	<b>\$ 6,799,800</b>	<b>SAY \$ 6,800,000</b>	
<b>Total R/W Costs (Escalated to 2008)</b>			<b>\$ 7,496,400</b>
		Say	<b>\$ 7,496,000</b>
Construction Contract Work (unescalated)	\$ 0		

2. Anticipated Year of Right of Way Certification: January 2008

Attachment G

Parcel Data:

Type	Dual Appr.	Utilities	RR Involvement
X _____		None	None <u>X</u>
A <u>2</u>		U4-1 _____	C&M Agrmt
B <u>2</u>	B _____	U4-2 _____	Svc Contract
C _____	C _____	U4-3 <u>2</u>	Lic/RE/Clauses
D _____	D _____	U4-4 _____	
		U5-7 _____	Misc R/W Work
Total 4		U5-8 _____	None <u>X</u>
		U5-9 <u>2</u>	RAP Displ
			Const. Perm.
			Condemnation _____

Areas: R/W 9.48 HA (23.4 Ac) No. Excess Pcls 0 Excess 0 Easements 0

3. Are there any items of construction contract work?  
Yes No (If yes, explain)
4. Provide a general description of the right of way and excess land required (zoning, use major improvements, critical or sensitive parcels, etc.).

*The right of way acquisition from the south side of Route 50 is vacant land zoned for grazing purposes and would accommodate the interchange eastbound on and off ramps. The right of way acquisition on the north side of Route 50 was planned for as part of the master plan for the Empire Ranch development.*

5. Is there an effect on assessed valuation?  
Yes Not Significant No (If yes, explain)
6. Are utility facilities or rights of way affected?  
Yes No (If yes, attach Utility Information Sheet)
7. Are railroad facilities or rights of way affected?  
Yes No (If yes, attach Railroad Information Sheet)
8. Were any previously unidentified sites with hazardous waste and/or material found?  
Yes None Evident  
(If yes, attach memorandum per Procedural Handbook Volume 1, Section 101.011)
10. Are RAP displacements required? Yes No  
(If yes, provide the following information)  

No. of single family _____	No. of business/nonprofit _____
No. of multi-family _____	No. of farms _____

11. Are there material sites (imported borrow) and/or disposal sites required?  
Yes No (If yes, explain)
12. Are there potential relinquishments and/or vacations (abandonments)?  
Yes No (If yes, explain)
13. Are there any existing and/or potential Airspace sites?  
Yes No (If yes, explain)
14. Are there off-site environmental mitigation sites required?  
Yes No (If yes, explain)
15. Are there off-site park & ride sites required?  
Yes No (If yes, explain)
16. Indicate the anticipated Right of Way schedule and lead time requirements.  
(Discuss if District proposes less time than PMCS lead time and/or if significant pressures for project advancement are anticipated.)

*Right of Way lead time is calculated at 16 months after environmental clearance to Right of Way Certification. All utility relocations are expected to be performed prior to or during construction.*

17. Is it anticipated that any Right of Way work would be performed by Caltrans staff?  
Yes No (If no, discuss)

*The City of Folsom will be the lead agency for right of way acquisition, with Caltrans providing oversight.*

Evaluation prepared by:

Signed David E. Melis 01-31-06  
Name: David E. Melis, Mark Thomas & Co. Inc. Date

I have personally reviewed this Right of Way Data Sheet. It is my opinion that the probable Highest and Best Use, estimated values, escalation rates, and assumptions are reasonable and proper, subject to the limiting conditions set forth, and find this Data Sheet to be complete.

\_\_\_\_\_  
LINDY K. LEE Date  
Chief, North Region Right of Way