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# Memorandum

**To:** Natalie Porter, P.E., T.E.
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**From:** Chris Gregerson, P.E., T.E.
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**Re:** 2018 Technical TIM Fee Program Update
*Capacity Threshold Study Findings and Summary of Effort*

**Date:** April 16, 2018

The purpose of this technical memorandum is to summarize activities undertaken to update the El Dorado County (EDC) Traffic Impact Mitigation (TIM) Fee Program. Specifically, this memorandum includes the following:

- Background discussion regarding the TIM Fee Update
- Overview of Updates to Travel Demand Model including land use and changes to the fee zone geography
- Overview of Level of Service Standards updates and methodologies
- Results of the Deficiency Analysis
- TIM Fee Improvements and Fair Share Calculations

## Background

The current TIM Fee was adopted by Board Resolution 172-2017 on December 12, 2017. The TIM Fee is used to fund transportation improvements over the next 20 years in the unincorporated area of the west slope of El Dorado County (generally defined as the unincorporated area of the County west of the Sierra crest as defined by the TIM Fee Zone boundaries in the TIM Fee Program Schedule). Improvements funded by the TIM Fee Program include new roadways, roadway widenings, roadway intersection improvements and, where appropriate, bridge, safety, and transit improvements.

In conjunction with the newly adopted Capital Improvement Program (CIP), EDC has undertaken this update to their TIM Fee program. The purpose of this update is to re-evaluate the deficiency list based on the most recent version of the Highway Capacity Manual, as required by General Plan Policy TC-Xd. Additionally, changes to the TIM Fee Zone geography were considered. In addition, the following activities were carried out related to the EDC Travel Demand Model: (1) specific land use updates were made as directed by EDC staff; (2) land use outside of the County was updated to reflect current Sacramento Area Council of Governments (SACOG) control totals as well as planned development information obtained from Sacramento County, the City of Rancho Cordova, and the City of Folsom.

## Updates to Travel Demand Model

El Dorado County provided Kimley-Horn with the version of the County's Travel Demand Model (TDM) that resulted from the 2016 Major TIM Fee Update, along with accompanying analysis files. Based on direction from County staff, land use and Traffic Analysis Zone (TAZ) updates were completed.

Land use assumptions outside of the County were also updated to reflect current information regarding land use in the area west of the County line. This area of the model is referred to as the "buffer area" and its purpose is to improve model performance by providing land use assumptions that produce traffic assignment for vehicles entering and leaving the County.

These updates in the "buffer area" included recent updates for the City of Folsom, the City of Rancho Cordova, and Sacramento County. The update was performed by aggregating parcel data from a version of SACOG's SACSIM model developed for the Capitol SouthEast Connector's Segment D2 project into the County's TAZ structure using GIS methods. The resultant land use totals by TAZ were tabulated into aggregate totals and matched to current SACOG SACSIM control totals for the "buffer area."

## Deficiency Analysis

### Level of Service Definitions

Analysis of transportation facility significant environmental impacts is based on the concept of Level of Service (LOS). The LOS of a facility is a qualitative measure used to describe operational conditions. LOS ranges from A (best), which represents minimal delay, to F (worst), which represents heavy delay and a facility that is operating at or near its functional capacity. Levels of Service were determined using methods defined in the *Highway Capacity Manual (HCM), 6th Edition*.

Table 1 below displays the segment thresholds by facility type for both HCM 2010 and HCM 6th Edition as well as the differences between the two. The factors used to develop the LOS threshold volumes shown included: K-factor of 0.09, D-factor of 0.60, rolling terrain (where applicable), and urban instead of rural. These factors were developed based on local data and the context of the County as a whole. As is shown in Table 1, the large majority of thresholds found in the HCM 6th Edition are lower than those found in HCM 2010. The few exceptions include freeway thresholds for LOS B through LOS D, and LOS E threshold for 6-lane divided arterials.

El Dorado County guidelines state that the LOS threshold for facilities within the urban service boundary is LOS E, while the facilities in the rural parts of the County have a LOS threshold of LOS D. The LOS for arterials analyzed as a part of this effort was determined using the thresholds described in Table 1.

### Two-Lane Highway and Multilane Highway Facility Analysis

The HCM includes procedures for analyzing multi-lane and two-lane roadway segments. For multilane roadways segments, LOS is determined based on the density of the traffic stream. For two-lane highways, the LOS calculation is dependent on the class of the roadway. Class I two-lane highways are highways generally have high speeds, Class II two-lane highways are lower speed highways that typically serve scenic routes or areas of rugged terrain, and Class III two-lane highways typically serve moderately developed areas with higher densities of local traffic and access. Specifically, for Class III highways, the percent of free-flow speed, which is the measure representing the ability of vehicles to travel at the posted speed limit, is used to determine LOS. To determine LOS for Class II two-lane highways, the percent time spent following (one vehicle behind another) is used. The LOS criteria for multi-lane and two-lane roadway segments are shown in Table 2 and Table 3, respectively.

### Freeway Facility Analysis

El Dorado County's traffic study guidelines specify the use of vehicle density (passenger cars/mile/lane) as the appropriate measure of effectiveness for freeway facilities. The LOS criteria for basic freeway segments and freeway merge/diverge segments are summarized in Table 4.

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Table 1 – HCM 2010 and HCM 6th Edition Roadway Segment Thresholds by Facility Type

| CLASS | | HCM 2010 LOS | | | | | HCM 6th Edition | | | | | Delta between HCM 6th Edition and HCM 2010 LOS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | A | B | C | D | E | A | B | C | D | E |
| 2R | Minor Two-Lane Highway | - | 330 | 710 | 1,310 | 2,480 | - | 330 | 710 | 1,310 | 2,480 | - | 0 | 0 | 0 | 0 |
| 2U | Major Two-Lane Highway | - | 330 | 710 | 1,310 | 2,480 | - | 330 | 710 | 1,310 | 2,480 | - | 0 | 0 | 0 | 0 |
| 4M | Multilane Four-Lane Highway | - | 1,790 | 2,580 | 3,290 | 3,660 | - | 1,770 | 2,540 | 3,160 | 3,600 | - | (20) | (40) | (130) | (60) |
| 2A | Two-Lane Arterial | - | - | 850 | 1,540 | 1,650 | - | - | 640 | 1,310 | 1,510 | - | - | (210) | (230) | (140) |
| 4AU | Four-Lane Arterial, Undivided | - | - | 1,760 | 3,070 | 3,130 | - | - | 1,360 | 2,770 | 3,030 | - | - | (400) | (300) | (100) |
| 4AD | Four-Lane Arterial, Divided | - | - | 1,850 | 3,220 | 3,290 | - | - | 1,430 | 2,910 | 3,180 | - | - | (420) | (310) | (110) |
| 6AD | Six-Lane Arterial, Divided | - | - | 2,760 | 4,680 | 4,710 | - | - | 2,210 | 4,480 | 4,790 | - | - | (550) | (200) | 80 |
| 2F | Two Freeway Lanes | - | 2,070 | 2,880 | 3,590 | 4,150 | - | 2,150 | 2,960 | 3,610 | 4,100 | - | 80 | 80 | 20 | (50) |
| 2FA | Two Freeway Lanes + Auxiliary Lane | - | 2,610 | 3,630 | 4,520 | 5,230 | - | 3,150 | 3,960 | 4,610 | 5,100 | - | 540 | 330 | 90 | (130) |
| 3F | Three Freeway Lanes | - | 3,100 | 4,320 | 5,380 | 6,230 | - | 3,230 | 4,440 | 5,420 | 6,150 | - | 130 | 120 | 40 | (80) |
| 3FA | Three Freeway Lanes + Auxiliary Lane | - | 3,640 | 5,070 | 6,320 | 7,310 | - | 4,230 | 5,440 | 6,420 | 7,150 | - | 590 | 370 | 100 | (160) |
| 4F | Four Freeway Lanes | - | 4,140 | 5,760 | 7,180 | 8,310 | - | 4,300 | 5,930 | 7,220 | 8,200 | - | 160 | 170 | 40 | (110) |
| W22 | Minor Two-Lane Highway | - | 330 | 710 | 1,310 | 2,480 | - | 330 | 710 | 1,310 | 2,480 | - | 0 | 0 | 0 | 0 |
| W20 | Minor Two-Lane Highway | - | 330 | 710 | 1,310 | 2,480 | - | 330 | 710 | 1,310 | 2,480 | - | 0 | 0 | 0 | 0 |
| W18 | Minor Two-Lane Highway | - | 330 | 710 | 1,310 | 2,480 | - | 330 | 710 | 1,310 | 2,480 | - | 0 | 0 | 0 | 0 |

Notes:

(1) Threshold reductions between HCM 2010 and HCM 6th Edition are shown in red text and highlighted

(2) HCM 2010 Freeway LOS based on Exhibit 10-8, Urban Area, Rolling Terrain, K-factor of 0.09, and D-factor of 0.60

(3) HCM 6th Edition Freeway LOS based on Exhibits 12-39 and 12-40, Urban Area/Rural Area, Rolling Terrain, K-factor of 0.09, and D-factor of 0.60

(4) HCM 2010 Multilane Highway LOS based on Exhibit 14-19, Urban Area/Rural Area, Rolling Terrain, K-factor of 0.09, and D-factor of 0.60

(5) HCM 6th Edition Multilane Highway LOS based on Exhibits 12-41 and 12-42, Urban Area/Rural Area, Rolling Terrain, K-factor of 0.09, and D-factor of 0.60

(6) HCM 2010 2-lane highway LOS based on Exhibit 15-30, Class II Rolling, 0.09 K-factor, and D-factor of 0.60

(7) HCM 6th Edition 2-lane highway LOS based on Exhibit 15-46, Class II Rolling, 0.09 K-factor, and D-factor of 0.60

(8) HCM 2010 Arterial LOS based on Exhibit 16-14, K-factor of 0.09, D-factor of 0.60, posted speed 45 mi/h

(9) HCM 6th Edition Arterial LOS based on Exhibit 16-16, K-factor of 0.09, D-factor of 0.60, posted speed 45 mi/h

**Table 2** – Multi-Lane Roadway Segment Level of Service Criteria

| Level of Service (LOS) | Free Flow Speed (mph) | Density (pc/mi/ln) |
|---|---|---|
| A | All | > 0 – 11 |
| B | All | > 11 – 18 |
| C | All | > 18 – 26 |
| D | All | > 26 – 35 |
| E | 60<br>55<br>50<br>45 | > 35 – 40<br>> 35 – 41<br>> 35 – 43<br>> 35 – 45 |
| F (demand exceeds capacity) | 60<br>55<br>50<br>45 | > 40<br>> 41<br>> 43<br>> 45 |

*Source: Highway Capacity Manual, 6th Edition*

**Table 3** – Two-Lane Roadway Segment (Class II & III) Level of Service Criteria

| Level of Service (LOS) | Percent Free-Flow Speed (%) | Percent Time Spent Following (%) |
|---|---|---|
| A | > 91.7 | ≤ 40 |
| B | > 83.3 – 91.7 | > 40 – 55 |
| C | > 75.0 – 83.3 | > 55 – 70 |
| D | > 66.7 – 75.0 | > 70 – 85 |
| E | ≤ 66.7 | > 85 |

*Source: Highway Capacity Manual, 6th Edition*

**Table 4** – Freeway Facility Level of Service Criteria

| Level of Service (LOS) | Basic Segments Density (pc/mi/ln) | Merge/Diverge Segments Density (pc/mi/ln) | Weave Segments Density (pc/mi/ln) |
|---|---|---|---|
| A | ≤ 11 | ≤ 10 | ≤ 10 |
| B | > 11 – 18 | > 10 – 20 | > 10 – 20 |
| C | > 18 – 26 | > 20 – 28 | > 20 – 28 |
| D | > 26 – 35 | > 28 – 35 | > 28 – 35 |
| E | > 35 – 45 | > 35 | > 35 – 43 |
| F* | > 45* | * | > 43* |

*Source: Highway Capacity Manual, 6th Edition*

* Demand exceeds capacity

## Auxiliary Lane Analysis

The freeway analysis and existing CIP document informed the selection of auxiliary lanes to be analyzed. The methodology for weaving analysis was updated for the HCM 6th Edition, but the determination of LOS is based on density described for freeway facilities as shown in **Table 4**.

The completion of the deficiency analysis included analyzing two different conditions, the 2035 unimproved condition (future land use on existing roadway network) and the future improved condition (future land use on CIP network, the existing roadway network plus the parallel facilities). The County provided all traffic analysis files from the previous TIM Fee update effort and operational and planning level traffic analyses, consistent with the 2016 Major TIM Fee Update, were completed based on the updated model described previously. Kimley-Horn updated the provided analysis spreadsheets to incorporate the most recent updates to the Highway Capacity Manual (HCM), the HCM 6th Edition, which was released after the completion of the prior TIM Fee update. Note that this version includes updates to several key methodologies incorporated in these analyses. The traffic analyses included:

1. Roadway Segment Analysis – 57 County roadways spanning nearly 150 segments as well as the entire state highway system located within El Dorado County spanning 60 segments.
2. Interchange Analysis – This analysis was carried forward from 2016 Major TIM Fee update. The results described in Technical Memorandum 2-3[1] are not expected to be significantly different than what would be found using the HCM 6th Edition and incorporating the land use changes described above.
3. Parallel Facility Analysis – Several roadway segments that will be constructed in the future (Saratoga Way extension, Country Club Drive realignment and extension, Diamond Springs Parkway, Headington Road, and the Latrobe Road Connector) were analyzed for the 2035 scenario due to previously identified deficiencies.

Traffic analysis assumptions (D-Factor, K-Factor, PHF, Post-Processing etc.) from the 2016 Major TIM Fee Update were maintained for this analysis. The results of the deficiency analysis can be seen in **Appendix A**. Those facilities that were found to be deficient are listed below and shown in **Exhibit 1a** and **Exhibit 1b**.

- Cameron Park Drive, South of Sudbury Road
- Green Valley Road, West of Sophia Parkway
- Green Valley Road, East of Francisco Drive
- White Rock Road, East of Post Street
- White Rock Road, West of Windfield Way
- Missouri Flat Road, South of China Garden Road
- Bass Lake Road, North of US-50
- Latrobe Road, North of Investment Boulevard
- Westbound US-50, El Dorado Hills Boulevard to the El Dorado County Line
- Westbound US-50, Bass Lake Road to El Dorado Hills Boulevard
- Eastbound US-50, Bass Lake Road to Cambridge Road

While no two-lane state highways were found to be deficient at this time, several locations would not provide for any feasible mitigations should they be found to be deficient in the future. One possible solution would be the inclusion of passing lanes rather than a complete widening. This is described in further detail in the memo provided as **Appendix B**.

[1] Final Technical Memorandum 2-3: Existing and Future Deficiency and Nexus Assessment. Kittelson & Associates, Inc. September 9, 2016.

## TIM Fee Improvements and Fair Share Calculations

As completed previously, for identified TIM Fee improvements, the following analyses were completed:

1. Capacity Threshold Analysis – As with the previously completed analyses, a capacity threshold analysis was performed for each identified TIM Fee improvement to determine a timeframe at which current County facilities would exceed the County's LOS thresholds. The improvement projects were designated to the 5-Year, 10-Year, and 20-Year CIP Project lists as shown in Table 5.
2. Fair Share Percentages – Fair share percentages were completed in order to facilitate the determination of cost sharing for each project by TIM Fee Zone. This was completed using a select link analysis and categorizing trips by origin and destination.

### Capacity Threshold Analysis

To complete the capacity threshold analysis, each identified TIM Fee improvement was analyzed year by year to determine in which year between the 2015 and 2035 the facility is required to be constructed. Once this year was determined, the facility was assigned to a corresponding CIP year (2015, 2020, 2025, 2030, or 2035) as shown in Table 5 below.

### Fair Share Calculations

The fair share percentages were determined by using the EDC Travel Demand Model to determine the origins and destinations by TAZ of every vehicle that traveled over each of the roadways associated with the TIM Fee improvements. This was completed by conducting a select link run on each of the TIM Fee improvement segments in 2015 and 2035 and calculating the growth between the two. For the Highway 50 auxiliary lanes, a select link was performed on the corresponding general-purpose lane and in the case of interchanges, on the ramps and overcrossings comprising that interchange. The daily trip tables associated with the growth of traffic on the roadway segments associated with the TIM Fee improvements and produced by the select link model runs, were then used to determine whether the trip origin/destination pair occurred entirely within the County (internal-internal), had one end in the County and one end outside the County or in Placerville (internal-external or external-internal), or both started and ended outside of the County (external-external). These trips were further segmented by determining in which TIM Fee Zone the origin and destination occurred and segmenting it into internal-internal, internal-external, external-internal, and external-external categories based on TIM Fee zones rather than County boundaries. A trip occurring entirely within a TIM Fee zone was counted as one trip while a trip that only started or ended within the TIM Fee Zone was counted as half a trip for that zone. The total number of trips associated with each TIM Fee Zone were then divided by the total number of new trips (difference between 2035 and 2015 conditions) to determine the fair share percentage. In the event that this identified deficiency existed under the 2015 condition, the fair share was calculated based on all trips (not just the new trips). These percentages can be seen in Appendix C.

During this task, the effect of changing two projects (Bell Woods and Bell Ranch) between TIM Fee Zones was evaluated for the purpose of establishing fair share calculations. Scenario analyses were limited to the following:

- Scenario 1: Bell Woods and Bell Ranch are included in TIM Fee Zone 2
- Scenario 2: Bell Woods and Bell Ranch are included in TIM Fee Zone 8

The results of this change can be seen in Appendix C.

Table 5 – Improvement Projects Priority List

| Improvement | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|
| **Highway 50 Auxiliary Lanes** | | | | | |
| A-1 Eastbound, County Line to Latrobe Rd | | | | | X |
| A-2 Eastbound, Bass Lake Rd to Cambridge Rd | | | | | X |
| A-3 Eastbound, Cambridge Rd to Cameron Park Dr | | | | | X |
| A-4 Eastbound, Cameron Park Dr to Ponderosa Rd | | | | | X |
| A-5 Westbound, Ponderosa Rd to Cameron Park Dr | | | | | X |
| A-6 Westbound, Cameron Park Dr Cambridge Rd | | | | | X |
| A-7 Westbound, Bass Lake Rd to Silva Valley Pkwy | | | X | | |
| A-8 Westbound, El Dorado Hills Blvd to County Line | | | | | X |
| **Interchange Improvement** | | | | | |
| I-1, El Dorado Hills Boulevard | | | | X | |
| I-2, Silva Valley Parkway, Phase 2 | | | | | X |
| I-3, Bass Lake Road | | | X | | |
| I-4, Cambridge Road | | | | | X |
| I-5, Cameron Park Drive | | | | | X |
| I-6, Ponderosa Road | | | | | X |
| I-7, El Dorado Road | | | | | X |
| **Roadway Improvement** | | | | | |
| R-1, Cameron Park Drive, South of Sudbury Road | X | | | | |
| R-2, Green Valley Road, West of Sophia Parkway | X | | | | |
| R-3, Green Valley Road, East of Francisco Drive | | | | | X |
| R-4, White Rock Road, East of Post Street | | | X | | |
| R-5, Missouri Flat Road, South of China Garden Road | | | | | X |
| R-6a, Saratoga Way, El Dorado Hills Boulevard to Iron Point Road (2 lanes) | | | X | | |
| R-6b, Saratoga Way, El Dorado Hills Boulevard to Iron Point Road (4 lanes) | | | | | X |
| R-7, Country Club Drive, El Dorado Hills Boulevard to Silva Valley Parkway | | | | | X |
| R-8, Country Club Drive, Silva Valley Parkway to Tong Road | | | X | | |
| R-9, Country Club Drive, Tong Road to Bass Lake Road | | | X | | |
| R-10, Country Club Drive, Bass Lake Road to Tierre de Dios Drive | | | X | | |
| R-11, Diamond Springs Parkway, Missouri Flat Road to SR-49 | | | | | X |
| R-12, Latrobe Road Connector, White Rock Road to Golden Foothills Parkway | | | X | | |
| R-13, Headington Road, El Dorado Road to Missouri Flat Road | | | | | X |
| R-14, Bass Lake Road, North of US-50 | | | | X | |
| R-15, Latrobe Road, North of Investment Boulevard | | | | X | |
| R-16, White Rock Road, West of Windfield Way | | | X | | |

NOT TO SCALE

Legend:
- Hwy 50 Auxiliary Lane
- Roadway Improvement
- Hwy 50 Interchange Project
- X# Map ID
- Future Roadway



*Figure 1a*
*Western El Dorado County, Deficient Segments and Parallel Facilities (Bypasses)*

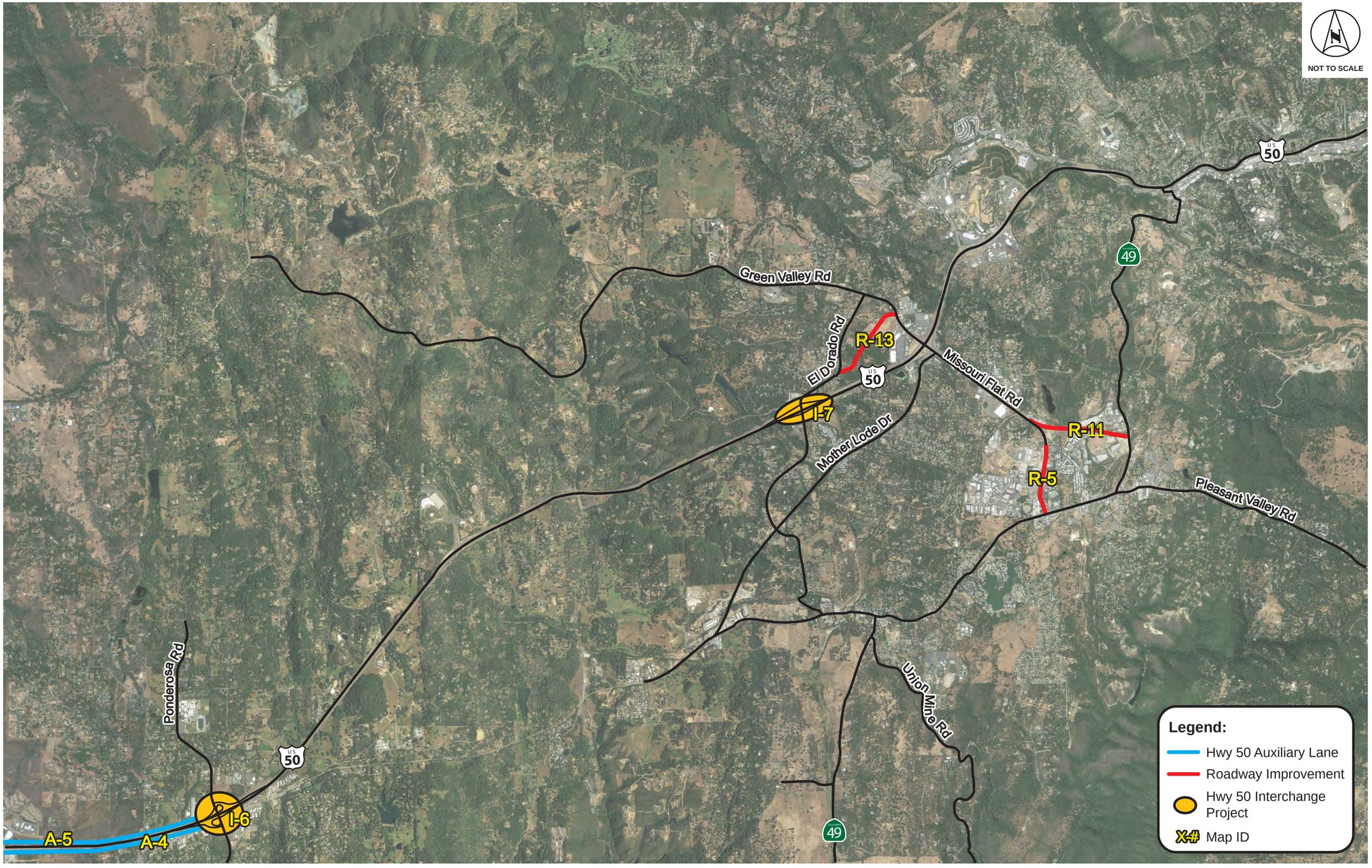



*Figure 1b*
*Eastern El Dorado County, Deficient Segments and Parallel Facilities (Bypasses)*

Appendix A – Level of Service Results

# 2035 Non-State Roadway Analysis Results

| ID | A | B | Index | Name | Location | Area | Type | LOS Threshold | 2035 TGPA2 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | AM Volume | LOS | PM Volume | LOS |
| 1 | 2021 | 2119 | 2021_2119 | Bass Lake Rd | North of US 50 | Rural | 2AU | D | 1410 | **E** | 1400 | **E** |
| 2 | 2221 | 2240 | 2221_2240 | Bass Lake Rd | South of Green Valley Rd | Community Region | 2AU | E | 810 | D | 690 | D |
| 3 | 2228 | 2229 | 2228_2229 | Bass Lake Rd | North of Serrano Pkwy | Community Region | 2AU | E | 1150 | D | 1130 | D |
| 4 | 1014 | 2964 | 1014_2964 | Bassi Rd | West of Lotus Rd | Rural | 2AU | D | 110 | A-C | 140 | A-C |
| 5 | 2738 | 2739 | 2738_2739 | Bedford Ave | At City Limit | Rural | 2AU | D | 40 | A-C | 50 | A-C |
| 6 | 2505 | 2512 | 2505_2512 | Broadway | At City Limit | Community Region | 2AU | E | 350 | A-C | 420 | A-C |
| 7 | 2452 | 2762 | 2452_2762 | Bucks Bar Rd | South Pleasant Valley Rd | Rural | 2AU | D | 490 | A-C | 520 | A-C |
| 8 | 2805 | 2811 | 2805_2811 | Bucks Bar Rd | North of Mt Aukum Rd | Rural | 2AU | D | 360 | A-C | 400 | A-C |
| 9 | 2125 | 2139 | 2125_2139 | Cambridge Rd | North of Country Club Dr | Exception F | 2AU | F | 830 | D | 1040 | D |
| 10 | 2125 | 2126 | 2125_2126 | Cambridge Rd | South of Country Club Dr | Community Region | 2AU | E | 830 | D | 940 | D |
| 11 | 2133 | 2134 | 2133_2134 | Cambridge Rd | At US 50 Overcrossing | Community Region | 2AU | E | 1280 | D | 1360 | E |
| 12 | 2215 | 2241 | 2215_2241 | Cambridge Rd | South of Green Valley Rd | Community Region | 2AU | E | 620 | A-C | 600 | A-C |
| 13 | 2236 | 2242 | 2236_2242 | Cambridge Rd | North of Oxford Rd | Community Region | 2AU | E | 400 | A-C | 450 | A-C |
| 14 | 1970 | 2273 | 1970_2273 | Cameron Park Dr | North of Coach Ln | Community Region | 4AD | E | 1630 | D | 2670 | D |
| 15 | 1975 | 2277 | 1975_2277 | Cameron Park Dr | South of Meder Rd | Community Region | 2AU | E | 1450 | E | 1760 | **F** |
| 16 | 2220 | 2231 | 2220_2231 | Cameron Park Dr | South of Green Valley Rd | Community Region | 2AU | E | 760 | D | 870 | D |
| 17 | 2237 | 2246 | 2237_2246 | Cameron Park Dr | North of Mira Loma Dr | Community Region | 2AU | E | 1080 | D | 1370 | E |
| 18 | 2276 | 2282 | 2276_2282 | Cameron Park Dr | South of Robin Ln | Community Region | 2AU | E | 910 | D | 1360 | E |
| 19 | 2279 | 2282 | 2279_2282 | Cameron Park Dr | North of Robin Ln | Exception F | 2AU | F | 460 | A-C | 780 | D |
| 20 | 2856 | 2884 | 2856_2884 | Carson Rd | East of Barkley Rd | Community Region | 2AU | E | 220 | A-C | 300 | A-C |
| 21 | 2864 | 2867 | 2864_2867 | Carson Rd | At Carson Ct | Rural | 2AU | D | 90 | A-C | 150 | A-C |
| 22 | 2870 | 2875 | 2870_2875 | Carson Rd | West of Gatlin Rd | Rural | 2AU | D | 60 | A-C | 140 | A-C |
| 23 | 2892 | 2896 | 2892_2896 | Carson Rd | East of Ponderosa Way | Community Region | 2AU | E | 150 | A-C | 220 | A-C |
| 24 | 2583 | 2930 | 2583_2930 | China Garden Rd | East of Missouri Flat Rd | Community Region | 2AU | E | 330 | A-C | 380 | A-C |
| 25 | 2671 | 2672 | 2671_2672 | China Garden Rd | North of SR 49 | Community Region | 2AU | E | 90 | A-C | 80 | A-C |
| 26 | 2440 | 2441 | 2440_2441 | Cold Springs Rd | South of Gold Hill Rd | Rural | 2AU | D | 210 | A-C | 290 | A-C |
| 27 | 2445 | 2447 | 2445_2447 | Cold Springs Rd | South of SR 153 | Rural | 2AU | D | 150 | A-C | 200 | A-C |
| 28 | 2021 | 2111 | 2021_2111 | Country Club Dr | East of Bass Lake Rd | Rural | 2AU | D | 930 | D | 680 | D |
| 29 | 2124 | 2128 | 2124_2128 | Country Club Dr | West of Knollwood Dr | Community Region | 2AU | E | 990 | D | 530 | A-C |
| 30 | 2125 | 2136 | 2125_2136 | Country Club Dr | East of Cambridge Rd | Community Region | 2AU | E | 660 | D | 570 | A-C |
| 31 | 2129 | 2131 | 2129_2131 | Country Club Dr | East of Merrychase Dr | Community Region | 2AU | E | 750 | D | 350 | A-C |
| 32 | 2278 | 2283 | 2278_2283 | Country Club Dr | West of Cameron Park Dr | Community Region | 2AU | E | 690 | D | 670 | D |
| 33 | 2297 | 2298 | 2297_2298 | Durock Rd | West of S. Shingle Rd | Community Region | 2AU | E | 690 | D | 910 | D |
| 34 | 1988 | 1989 | 1988_1989 | El Dorado Hills Blvd | South of Wilson Blvd | Community Region | 4AD | E | 2560 | D | 2220 | D |
| 35 | 1989 | 2199 | 1989_2199 | El Dorado Hills Blvd | North of Wilson Blvd | Community Region | 4AD | E | 2340 | D | 1930 | D |
| 36 | 2089 | 2092 | 2089_2092 | El Dorado Hills Blvd | North of Saratoga Way | Community Region | 4AD | E | 2550 | D | 2460 | D |
| 37 | 2157 | 2159 | 2157_2159 | El Dorado Hills Blvd | South of Francisco Dr | Community Region | 2AU | E | 1480 | E | 1440 | E |
| 38 | 2161 | 2184 | 2161_2184 | El Dorado Hills Blvd | South of Green Valley Rd | Community Region | 2AU | E | 550 | A-C | 450 | A-C |
| 39 | 2169 | 3128 | 2169_3128 | El Dorado Hills Blvd | North of Harvard Way | Community Region | 4AD | E | 1860 | D | 1690 | D |
| 40 | 1910 | 2426 | 1910_2426 | El Dorado Rd | South of US 50 | Community Region | 2AU | E | 540 | A-C | 570 | A-C |
| 41 | 2403 | 2404 | 2403_2404 | El Dorado Rd | North of Pleasant Valley Rd | Community Region | 2AU | E | 400 | A-C | 360 | A-C |
| 42 | 2425 | 2428 | 2425_2428 | El Dorado Rd | South of Missouri Flat Rd | Community Region | 2AU | E | 310 | A-C | 350 | A-C |
| 43 | 2597 | 2613 | 2597_2613 | Enterprise Dr | East of Forni Rd | Community Region | 2AU | E | 240 | A-C | 330 | A-C |
| 44 | 2477 | 2809 | 2477_2809 | Fairplay Rd | South of Mt Aukum Rd | Rural | 2AU | D | 170 | A-C | 190 | A-C |
| 45 | 2599 | 2600 | 2599_2600 | Forni Rd | North of SR 49 | Community Region | 2AU | E | 360 | A-C | 300 | A-C |
| 46 | 2625 | 2634 | 2625_2634 | Forni Rd | West of Arroyo Vista Way | Community Region | 2AU | E | 100 | A-C | 160 | A-C |
| 47 | 2192 | 2193 | 2192_2193 | Francisco Dr | South of Green Valley Rd | Community Region | 2AU | E | 1180 | D | 1250 | D |
| 48 | 2255 | 2289 | 2255_2289 | French Creek Rd | North of Old French Town Rd | Rural | 2AU | D | 230 | A-C | 240 | A-C |
| 49 | 2324 | 2360 | 2324_2360 | Gold Hill Rd | East of Lotus Road | Rural | 2AU | D | 270 | A-C | 160 | A-C |
| 50 | 2437 | 2438 | 2437_2438 | Gold Hill Rd | East of Cold Springs Rd | Rural | 2AU | D | 80 | A-C | 60 | A-C |
| 51 | 2440 | 2443 | 2440_2443 | Gold Hill Rd | West of Cold Springs Rd | Rural | 2AU | D | 260 | A-C | 150 | A-C |
| 52 | 1046 | 2171 | 1046_2171 | Green Valley Rd | West of Sophia Pkwy | Community Region | 2AU | E | 2800 | **F** | 3280 | **F** |
| 53 | 1929 | 1930 | 1929_1930 | Green Valley Rd | West of Weber Creek | Rural | 2AU | D | 360 | A-C | 470 | A-C |
| 54 | 2161 | 2162 | 2161_2162 | Green Valley Rd | West of Silva Valley Rd | Community Region | 2AU | E | 1030 | E | 1340 | E |
| 55 | 2176 | 2182 | 2176_2182 | Green Valley Rd | East of Mormon Island Dr | Community Region | 4AD | E | 2240 | C | 3280 | C |
| 56 | 2179 | 2182 | 2179_2182 | Green Valley Rd | West of Mormon Island Dr | Community Region | 4AD | E | 2240 | C | 3280 | C |
| 57 | 2180 | 2181 | 2180_2181 | Green Valley Rd | East of Sophia Pkwy | Community Region | 4AD | E | 2280 | C | 3300 | C |
| 58 | 2185 | 2189 | 2185_2189 | Green Valley Rd | East of Francisco Dr | Community Region | 2AU | E | 1605 | **F** | 1725 | **F** |
| 59 | 2214 | 2221 | 2214_2221 | Green Valley Rd | West of Bass Lake Rd | Community Region | 2AU | E | 1630 | E | 1190 | E |
| 60 | 2215 | 2221 | 2215_2221 | Green Valley Rd | East of Bass Lake Rd | Community Region | 2AU | E | 1490 | E | 1290 | D |
| 61 | 2218 | 2250 | 2218_2250 | Green Valley Rd | East of La Crescenta Dr | Community Region | 2AU | E | 1020 | D | 990 | E |
| 62 | 2334 | 2341 | 2334_2341 | Green Valley Rd | East of Deer Valley Rd | Rural | 2AU | D | 480 | C | 510 | D |
| 63 | 2350 | 2359 | 2350_2359 | Green Valley Rd | West of Lotus Rd | Rural | 2AU | D | 800 | D | 960 | D |
| 64 | 2399 | 2401 | 2399_2401 | Green Valley Rd | West of Greenstone Rd | Rural | 2AU | D | 380 | A-C | 400 | A-C |
| 65 | 2420 | 2423 | 2420_2423 | Green Valley Rd | West of Missouri Flat Rd | Community Region | 2AU | E | 870 | D | 760 | D |
| 66 | 2422 | 2423 | 2422_2423 | Green Valley Rd | West of Campus Dr | Rural | 2AU | D | 400 | A-C | 440 | A-C |
| 67 | 2368 | 2397 | 2368_2397 | Greenstone Rd | North of US 50 | Rural | 2AU | D | 300 | A-C | 290 | A-C |
| 68 | 2383 | 2395 | 2383_2395 | Greenstone Rd | North of Mother Lode Dr | Community Region | 2AU | E | 130 | A-C | 160 | A-C |
| 69 | 2805 | 2806 | 2805_2806 | Grizzly Flat Rd | East of Mt Aukum Rd | Rural | 2AU | D | 200 | A-C | 250 | A-C |
| 70 | 2169 | 2201 | 2169_2201 | Harvard Way | East of El Dorado Hills Blvd | Community Region | 4AU | E | 1250 | A-C | 690 | A-C |
| 71 | 2194 | 2197 | 2194_2197 | Harvard Way | West of Silva Valley Pkwy | Community Region | 4AU | E | 1200 | A-C | 880 | A-C |
| 72 | 15612 | 15613 | 15612_15613 | Ice House Rd | North of US 50 | Rural | 2AU | D | 40 | A-C | 80 | A-C |
| 73 | 1962 | 1963 | 1962_1963 | Latrobe Rd | North of County Line | Rural | 2AU | D | 640 | D | 680 | D |
| 74 | 2025 | 2072 | 2025_2072 | Latrobe Rd | South of Investment Blvd | Community Region | 2AU | E | 830 | D | 860 | D |
| 75 | 2041 | 2042 | 2041_2042 | Latrobe Rd | North of Golden Foothill Pkwy South | Community Region | 4AD | E | 1610 | D | 1820 | D |
| 76 | 2072 | 2073 | 2072_2073 | Latrobe Rd | North of Investment Blvd | Community Region | 2AU | E | 1540 | **F** | 1640 | **F** |
| 77 | 2076 | 2085 | 2076_2085 | Latrobe Rd | North of Golden Foothill Pkwy | Community Region | 4AD | E | 2640 | D | 2710 | D |
| 78 | 2078 | 2085 | 2078_2085 | Latrobe Rd | North of White Rock Rd | Community Region | 6AD | E | 2640 | D | 2790 | D |
| 79 | 2314 | 2360 | 2314_2360 | Lotus Rd | South of Thompson Hill Rd | Rural | 2AU | D | 480 | A-C | 620 | A-C |
| 80 | 2350 | 2357 | 2350_2357 | Lotus Rd | North Green Valley Rd | Rural | 2AU | D | 760 | D | 960 | D |
| 81 | 2984 | 2987 | 2984_2987 | Lotus Rd | South of SR 49 | Rural | 2AU | D | 390 | A-C | 530 | A-C |
| 82 | 2360 | 2362 | 2360_2362 | Luneman Rd | West of Lotus Rd | Rural | 2AU | D | 380 | A-C | 220 | A-C |
| 83 | 2968 | 2985 | 2968_2985 | Marshall Rd | East of SR 49 | Rural | 2AU | D | 410 | A-C | 430 | A-C |
| 84 | 2992 | 2994 | 2992_2994 | Marshall Rd | East of Garden Valley Rd | Rural | 2AU | D | 530 | A-C | 510 | A-C |
| 85 | 3034 | 3035 | 3034_3035 | Marshall Rd | South of Lower Main St | Rural | 2AU | D | 80 | A-C | 110 | A-C |
| 86 | 2009 | 2238 | 2009_2238 | Meder Rd | East of Cameron Park Dr | Community Region | 2AU | E | 840 | D | 1030 | D |
| 87 | 2336 | 2346 | 2336_2346 | Meder Rd | West of Ponderosa Rd | Community Region | 2AU | E | 550 | A-C | 610 | A-C |
| 88 | 1926 | 1927 | 1926_1927 | Missouri Flat Rd | West of El Dorado Rd | Community Region | 2AU | E | 930 | D | 800 | D |
| 89 | 1927 | 2627 | 1927_2627 | Missouri Flat Rd | East of El Dorado Rd | Community Region | 2AU | E | 810 | D | 840 | D |
| 90 | 2570 | 2672 | 2570_2672 | Missouri Flat Rd | South of China Garden Rd | Community Region | 2AU | E | 1320 | E | 1670 | **F** |
| 91 | 2618 | 2620 | 2618_2620 | Missouri Flat Rd | North of SR 49 | Community Region | 2AU | E | 1110 | D | 1310 | E |
| 92 | 2644 | 2668 | 2644_2668 | Missouri Flat Rd | North of Forni Rd | Exception F | 4AD | F | 2130 | D | 3090 | E |
| 93 | 2668 | 2670 | 2668_2670 | Missouri Flat Rd | South of Forni Rd | Exception F | 4AD | F | 2030 | D | 2580 | D |
| 94 | 3075 | 3077 | 3075_3077 | Mormon Emigrant Trl | East of Sly Park Rd | Rural | 2AU | D | 80 | A-C | 120 | A-C |
| 95 | 2539 | 2540 | 2539_2540 | Mosquito Rd | At City Limit | Community Region | 2AU | E | 420 | A-C | 430 | A-C |
| 96 | 2765 | 2767 | 2765_2767 | Mosquito Rd | South of American River Bridge | Rural | 2AU | D | 130 | A-C | 160 | A-C |

# 2035 Non-State Roadway Analysis Results

| ID | A | B | Index | Name | Location | Area | Type | LOS Threshold | 2035 TGPA2 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | AM Volume | LOS | PM Volume | LOS |
| 97 | 2013 | 2014 | 2013_2014 | Mother Lode Dr | East of French Creek Rd | Community Region | 2AU | E | 1080 | D | 1000 | D |
| 98 | 2287 | 2300 | 2287_2300 | Mother Lode Dr | West of Sunset Ln | Community Region | 2AU | E | 1150 | D | 1250 | D |
| 99 | 2408 | 2412 | 2408_2412 | Mother Lode Dr | West of Pleasant Valley Rd | Community Region | 2AU | E | 910 | D | 1070 | D |
| 100 | 2409 | 2412 | 2409_2412 | Mother Lode Dr | East of Pleasant Vally Rd | Community Region | 2AU | E | 270 | A-C | 400 | A-C |
| 101 | 1922 | 2501 | 1922_2501 | Mt Aukum Rd | North of County Line | Rural | 2AU | D | 120 | A-C | 140 | A-C |
| 102 | 2805 | 2808 | 2805_2808 | Mt Aukum Rd | South of Bucks Bar Rd | Rural | 2AU | D | 310 | A-C | 360 | A-C |
| 103 | 2846 | 2847 | 2846_2847 | Mt Aukum Rd | South of Pleasant Valley Rd | Rural | 2AU | D | 240 | A-C | 360 | A-C |
| 104 | 1010 | 2988 | 1010_2988 | Mt Murphy Rd | North of SR 49 | Rural | 2AU | D | 40 | A-C | 40 | A-C |
| 105 | 2980 | 2983 | 2980_2983 | Mt Murphy Rd | South of Marshall Rd | Rural | 2AU | D | 70 | A-C | 120 | A-C |
| 106 | 2353 | 2352 | 2353_2352 | N Shingle Rd | South of Green Valley Rd | Rural | 2AU | D | 570 | A-C | 620 | A-C |
| 107 | 2455 | 2463 | 2455_2463 | Newtown Rd | North of Pioneer Hill Rd | Rural | 2AU | D | 290 | A-C | 310 | A-C |
| 108 | 2546 | 2547 | 2546_2547 | Newtown Rd | East of Broadway Rd | Community Region | 2AU | E | 360 | A-C | 390 | A-C |
| 109 | 2831 | 2843 | 2831_2843 | Newtown Rd | North of Pleasant Valley Rd | Rural | 2AU | D | 300 | A-C | 260 | A-C |
| 110 | 2007 | 2008 | 2007_2008 | Old French Town Rd | South of Mother Lode Dr | Community Region | 2AU | E | 140 | A-C | 160 | A-C |
| 111 | 2478 | 2500 | 2478_2500 | Omo Ranch Rd | East of Mt Aukum Rd | Rural | 2AU | D | 70 | A-C | 60 | A-C |
| 112 | 2233 | 2244 | 2233_2244 | Oxford Rd | East of Salida Way | Community Region | 2AU | E | 420 | A-C | 550 | A-C |
| 113 | 2277 | 2284 | 2277_2284 | Palmer Dr | East of Cameron Park Dr | Community Region | 2AU | E | 620 | A-C | 1100 | D |
| 114 | 2595 | 2602 | 2595_2602 | Patterson Dr | South of Pleasant Valley Rd | Community Region | 2AU | E | 420 | A-C | 570 | A-C |
| 115 | 2405 | 2412 | 2405_2412 | Pleasant Valley Rd | East of Mother Lode Dr | Community Region | 2AU | E | 820 | D | 900 | D |
| 116 | 2457 | 2461 | 2457_2461 | Pleasant Valley Rd | East of Bucks Bar Rd | Community Region | 2AU | E | 590 | A-C | 540 | A-C |
| 117 | 2506 | 2753 | 2506_2753 | Pleasant Valley Rd | West of Oak Hill Rd | Community Region | 2AU | E | 1020 | D | 1140 | D |
| 118 | 2579 | 2678 | 2579_2678 | Pleasant Valley Rd | East of SR 49 | Community Region | 2AU | E | 1290 | D | 1490 | E |
| 119 | 2749 | 2763 | 2749_2763 | Pleasant Valley Rd | East of Cedar Ravine Rd | Community Region | 2AU | E | 1050 | D | 1060 | D |
| 120 | 2839 | 2843 | 2839_2843 | Pleasant Valley Rd | East of Newtown Rd | Community Region | 2AU | E | 530 | A-C | 540 | A-C |
| 121 | 2335 | 2343 | 2335_2343 | Ponderosa Rd | North of Jackpine Rd | Rural | 2AU | D | 170 | A-C | 140 | A-C |
| 122 | 2896 | 2904 | 2896_2904 | Pony Express Trl | East of Carson Rd | Community Region | 2AU | E | 240 | A-C | 310 | A-C |
| 123 | 2917 | 2918 | 2917_2918 | Pony Express Trl | East of Gilmore Rd | Community Region | 2AU | E | 300 | A-C | 490 | A-C |
| 124 | 3102 | 3104 | 3102_3104 | Pony Express Trl | West of Forebay Rd | Community Region | 2AU | E | 290 | A-C | 530 | A-C |
| 125 | 2509 | 2721 | 2509_2721 | Rock Creek Rd | East of SR 193 | Rural | 2AU | D | 30 | A-C | 30 | A-C |
| 126 | 2149 | 2150 | 2149_2150 | Salmon Falls Rd | At New York Creek Bridge | Rural | 2AU | D | 360 | A-C | 460 | A-C |
| 127 | 2161 | 2163 | 2161_2163 | Salmon Falls Rd | South of Malcolm Dixon Rd | Community Region | 2AU | E | 820 | D | 800 | D |
| 128 | 2943 | 2948 | 2943_2948 | Salmon Falls Rd | South of Pedro Hill Rd | Rural | 2AU | D | 150 | A-C | 180 | A-C |
| 129 | 2946 | 2947 | 2946_2947 | Salmon Falls Rd | South of Rattlesnake Bar Rd | Rural | 2AU | D | 50 | A-C | 70 | A-C |
| 130 | 2006 | 2195 | 2006_2195 | Serrano Pkwy | East of Silva Valley Pkwy | Community Region | 4AD | E | 2080 | D | 1530 | D |
| 131 | 2152 | 2229 | 2152_2229 | Serrano Pkwy | West of Bass Lake Rd | Community Region | 2AU | E | 780 | D | 790 | D |
| 132 | 2317 | 2318 | 2317_2318 | Shingle Springs Dr | South of US 50 | Rural | 2AU | D | 960 | D | 590 | A-C |
| 133 | 2005 | 2006 | 2005_2006 | Silva Valley Pky | North of US 50 | Community Region | 4AD | E | 1950 | D | 2330 | D |
| 134 | 2162 | 2207 | 2162_2207 | Silva Valley Pky | South of Green Valley Rd | Community Region | 2AU | E | 830 | D | 720 | D |
| 135 | 2196 | 2197 | 2196_2197 | Silva Valley Pky | North of Havard Way | Community Region | 2AU | E | 1340 | E | 1190 | D |
| 136 | 2197 | 2203 | 2197_2203 | Silva Valley Pky | South of Serrano Pkwy | Community Region | 4AD | E | 1720 | D | 1600 | D |
| 137 | 2823 | 2846 | 2823_2846 | Sly Park Rd | East of Mt Aukum Rd | Rural | 2AU | D | 280 | A-C | 310 | A-C |
| 138 | 3073 | 3077 | 3073_3077 | Sly Park Rd | East of Mormon Emigrant Trail | Rural | 2AU | D | 310 | A-C | 410 | A-C |
| 139 | 3101 | 3103 | 3101_3103 | Sly Park Rd | South of Pony Express Trail | Community Region | 2AU | E | 640 | D | 780 | D |
| 140 | 2840 | 2850 | 2840_2850 | Snows Rd | North of Newtown Rd | Rural | 2AU | D | 100 | A-C | 100 | A-C |
| 141 | 2852 | 2901 | 2852_2901 | Snows Rd | South of Carson Rd | Community Region | 2AU | E | 350 | A-C | 230 | A-C |
| 142 | 1980 | 2109 | 1980_2109 | South Shingle Rd | East of Latrobe Rd | Rural | 2AU | D | 120 | A-C | 90 | A-C |
| 143 | 2270 | 2271 | 2270_2271 | South Shingle Rd | North of Barnett Ranch | Rural | 2AU | D | 200 | A-C | 220 | A-C |
| 144 | 2288 | 2290 | 2288_2290 | South Shingle Rd | South of Sunset Ln | Community Region | 2AU | E | 550 | A-C | 730 | D |
| 145 | 2220 | 2222 | 2220_2222 | Starbuck Rd | North of Green Valley Rd | Community Region | 2AU | E | 150 | A-C | 190 | A-C |
| 146 | 2768 | 2769 | 2768_2769 | Union Ridge Rd | West of Hassler Rd | Rural | 2AU | D | 40 | A-C | 50 | A-C |
| 147 | 3016 | 3047 | 3016_3047 | Wentworth Springs Rd | West of Quintette Rd | Rural | 2AU | D | 40 | A-C | 60 | A-C |
| 148 | 2029 | 2028 | 2029_2028 | White Rock Rd | West of Windfield Way | Community Region | 2AU | E | 830 | D | 1900 | **F** |
| 149 | 2037 | 2038 | 2037_2038 | White Rock Rd | At County Line | Community Region | 2AU | E | 990 | D | 2130 | **F** |
| 150 | 2085 | 2088 | 2085_2088 | White Rock Rd | East of Post St | Community Region | 2AU | E | 1390 | E | 2110 | **F** |
| 151 | 2086 | 2087 | 2086_2087 | White Rock Rd | West of Latrobe Rd | Community Region | 4AD | E | 1000 | A-C | 1630 | D |

# 2035 Freeway Analysis Results

| Route | Seg | EB Postmile | WB Postmile | Segment Length | East of Segment | West of Segment | LOS Threshold | Eastbound | | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | AM Peak | | | PM Peak | | | AM Peak | | | PM Peak | | |
| | | | | | | | | Average Speed (mph) | Density[1] (pc/mi/ln) | LOS[2] | Average Speed (mph) | Density[1] (pc/mi/ln) | LOS[2] | Average Speed (mph) | Density[1] (pc/mi/ln) | LOS[2] | Average Speed (mph) | Density[1] (pc/mi/ln) | LOS[2] |
| 50 | 1 | 0 | 0.857 | 0.857 | SACRAMENTO/EL DORADO COUNTY LINE | LATROBE ROAD | E | 65.00 | 15.48 | B | 63.77 | 26.58 | D | Unstable | >45 | F | 65.00 | 17.48 | B |
| 50 | 2 | 0.857 | 3.232 | 2.375 | LATROBE ROAD | BASS LAKE ROAD | D | 65.00 | 11.95 | B | 63.69 | 26.75 | D | Unstable | >45 | F | 62.23 | 29.60 | D |
| 50 | 3 | 3.232 | 4.962 | 1.73 | BASS LAKE ROAD | CAMBRIDGE ROAD | D | 65.00 | 17.32 | B | Unstable | >45 | F | 62.92 | 28.34 | D | 64.90 | 22.83 | C |
| 50 | 4 | 4.962 | 6.57 | 1.608 | CAMBRIDGE ROAD | CAMERON PARK DRIVE | E | 65.00 | 18.62 | C | 61.68 | 30.55 | D | 64.72 | 23.81 | C | 65.00 | 20.28 | C |
| 50 | 5 | 6.57 | 8.564 | 1.994 | CAMERON PARK DRIVE | PONDEROSA ROAD | E | 65.00 | 18.44 | C | 55.49 | 39.99 | E | 61.83 | 30.30 | D | 64.75 | 23.68 | C |
| 50 | 6 | 8.564 | 10.295 | 1.731 | PONDEROSA ROAD | SHINGLE SPRINGS | D | 65.00 | 14.45 | B | 63.35 | 27.47 | D | 64.51 | 24.57 | C | 65.00 | 21.73 | C |
| 50 | 7 | 10.295 | 12.19 | 1.895 | SHINGLE SPRINGS | GREENSTONE ROAD | D | 65.00 | 14.36 | B | 63.00 | 28.18 | D | 64.57 | 24.37 | C | 65.00 | 19.06 | C |
| 50 | 8 | 12.19 | 14.011 | 1.821 | GREENSTONE ROAD | EL DORADO ROAD | D | 65.00 | 11.88 | B | 65.00 | 21.73 | C | 65.00 | 20.04 | C | 65.00 | 18.09 | C |
| 50 | 9 | 14.011 | 15.055 | 1.044 | EL DORADO ROAD | MISSOURI FLAT ROAD | E | 65.00 | 11.35 | B | 65.00 | 20.75 | C | 65.00 | 19.33 | C | 65.00 | 17.38 | B |
| 50 | 10 | 15.055 | 15.829 | 0.774 | MISSOURI FLAT ROAD | PLACERVILLE, FAIRGROUNDS | E | 65.00 | 8.58 | A | 65.00 | 14.89 | B | 65.00 | 14.66 | B | 65.00 | 12.71 | B |
| 50 | 11 | 15.829 | 16.99 | 1.161 | PLACERVILLE, FAIRGROUNDS | WEST PLACERVILLE | E | 65.00 | 9.58 | A | 65.00 | 16.49 | B | 65.00 | 14.28 | B | 65.00 | 14.63 | B |
| 50 | 12 | 16.99 | 17.42 | 0.43 | WEST PLACERVILLE | EB OFF TO MAIN STREET | E | 65.00 | 11.62 | B | 65.00 | 20.04 | C | 65.00 | 17.56 | B | 65.00 | 17.82 | B |
| 50 | 18 | 18.517 | 18.99 | 0.473 | PLACERVILLE, MOSQUITO ROAD OH (BROADWAY) | PLACERVILLE, SCHNELL SCHOOL ROAD | E | 55.00 | 8.85 | A | 55.00 | 18.22 | C | 55.00 | 16.96 | B | 55.00 | 13.17 | B |
| 50 | 19 | 18.99 | 20.296 | 1.306 | PLACERVILLE, SCHNELL SCHOOL ROAD | PLACERVILLE, POINT VIEW DRIVE | E | 55.00 | 7.16 | A | 55.00 | 14.75 | B | 55.00 | 13.90 | B | 55.00 | 10.95 | A |
| 50 | 20 | 20.296 | 20.741 | 0.445 | PLACERVILLE, POINT VIEW DRIVE | NEW TOWN ROAD | D | 65.00 | 5.08 | A | 65.00 | 10.25 | A | 65.00 | 9.80 | A | 65.00 | 7.66 | A |
| 50 | 23 | 25.949 | 28.842 | 2.893 | EAST CAMINO ROAD | SAWMILL (POLLOCK PINES) | E | 65.00 | 3.32 | A | 65.00 | 10.51 | A | 65.00 | 9.34 | A | 65.00 | 7.09 | A |
| 50 | 24 | 28.842 | 31.299 | 2.457 | SAWMILL (POLLOCK PINES) | SLY PARK ROAD | E | 65.00 | 4.39 | A | 65.00 | 8.68 | A | 65.00 | 7.43 | A | 65.00 | 5.28 | A |

[1] Density expressed in pc/mi/ln, passenger cars per mile per lane

[2] Level of service is based on density as described in Basic Freeway Segment, Chapter 12, HCM 6th Edition

Indicates deficiency

# 2035 Multilane Highway Analysis Results

| Route | Seg | EB Postmile | WB Postmile | Segment Length | East of Segment | West of Segment | LOS Threshold | Eastbound | | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | AM Peak | | | PM Peak | | | AM Peak | | | PM Peak | | |
| | | | | | | | | Average Speed (mph) | Density[1] (pc/mi/ln) | LOS[2] | Average Speed (mph) | Density[1] (pc/mi/ln) | LOS[2] | Average Speed (mph) | Density[1] (pc/mi/ln) | LOS[2] | Average Speed (mph) | Density[1] (pc/mi/ln) | LOS[2] |
| 50 | 13 | 17.42 | 17.52 | 0.1 | EB OFF TO MAIN STREET | PLACERVILLE, CANAL STREET | E | 45.00 | 18.69 | C | 44.55 | 33.63 | D | 45.00 | 29.20 | D | 45.00 | 28.93 | D |
| 50 | 14 | 17.52 | 17.667 | 0.147 | PLACERVILLE, CANAL STREET | PLACERVILLE, JCT. RTE. 49 | F | 45.00 | 10.67 | A | 45.00 | 22.62 | C | 45.00 | 29.20 | D | 45.00 | 22.53 | C |
| 50 | 15 | 17.667 | 17.788 | 0.121 | PLACERVILLE, JCT. RTE. 49 | PLACERVILLE, COLOMA STREET | F | 45.00 | 8.64 | A | 45.00 | 18.58 | C | 45.00 | 27.49 | D | 45.00 | 20.80 | C |
| 50 | 16 | 17.788 | 18.032 | 0.244 | PLACERVILLE, COLOMA STREET | PLACERVILLE, BEDFORD AVENUE | F | 45.00 | 8.73 | A | 45.00 | 18.82 | C | 45.00 | 27.87 | D | 45.00 | 21.07 | C |
| 50 | 17 | 18.032 | 18.517 | 0.485 | PLACERVILLE, BEDFORD AVENUE | PLACERVILLE, MOSQUITO ROAD OH (BROADWAY) | F | 45.00 | 7.38 | A | 45.00 | 15.87 | B | 45.00 | 23.42 | C | 45.00 | 17.62 | B |
| 50 | 21 | 20.741 | 23.957 | 3.216 | NEW TOWN ROAD | JUNCTION OLD HIGHWAY, CAMINO, WEST | D | 60.00 | 5.63 | A | 60.00 | 11.37 | B | 60.00 | 10.78 | A | 60.00 | 8.45 | A |
| 50 | 22 | 23.957 | 25.949 | 1.992 | JUNCTION OLD HIGHWAY, CAMINO, WEST | EAST CAMINO ROAD | E | 60.00 | 3.50 | A | 60.00 | 10.98 | A | 60.00 | 9.82 | A | 60.00 | 7.38 | A |
| 50 | 26 | 34.219 | 39.772 | 5.553 | OLD CARSON ROAD | ICEHOUSE ROAD | D | 50.00 | 4.64 | A | 50.00 | 9.18 | A | 50.00 | 7.78 | A | 50.00 | 5.58 | A |

[1] Density expressed in pc/mi/ln, passenger cars per mile per lane

[2] Level of service for multi-lane highways is based on density as described in Chapter 12, HCM 6th Edition

Indicates deficiency

# 2035 Two-Lane Highway Analysis Results

| Route | Seg | NB/EB Postmile | SB/WB Postmile | Segment Length | North/East of Segment | South/West of Segment | LOS Threshold | Eastbound | | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | AM Peak | | | PM Peak | | | AM Peak | | | PM Peak | | |
| | | | | | | | | PTSF[1] (%) | PFFS[2] (%) | LOS[3] | PTSF[1] (%) | PFFS[2] (%) | LOS[3] | PTSF[1] (%) | PFFS[2] (%) | LOS[3] | PTSF[1] (%) | PFFS[2] (%) | LOS[3] |
| 49 | 1 | 0 | 1.65 | 1.65 | AMADOR/EL DORADO COUNTY LINE | NASHVILLE, SOUTH | D | 64.0% | | C | 25.6% | | A | 18.8% | | A | 62.4% | | C |
| 49 | 2 | 1.65 | 8.352 | 6.702 | NASHVILLE, SOUTH | CHINA HILL ROAD | D | 72.8% | | D | 33.2% | | A | 25.1% | | A | 71.9% | | D |
| 49 | 3 | 8.352 | 9.494 | 1.142 | CHINA HILL ROAD | EL DORADO, UNION MINE ROAD | E | 89.5% | | E | 34.9% | | A | 27.2% | | A | 89.6% | | E |
| 49 | 4 | 9.494 | 9.641 | 0.147 | EL DORADO, UNION MINE ROAD | EL DORADO, PLEASANT VALLEY ROAD | E | | 67.4% | D | | 55.6% | E | | 80.5% | C | | 82.6% | C |
| 49 | 5 | 9.641 | 11.239 | 1.598 | EL DORADO, PLEASANT VALLEY ROAD | MISSOURI FLAT ROAD | F | | 75.3% | C | | 69.1% | D | | 54.1% | E | | 59.3% | E |
| 49 | 6 | 11.239 | 11.859 | 0.62 | MISSOURI FLAT ROAD | DIAMOND SPRINGS, PLEASANT VALLEY ROAD | F | | 56.9% | E | | 45.6% | E | | 60.4% | E | | 63.5% | E |
| 49 | 7 | 11.859 | 14.463 | 2.604 | DIAMOND SPRINGS, PLEASANT VALLEY ROAD | PLACERVILLE, FISKE ROAD | E | 97.0% | | E | 51.1% | | B | 44.2% | | B | 96.0% | | E |
| 49 | 8 | 14.463 | 14.597 | 0.134 | PLACERVILLE, FISKE ROAD | PLACERVILLE, PACIFIC/ MAIN STREETS | E | | 61.6% | E | | 51.2% | E | | 42.9% | E | | 47.9% | E |
| 49 | 9 | 14.597 | 14.891 | 0.294 | PLACERVILLE, PACIFIC/ MAIN STREETS | PLACERVILLE, JCT. RTE. 50 | F | | 73.5% | D | | 67.5% | D | | 74.6% | D | | 72.1% | D |
| 49 | 10 | 14.891 | 15.685 | 0.794 | PLACERVILLE, JCT. RTE. 50 | JCT. RTE. 193 NORTH | F | | 69.5% | D | | 57.8% | E | | 79.0% | C | | 76.0% | C |
| 49 | 11 | 15.685 | 16.44 | 0.755 | JCT. RTE. 193 NORTH | DIANA STREET | D | | 80.7% | C | | 81.9% | C | | 81.5% | C | | 81.1% | C |
| 49 | 12 | 16.44 | 19.42 | 2.98 | DIANA STREET | GOLD HILL ROAD | D | 72.9% | | D | 29.6% | | A | 24.4% | | A | 72.0% | | D |
| 49 | 13 | 19.42 | 22.865 | 3.445 | GOLD HILL ROAD | COLOMA, JCT. RTE. 153 WEST | D | 60.4% | | C | 21.0% | | A | 14.9% | | A | 57.9% | | C |
| 49 | 14 | 22.865 | 24.48 | 1.615 | COLOMA, JCT. RTE. 153 WEST | MARSHALL GRADE ROAD (TO GEORGETOWN) | D | 73.5% | | D | 30.2% | | A | 22.9% | | A | 77.3% | | D |
| 49 | 15 | 24.48 | 28.19 | 3.71 | MARSHALL GRADE ROAD (TO GEORGETOWN) | HASTINGS CREEK BRIDGE | D | 70.9% | | D | 26.5% | | A | 22.9% | | A | 71.4% | | D |
| 49 | 16 | 28.19 | 34.466 | 6.276 | HASTINGS CREEK BRIDGE | COOL, JCT. RTE. 193 EAST | D | 67.2% | | C | 24.2% | | A | 19.9% | | A | 66.3% | | C |
| 49 | 17 | 34.466 | 38.233 | 3.767 | COOL, JCT. RTE. 193 EAST | EL DORADO/PLACER COUNTY LINE | F | 99.2% | | E | 66.1% | | C | 46.8% | | B | 99.1% | | E |
| 50 | 25 | 31.299 | 34.219 | 2.92 | SLY PARK ROAD | ICEHOUSE ROAD | E | 68.3% | 0.0% | C | 96.3% | 0.0% | E | 88.8% | 0.0% | E | 57.5% | 0.0% | C |
| 50 | 27 | 39.772 | 46.592 | 6.82 | ICEHOUSE ROAD | W O ALDER RIDGE ROAD | F | 73.8% | 0.0% | D | 100.0% | 0.0% | E | 95.3% | 0.0% | E | 80.9% | 0.0% | D |
| 50 | 28 | 46.592 | 48.952 | 2.36 | W O ALDER RIDGE ROAD | SILVER FORK ROAD | F | 0.0% | 80.3% | C | 0.0% | 81.0% | C | 0.0% | 81.8% | C | 0.0% | 78.8% | C |
| 50 | 29 | 48.952 | 53.732 | 4.78 | SILVER FORK ROAD | WRIGHTS LAKE ROAD | F | 73.2% | 0.0% | D | 96.1% | 0.0% | E | 94.4% | 0.0% | E | 78.9% | 0.0% | D |
| 50 | 30 | 53.732 | 57.892 | 4.16 | WRIGHTS LAKE ROAD | STRAWBERRY LN | F | 73.2% | 0.0% | D | 96.1% | 0.0% | E | 94.4% | 0.0% | E | 78.9% | 0.0% | D |
| 50 | 31 | 57.892 | 60.192 | 2.3 | STRAWBERRY LN | SLIPPERY FORD ROAD | F | 73.2% | 0.0% | D | 96.1% | 0.0% | E | 94.4% | 0.0% | E | 78.9% | 0.0% | D |
| 50 | 32 | 60.192 | 63.522 | 3.33 | SLIPPERY FORD ROAD | SIERRA-AT-TAHOE ROAD | F | 74.0% | 0.0% | D | 96.9% | 0.0% | E | 95.6% | 0.0% | E | 80.7% | 0.0% | D |
| 50 | 33 | 63.522 | 65.619 | 1.83 | SIERRA-AT-TAHOE ROAD | ECHO LAKE ROAD | F | 73.2% | 0.0% | D | 96.1% | 0.0% | E | 94.4% | 0.0% | E | 78.9% | 0.0% | D |
| 153 | 1 | 0 | 0.12 | 0.12 | JCT. RTE. 49 | COLD SPRINGS ROAD | D | 51.3% | | B | 33.6% | | A | 23.6% | | A | 50.1% | | B |
| 153 | 2 | 0.12 | 0.55 | 0.43 | COLD SPRINGS ROAD | MARSHALL'S MONUMENT | D | 28.2% | | A | 28.2% | | A | 28.2% | | A | 28.2% | | A |
| 193 | 1 | 0 | 0.856 | 0.856 | COOL, JCT. RTE. 49 | AMERICAN RIVER ROAD | D | 32.2% | | A | 81.7% | | D | 83.2% | | D | 42.1% | | B |
| 193 | 2 | 0.856 | 2.169 | 1.313 | AMERICAN RIVER ROAD | AUBURN LAKE TRAIL ROAD | D | 37.6% | | A | 72.1% | | D | 78.1% | | D | 49.4% | | B |
| 193 | 3 | 2.169 | 12.19 | 10.021 | AUBURN LAKE TRAIL ROAD | EVERGREEN COURT ROAD | D | 41.0% | | A | 74.6% | | D | 76.3% | | D | 51.2% | | B |
| 193 | 4 | 12.19 | 12.699 | 0.509 | EVERGREEN COURT ROAD | GEORGETOWN, LOWER MAIN STREET | D | | 79.4% | C | | 82.6% | D | | 73.7% | D | | 82.0% | D |
| 193 | 5 | 12.699 | 16.105 | 3.406 | GEORGETOWN, LOWER MAIN STREET | BLACK OAK MINE ROAD | D | 65.5% | | C | 21.9% | | A | 27.7% | | A | 65.0% | | C |
| 193 | 6 | 16.105 | 19.4 | 3.295 | BLACK OAK MINE ROAD | GARDEN VALLEY ROAD | D | 52.8% | | B | 20.1% | | A | 23.2% | | A | 51.0% | | B |
| 193 | 7 | 19.4 | 26.95 | 7.55 | GARDEN VALLEY ROAD | JCT. RTE. 49 | D | 65.7% | | C | 24.0% | | A | 30.3% | | A | 66.0% | | C |

[1] Percent of Time Spent Following - average percent of time that ones must follow slower slower vehicles

[2] Percent of Free-Flow Speed - ability of ones to travel at or near the posted speed limit

[3] Level of service for two-lane highways is based on criteria in Chapter 15, HCM 6th Edition

Indicates deficiency

Appendix B – Vehicle Turnout Analysis for SR 193 and SR 49

Kimley»Horn

# Memorandum

**To:** Natalie Porter, P.E., T.E.
El Dorado County

**From:** Chris Gregerson, P.E., T.E.
Mike Schmitt, AICP CTP, PTP

**Re:** Vehicle Turnout Analysis for SR 193 and SR 49

**Date:** February 15, 2018

The purpose of this technical memorandum is to present analysis for segments of SR 193 and SR 49 regarding the feasibility of vehicle turnouts in lieu of widening to four continuous travel lanes to address anticipated future deficiencies. Note that widening to four lanes is not considered feasible for a multitude of reasons including physical and design considerations, environmental concerns, the historical importance of the area and the context of these roadway segments. Specifically, this memorandum includes the following:

- **Background** discussion which includes a description of the limits of the segments
- Overview of potential **Mitigation Options** that resulted from a windshield survey of select segments of SR 193 and SR 49
- **Capacity Analysis** utilizing the most recent Highway Capacity Manual (HCM 6th Edition) to assess planning level operations, and
- **Recommendations** and findings resulting from this analysis

## Background

*State Route 193 (SR 193)*

SR 193 is a California State Highway running from the City of Lincoln to the City of Placerville. SR 193 runs in an east-west direction from the City of Lincoln to Georgetown, then turns south to just north of the City of Placerville. SR 193 is part of the California Freeway and Expressway System, but is not part of the National Highway System, a network of highways that are considered essential to the country's economy, defense, and mobility by the Federal Highway Administration (FHWA).

The examined segment of SR 193 is approximately 10.7 miles long and is located on the east side of Interstate 80 (I-80), just east of Cool. SR 193 continues through Greenwood and Fornis, and ends in Georgetown. The examined segment is a two-lane, undivided highway with one 12-foot wide lane in each direction and paved shoulders that vary from 0 to 4 feet in width. The posted speed limit is 55-mph along the entirety of the examined segment, but there are some locations with curves that have a 30-mph warning speed. In addition, the segment has a winding horizontal alignment and rolling vertical alignment. Along the segment are multiple intersections, some of which contain turn pockets, and the segment also contains multiple driveways along its length.

*State Route 49 (SR 49)*

SR 49 is a north–south state highway that passes through many historic mining communities of the 1849 California gold rush. The examined segment of SR 49 is part of the California Freeway and Expressway System but is not part of the National Highway System.

The examined segment of SR 49 is approximately 1.7 miles long. The segment is a two-lane, undivided highway with one 12-foot wide lane in each direction, paved shoulders that vary from 0 to 4 feet in width, and unpaved shoulders that vary from 0 to 4 feet in width. The segment begins in Coloma at the intersection with SR 153. The segment continues north through Marshall Gold Discovery State Historic Park and ends at the intersection with Marshall Road. The majority of the examined segment is located in the Marshall Gold Discovery State Historic Park. The posted speed through the majority of the park is 25-mph. The speed limit increases to 40-mph just south of the northern limit of the park. Within the park are multiple pedestrian crossings and space for vehicles to park along the roadway shoulders. The section of the examined segment from the northern limit of the park to Marshall Road has a posted speed limit of 40-mph. The intersection with Lotus Road is All Way Stop Controlled (AWSC), located just north of the exit from the park. The intersection with Marshall Road (also AWSC) is located a half-mile north of Lotus Road.

## Mitigation Options

While this memorandum primarily focuses on the feasibility of vehicle turnouts, passing lanes were also considered as a potential mitigation measure. The following discussion regarding the potential feasibility of improvements is based on a windshield survey conducted along select segments of SR 193 and SR 49, to assess general roadway conditions, as it related to their ability to accommodate considered improvements.

*Passing lanes along SR 193*

The Caltrans's Highway Design Manual (HDM) 204.5 (3) "Two-lane Road Climbing and Passing Lanes" states: "Climbing and passing lanes are most effective on uphill grades and curving alignment where the speed differential among vehicles is significant. Climbing and passing lanes should normally not be constructed on tangent sections where the length of tangent equals or exceeds the passing sight distance, because passing will occur at such locations without a passing lane and the double barrier stripe increases delay for opposing traffic. Where the Average Daily Traffic (ADT) exceeds 5,000, 4-lane passing sections may be considered." The projected 2035 ADT volume for the examined segment of SR 193 is 6,120. The HDM also indicates that the Headquarters Division of Traffic Operations should be consulted regarding the length of climbing and passing lanes, which will vary with the design speed of the highway, the traffic volume, and other factors.

Based on the HDM and the results of the windshield survey, there are three (3) passing lanes opportunities that could be considered:

1. At the beginning of the segment – east of American River Trail,
2. In the middle – between Coon Creek Road and Lou Allen Lane
3. At the end – just south of Evergreen Court

The passing opportunities would widen the existing two-lane sections to four-lane sections and would be anticipated to be approximately 2,000 to 2,500-feet long. The spacing between the passing opportunities, based on the description above, would be approximately 4 miles. The general locations that, based on this review, appear to be feasible locations for passing lanes are shown on Exhibit 1.

*SR 193 Turnouts*

Section 204.5 (4) of the HDM (Turnouts) states:

> "*(a) General*. On a two-lane highway where passing is limited, the California Vehicle Code requires slow-moving vehicles followed by five or more vehicles to turn off at designated turnouts or wherever

sufficient area for a safe turnout exists. Designated turnouts may be constructed in hilly or mountainous terrain or on winding roads in other areas. Where less than 4-foot shoulders are provided on ascending grades, consideration should be given to providing several short sections of 4 feet or wider shoulder as turnouts for bicycle passing. Frequent turnouts that are at least 30 feet in length are recommended on sustained uphill grades. These turnouts will allow safe passing of bicycles by other bicyclists and vehicles in addition to providing resting opportunities on the sustained grade for bicyclists.

*(b) Length*. Designated turnouts should be from 200 feet to 500 feet long including a short taper (usually 50 feet) at each end. Approach speeds, grades, traffic volumes, and available space are some factors to be considered in determining the length. The Headquarters Traffic Liaison should be consulted if longer turnouts are desired.

*(c) Width*. Paved widths of at least 15 feet in fill sections and 12 feet in cut sections are recommended. Width is measured from the edge of traveled way. On the outside of curves along steep fill slopes or drop offs, greater width or the installation of guardrail should be considered.

*(d) Location*. Turnouts should be located where there is stopping sight distance for approaching drivers to see vehicles leaving and re-entering the through lanes."

There are five (5) locations along the examined segment of SR 193 that have been initially identified for the consideration of vehicle turnouts. The locations of these turnouts are spaced approximately 2 miles apart in each direction. The locations of potential vehicle turnouts are shown on Exhibit 1.

*Passing Lanes and Turnouts on SR 49*

Passing lanes and turnouts are likely not feasible along the examined segment of SR 49. The following discussion provides, on a section by section basis, a description of the examined segment of SR 49 to support this conclusion:

- Section A is located between SR 153 and Coloma Heights Road, is approximately 720 feet long, and contains residences and parking adjacent to the road. Section A does not contain enough space to provide turnouts without eliminating parking and/or impacting the residences.
- Section B is located within the Marshall Gold Discovery State Historic Park. There are existing buildings on both sides of the roadway, and many vehicles utilize the available space along the shoulder to park their vehicle. The speed limit within the park is 25-mph.
- Section C is located between the northern limit of the park and the AWSC intersection with Lotus Road. Section C is approximately 2,500 feet long. Along the southern half of Section C, the speed limit is 40-mph. The northern half of Section C is located on a horizontal curve, ending at the intersection with Lotus Road.
- Section D is located between Lotus Road and Marshal Road, and is approximately 2,800 feet long. Just north of Lotus Road, approximately 600 feet of Section D is located along a bridge. The rest of Section D is located on a horizontal curve. There are three (3) intersections along this segment and multiple driveways to access businesses located along Section D.

Exhibit 2 provides a visual depiction of the characteristics of SR 49. As the examined segment of SR 49 is only 1.7 miles long, has rolling development along its edge, it travels through Marshall Gold Discovery State Historic Park, and contains parking, intersections and driveways to businesses and residences along

entirety of its length, it would likely not be feasible to construct passing lanes or turnouts without significant impacts to the immediate area.

## Capacity Analysis

The HCM 6th Edition does not specifically address the impact of turnouts on capacity analysis for two-lane highways. In addition, there is not a commonly accepted methodology within the transportation industry for analyzing the impact of turnouts. There have been limited efforts to develop simulation tools to understand the impact of turnouts on traffic operations, however these analysis tools have not been widely accepted. As part of the efforts undertaken to prepare this memorandum, a limited literature review was undertaken and alternative sources, including the Florida Department of Transportation (FDOT) Quality of Service Manual, were consulted. FDOT is considered to be a leader in the development and application of service volumes for the purpose of planning level analyses and has developed adjustment factors for some conditions not analyzed in the HCM. However, neither the FDOT Quality of Service Manual or any other sources were identified as being definitive on the subject.

The two-lane highway chapter of the HCM (Chapter 15) does, however, include analysis techniques for consideration of passing lanes. Based on the understanding that turnouts have a similar impact, albeit different operational approach, as passing lanes (allow faster moving traffic to pass slower moving traffic) an alternative method was developed to determine the impacts of turnouts on traffic operations using passing lanes. Based on the operational characteristics of a typical scenario under which a turn out would be utilized, an equivalent passing lane value was developed for use within the exiting HCM two-lane methodology. The assumptions underlying the development of this value are summarized in Appendix A. Given the less detailed nature of the approach detailed in this memorandum, it should be considered appropriate for understanding planning level impacts, however it should not be considered a definitive operational analysis for the reasons noted above.

Exhibit 3 summarizes the weekday operational impact of turnouts and passing lanes along SR 193 (SR 49 is excluded given that turnouts are considered unlikely to be feasible).

Exhibit 3 – Turnout Analysis of SR 193

| Roadway Segment | Direction | No Passing Lane | | | | With Passing Lane | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | AM | | PM | | AM | | PM | |
| | | PTSF | LOS | PTSF | LOS | PTSF | LOS | PTSF | LOS |
| SR 193 - American River to Sweetwater | EB | 38% | A | 78% | D | 38% | A | 74% | D |
| SR 193 - Sweetwater to American River | WB | 72% | D | 49% | B | 74% | D | 48% | B |
| SR 193 - Sweetwater to Evergreen | EB | 41% | B | 76% | D | 40% | B | 71% | D |
| SR 193 - Evergreen to Sweetwater | WB | 75% | D | 51% | B | 70% | D | 51% | B |

Note that it is understood that weekend traffic volumes, particularly during some seasons, may be significantly higher given the proximity of these roadways to recreational areas. As such, the level of service reflected in Exhibit 3 is not anticipated to reflect a worst-case scenario, or even what may be a common occurrence during some weekends of the year. As such, it is likely worthwhile to collect weekend traffic count data during conditions that are reflective of peak weekend conditions to determine the impact to weekend traffic operations (when potential improvements may be most needed). These volumes could then be grown using a nominal rate to reflect anticipated 2035 conditions (the EDC Travel Demand Model, like most travel demand models, only forecasts weekday volumes).

## Recommendations

Following are the recommendations and findings of the analysis undertaken:

- The examined segment of SR 193 can feasibly accommodate both passing lanes and turnouts.
- Passing lanes and turnouts are likely not feasible along the examined segment of SR 49.
- As shown on **Exhibit 1**, there are five locations along SR 193 identified for potential placement of turnouts. In addition, though not a focus of this analysis, as shown there are several locations that may be feasible for passing lanes.
- As shown in **Exhibit 3**, turnouts are anticipated to improve traffic operations.
- Given the proximity of SR 193 and SR 49 to recreational areas, traffic conditions are likely worse than presented within this memorandum during many weekends of the year.

## Appendix A – Summary of Turnout Assumptions Used to Develop Passing Lane Equivalence

Effective passing lane length for a two-lane highway pull-out was calculated assuming a five vehicle (25-foot) platoon traveling at 30 mph with a 2 second following distance. The resulting effective passing lane length was approximately 565-feet (0.11 mile). This length was used in two-lane highway with passing lane analysis consistent with the HCM.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 30 | mile | | x | feet? | | | | | |
| | 1 | hr | | 2 | sec | | | | | |
| | | | | | | | | | | |
| | 30 | mile | | x | mile | | | | | |
| | 60 | min | | 0.033333 | min | | | | | |
| | | | | | | | | | | |
| | 0.0167 | mile | = | x | | | | | | |
| | | | | | | | | | | |
| | 88 | feet | = | x | | | | | | |
| | | | | | | | | | | |
| | 5 | vehicle platoon | | | | | | | | |
| | | | | | | | | | | |
| | 565 | feet | = | effective passing lane | | | | | | |
| | 0.107 | mile | | | | | | | | |
| | | Ld | = | Lt | - | (Lu + Lpl + Lde) | | | | *based on Ex. 15-23 HCM 6 |
| | | | | | | | | | | |
| | | Y | = | X | - | =((X*0.1)+0.107+13) | | | | *assume <200 pc/h |
| | | | | | | | | | | |
| | | PTSFpl | = | PTSFd | [ | Lu + Ld + fplptsfLpl + | ((1 + fplptsf) / 2) | * Lde] | | *based on Ex. 15-26 HCM 6 |
| | | | | | | Lt | | | | |

Appendix C – Fair Share Percentages

Scenario 1

| ID | Segment/Interchange | Zone 1 | Zone 2 | Zone 3 | Zone 4 | Zone 5 | Zone 6 | Zone 7 | Zone 8 | Internal Subtotal | External | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Highway 50 Auxiliary Lanes** | | | | | | | | | | | | |
| 301 | US-50 EB, County Line to Latrobe Rd | 0.54% | 13.69% | 2.12% | 1.31% | 0.99% | 0.86% | 0.96% | 25.65% | 46.13% | 53.87% | 100.00% |
| 302 | US-50 EB, Bass Lake Rd to Cambridge Rd | 1.05% | 31.78% | 4.98% | 2.56% | 2.09% | 1.81% | 1.55% | 13.53% | 59.36% | 40.64% | 100.00% |
| 303 | US-50 EB, Cambridge Rd to Cameron Park Dr | 1.35% | 29.80% | 6.94% | 3.54% | 2.84% | 2.41% | 2.05% | 11.47% | 60.39% | 39.61% | 100.00% |
| 304 | US-50 EB, Cameron Park Dr to Ponderosa Rd | 1.86% | 26.02% | 10.78% | 5.08% | 4.45% | 3.65% | 2.84% | 7.46% | 62.14% | 37.86% | 100.00% |
| 305 | US-50 WB, Ponderosa Rd to Cameron Park Dr | 1.86% | 26.02% | 10.78% | 5.08% | 4.45% | 3.65% | 2.84% | 7.46% | 62.14% | 37.86% | 100.00% |
| 306 | US-50 WB, Cameron Park Dr Cambridge Rd | 1.35% | 29.80% | 6.94% | 3.54% | 2.84% | 2.41% | 2.05% | 11.47% | 60.39% | 39.61% | 100.00% |
| 307 | US-50 WB, Cambridge Rd to Bass Lake Rd | 1.05% | 31.78% | 4.98% | 2.56% | 2.09% | 1.81% | 1.55% | 13.53% | 59.36% | 40.64% | 100.00% |
| 308 | US-50 WB, Bass Lake Rd to Silva Valley Pkwy | 0.78% | 26.19% | 3.87% | 2.00% | 1.59% | 1.35% | 1.11% | 20.64% | 57.52% | 42.48% | 100.00% |
| 309 | US-50 WB, El Dorado Hills Blvd to County Line | 0.54% | 13.69% | 2.12% | 1.31% | 0.99% | 0.86% | 0.96% | 25.65% | 46.13% | 53.87% | 100.00% |
| **Highway 50 Interchange Projects** | | | | | | | | | | | | |
| 401 | El Dorado Hills Boulevard | 0.02% | 5.02% | 0.45% | 0.62% | 0.10% | 0.08% | 0.76% | 52.26% | 59.31% | 40.69% | 100.00% |
| 402 | Silva Valley Parkway, Phase 2 | 0.12% | 13.29% | 2.29% | 1.12% | 0.72% | 0.41% | 0.45% | 50.69% | 69.10% | 30.90% | 100.00% |
| 403 | Bass Lake Road | 0.04% | 18.81% | 1.11% | 0.24% | 0.25% | 0.15% | 0.20% | 48.71% | 69.51% | 30.49% | 100.00% |
| 404 | Cambridge Road | 0.10% | 59.61% | 1.68% | 0.94% | 0.53% | 0.34% | 0.44% | 11.21% | 74.85% | 25.15% | 100.00% |
| 405 | Cameron Park Drive | 0.19% | 63.25% | 3.81% | 1.05% | 1.26% | 0.78% | 0.44% | 9.90% | 80.68% | 19.32% | 100.00% |
| 406 | Ponderosa Road | 0.16% | 51.52% | 6.86% | 9.81% | 0.96% | 0.34% | 2.70% | 6.88% | 79.21% | 20.79% | 100.00% |
| 407 | El Dorado Road | 0.14% | 11.68% | 62.32% | 1.98% | 2.92% | 0.74% | 0.76% | 3.23% | 83.77% | 16.23% | 100.00% |
| **Roadway Improvements** | | | | | | | | | | | | |
| 1 | Bass Lake Road, North of US-50 | 0.04% | 23.44% | 1.00% | 0.15% | 0.24% | 0.14% | 0.19% | 44.69% | 69.89% | 30.11% | 100.00% |
| 15 | Cameron Park Drive, South of Sudbury Road | 0.07% | 75.62% | 2.61% | 0.27% | 0.67% | 0.50% | 0.40% | 7.94% | 88.08% | 11.92% | 100.00% |
| 52 | Green Valley Road, West of Sophia Parkway | 0.02% | 9.96% | 0.11% | 10.09% | 0.03% | 0.02% | 0.03% | 27.34% | 47.62% | 52.38% | 100.00% |
| 58 | Green Valley Road, East of Francisco Drive | 0.03% | 15.76% | 0.13% | 15.10% | 0.02% | 0.02% | 0.01% | 17.06% | 48.13% | 51.87% | 100.00% |
| 77 | Latrobe Road, Investment Boulevard | 0.00% | 2.25% | 0.02% | 0.03% | 0.01% | 0.01% | 10.95% | 10.82% | 24.09% | 75.91% | 100.00% |
| 90 | Missouri Flat Road, South of China Garden Road | 1.54% | 8.00% | 47.37% | 0.76% | 0.20% | 11.35% | 6.54% | 2.92% | 78.68% | 21.32% | 100.00% |
| 148 | White Rock Road, West of Windfield | 0.07% | 2.71% | 0.35% | 0.44% | 0.15% | 0.11% | 1.17% | 48.23% | 53.22% | 46.78% | 100.00% |
| 149 | White Rock Road, At County Line | 0.05% | 1.76% | 0.26% | 0.34% | 0.12% | 0.08% | 0.96% | 45.20% | 48.77% | 51.23% | 100.00% |
| 150 | White Rock Road, East of Post Street | 0.19% | 8.79% | 1.75% | 0.98% | 0.72% | 0.43% | 0.65% | 57.57% | 71.10% | 28.90% | 100.00% |
| P1 | Saratoga Way, Saratoga Way to Iron Point Road | 0.05% | 3.31% | 0.41% | 0.81% | 0.18% | 0.11% | 0.16% | 43.98% | 49.02% | 50.98% | 100.00% |
| P2 | Country Club Drive, El Dorado Hills Boulevard to Silva Valley Parkway | 0.23% | 19.39% | 3.33% | 1.31% | 1.10% | 0.67% | 0.46% | 48.81% | 75.30% | 24.70% | 100.00% |
| P3 | Country Club Drive, Silva Valley Parkway to Tong Road | 0.12% | 7.65% | 0.74% | 0.57% | 0.36% | 0.24% | 0.30% | 66.05% | 76.03% | 23.97% | 100.00% |
| P4 | Country Club Drive, Tong Road to Bass Lake Road | 0.25% | 23.60% | 2.41% | 1.27% | 0.97% | 0.62% | 0.54% | 53.23% | 82.90% | 17.10% | 100.00% |
| P5 | Country Club Drive, Bass Lake Road to Tierra de Dios Drive | 0.05% | 48.98% | 0.29% | 0.21% | 0.13% | 0.08% | 0.14% | 23.39% | 73.27% | 26.73% | 100.00% |
| P6 | Diamond Springs Parkway, Missouri Flat Road to SR-49 | 1.76% | 7.25% | 47.19% | 0.84% | 1.84% | 12.85% | 5.81% | 2.87% | 80.39% | 19.61% | 100.00% |
| P7 | Latrobe Road Connector, White Rock Road to Golden Foothills Parkway | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 2.72% | 40.34% | 43.07% | 56.93% | 100.00% |
| P8 | Headington Road, El Dorado Road to Missouri Flat Road | 0.17% | 0.67% | 93.63% | 0.00% | 0.00% | 4.62% | 0.86% | 0.00% | 99.95% | 0.05% | 100.00% |

Scenario 2

| ID | Segment/Interchange | Zone 1 | Zone 2 | Zone 3 | Zone 4 | Zone 5 | Zone 6 | Zone 7 | Zone 8 | Internal Subtotal | External | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Highway 50 Auxiliary Lanes** | | | | | | | | | | | | |
| 301 | US-50 EB, County Line to Latrobe Rd | 0.54% | 13.55% | 2.12% | 1.31% | 0.99% | 0.86% | 0.96% | 25.79% | 46.13% | 53.87% | 100.00% |
| 302 | US-50 EB, Bass Lake Rd to Cambridge Rd | 1.05% | 31.74% | 4.98% | 2.56% | 2.09% | 1.81% | 1.55% | 13.57% | 59.36% | 40.64% | 100.00% |
| 303 | US-50 EB, Cambridge Rd to Cameron Park Dr | 1.35% | 29.75% | 6.94% | 3.54% | 2.84% | 2.41% | 2.05% | 11.51% | 60.39% | 39.61% | 100.00% |
| 304 | US-50 EB, Cameron Park Dr to Ponderosa Rd | 1.86% | 25.97% | 10.78% | 5.08% | 4.45% | 3.65% | 2.84% | 7.52% | 62.14% | 37.86% | 100.00% |
| 305 | US-50 WB, Ponderosa Rd to Cameron Park Dr | 1.86% | 25.97% | 10.78% | 5.08% | 4.45% | 3.65% | 2.84% | 7.52% | 62.14% | 37.86% | 100.00% |
| 306 | US-50 WB, Cameron Park Dr Cambridge Rd | 1.35% | 29.75% | 6.94% | 3.54% | 2.84% | 2.41% | 2.05% | 11.51% | 60.39% | 39.61% | 100.00% |
| 307 | US-50 WB, Cambridge Rd to Bass Lake Rd | 1.05% | 31.74% | 4.98% | 2.56% | 2.09% | 1.81% | 1.55% | 13.57% | 59.36% | 40.64% | 100.00% |
| 308 | US-50 WB, Bass Lake Rd to Silva Valley Pkwy | 0.78% | 25.90% | 3.87% | 2.00% | 1.59% | 1.35% | 1.11% | 20.93% | 57.52% | 42.48% | 100.00% |
| 309 | US-50 WB, El Dorado Hills Blvd to County Line | 0.54% | 13.55% | 2.12% | 1.31% | 0.99% | 0.86% | 0.96% | 25.79% | 46.13% | 53.87% | 100.00% |
| **Highway 50 Interchange Projects** | | | | | | | | | | | | |
| 401 | El Dorado Hills Boulevard | 0.02% | 4.96% | 0.45% | 0.62% | 0.10% | 0.08% | 0.76% | 52.32% | 59.31% | 40.69% | 100.00% |
| 402 | Silva Valley Parkway, Phase 2 | 0.12% | 13.14% | 2.29% | 1.12% | 0.72% | 0.41% | 0.45% | 50.84% | 69.10% | 30.90% | 100.00% |
| 403 | Bass Lake Road | 0.04% | 17.88% | 1.11% | 0.24% | 0.25% | 0.15% | 0.20% | 49.64% | 69.51% | 30.49% | 100.00% |
| 404 | Cambridge Road | 0.10% | 59.49% | 1.68% | 0.94% | 0.53% | 0.34% | 0.44% | 11.33% | 74.85% | 25.15% | 100.00% |
| 405 | Cameron Park Drive | 0.19% | 63.13% | 3.81% | 1.05% | 1.26% | 0.78% | 0.44% | 10.02% | 80.68% | 19.32% | 100.00% |
| 406 | Ponderosa Road | 0.16% | 51.46% | 6.86% | 9.81% | 0.96% | 0.34% | 2.70% | 6.93% | 79.21% | 20.79% | 100.00% |
| 407 | El Dorado Road | 0.14% | 11.65% | 62.32% | 1.98% | 2.92% | 0.74% | 0.76% | 3.25% | 83.77% | 16.23% | 100.00% |
| **Roadway Improvements** | | | | | | | | | | | | |
| 1 | Bass Lake Road, North of US-50 | 0.04% | 20.28% | 1.00% | 0.15% | 0.24% | 0.14% | 0.19% | 47.85% | 69.89% | 30.11% | 100.00% |
| 15 | Cameron Park Drive, South of Sudbury Road | 0.07% | 75.59% | 2.61% | 0.27% | 0.67% | 0.50% | 0.40% | 7.97% | 88.08% | 11.92% | 100.00% |
| 52 | Green Valley Road, West of Sophia Parkway | 0.02% | 9.95% | 0.11% | 10.09% | 0.03% | 0.02% | 0.03% | 27.35% | 47.62% | 52.38% | 100.00% |
| 58 | Green Valley Road, East of Francisco Drive | 0.03% | 15.74% | 0.13% | 15.10% | 0.02% | 0.02% | 0.01% | 17.08% | 48.13% | 51.87% | 100.00% |
| 77 | Latrobe Road, Investment Boulevard | 0.00% | 2.24% | 0.02% | 0.03% | 0.01% | 0.01% | 10.95% | 10.83% | 24.09% | 75.91% | 100.00% |
| 90 | Missouri Flat Road, South of China Garden Road | 1.54% | 7.98% | 47.37% | 0.76% | 0.20% | 11.35% | 6.54% | 2.94% | 78.68% | 21.32% | 100.00% |
| 148 | White Rock Road, West of Windfield | 0.07% | 2.65% | 0.35% | 0.44% | 0.15% | 0.11% | 1.17% | 48.29% | 53.22% | 46.78% | 100.00% |
| 149 | White Rock Road, At County Line | 0.05% | 1.71% | 0.26% | 0.34% | 0.12% | 0.08% | 0.96% | 45.24% | 48.77% | 51.23% | 100.00% |
| 150 | White Rock Road, East of Post Street | 0.19% | 8.64% | 1.75% | 0.98% | 0.72% | 0.43% | 0.65% | 57.72% | 71.10% | 28.90% | 100.00% |
| P1 | Saratoga Way, Saratoga Way to Iron Point Road | 0.05% | 3.27% | 0.41% | 0.81% | 0.18% | 0.11% | 0.16% | 44.02% | 49.02% | 50.98% | 100.00% |
| P2 | Country Club Drive, El Dorado Hills Boulevard to Silva Valley Parkway | 0.23% | 19.20% | 3.33% | 1.31% | 1.10% | 0.67% | 0.46% | 49.00% | 75.30% | 24.70% | 100.00% |
| P3 | Country Club Drive, Silva Valley Parkway to Tong Road | 0.12% | 7.31% | 0.74% | 0.57% | 0.36% | 0.24% | 0.30% | 66.39% | 76.03% | 23.97% | 100.00% |
| P4 | Country Club Drive, Tong Road to Bass Lake Road | 0.25% | 22.81% | 2.41% | 1.27% | 0.97% | 0.62% | 0.54% | 54.02% | 82.90% | 17.10% | 100.00% |
| P5 | Country Club Drive, Bass Lake Road to Tierra de Dios Drive | 0.05% | 45.73% | 0.29% | 0.21% | 0.13% | 0.08% | 0.14% | 26.64% | 73.27% | 26.73% | 100.00% |
| P6 | Diamond Springs Parkway, Missouri Flat Road to SR-49 | 1.76% | 7.23% | 47.19% | 0.84% | 1.84% | 12.85% | 5.81% | 2.88% | 80.39% | 19.61% | 100.00% |
| P7 | Latrobe Road Connector, White Rock Road to Golden Foothills Parkway | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 2.72% | 40.34% | 43.07% | 56.93% | 100.00% |
| P8 | Headington Road, El Dorado Road to Missouri Flat Road | 0.17% | 0.67% | 93.63% | 0.00% | 0.00% | 4.62% | 0.86% | 0.00% | 99.95% | 0.05% | 100.00% |