Addendum

to the

U.S. 50/Ponderosa Road/South Shingle Road Interchange Improvements Project

Initial Study/Mitigated Negative Declaration

(SCH #2018012042)

El Dorado County
Department of Transportation
2850 Fairlane Court
Placerville, CA 95667

March 2025

Project Background and Description

The U.S. 50/Ponderosa Road/South Shingle Road Interchange Improvements Project (Project) was approved by the Board of Supervisors in March of 2020 with the selection of Alternative 1. The proposed Project entails modifying the existing U.S. 50/Ponderosa Road/South Shingle Road interchange and adjacent frontage roads. Modifications would include increasing the capacity of the overcrossing from three to five lanes; widening the westbound on-ramps; providing acceleration/deceleration lanes at all ramps; adding turn pockets on the local roads at ramp intersections; and adding square ramp junctions and islands to provide safety and ADA compliance for pedestrians and bicycles (Figures 1 through 3). General speaking, the project extends westerly along the mainline for approximately 450 feet and easterly 600 feet. To the north, widening would extend 450 feet just north of the Ponderosa Road and North Shingle Road junction; and in a southern direction 600 feet to the South Shingle Road and Sunset Lane junction. The project footprint encompasses approximately 165 acres and would involve partial and full right of way acquisitions. The project has been designed to reduce travel delays through the project area associated with traffic congestion, improve multimodal access and mobility, and accommodate the needs of future local and regional traffic.

Design, right of way acquisitions, utility relocations (including undergrounding), and construction of the ultimate project will be phased. Currently, the tentative phasing plan includes three phases: Phase 1 is the realignment of Durock Road, Phase 2 is the realignment of North Shingle Road and westbound off-ramp improvements, and Phase 3 is the overcrossing widening and remaining ramp improvements. Interim improvements for the Project that are tentatively planned for construction in 2027 include Phases 1 and 2, as shown in Figure 3. Phase 3 will be constructed at a later date.

Proposed Addendum

This Addendum proposes to amend the project features exhibit of the final Initial Study/Mitigated Negative Declaration (IS/MND) document to include the construction of roundabouts at the intersection of Ponderosa Road and North Shingle Road, and the at the intersection of South Shingle Road with Durock Road and Sunset Lane. Based on further traffic and air quality analysis since approval of the 2020 IS/MND, it was determined that roundabouts perform better operationally than the previously approved signalized intersection design by reducing traffic congestion and thereby pollution due to less idling (see Sections III Air Quality and XVI Transportation). Roundabouts were also selected for public safety purposes. Studies show that roundabouts significantly reduce severe crashes with up to a 40% reduction in total crashes and a 76% reduction in crashes resulting in injuries or fatalities by having fewer vehicle to vehicle and vehicle to pedestrian conflict points[1]. A five-year collision history for the Ponderosa Road/South Shingle Road corridor showed 13 injury-related collisions. Including roundabouts as a design feature is anticipated to reduce the number of vehicle and pedestrian/bicycle accidents at the intersection of Ponderosa Road and North Shingle Road, and the at the intersection of South Shingle Road with Durock Road and Sunset Lane.

[1] https://www.iihs.org/topics/roundabouts
https://highways.dot.gov/safety/intersection-safety/intersection-types/roundabouts

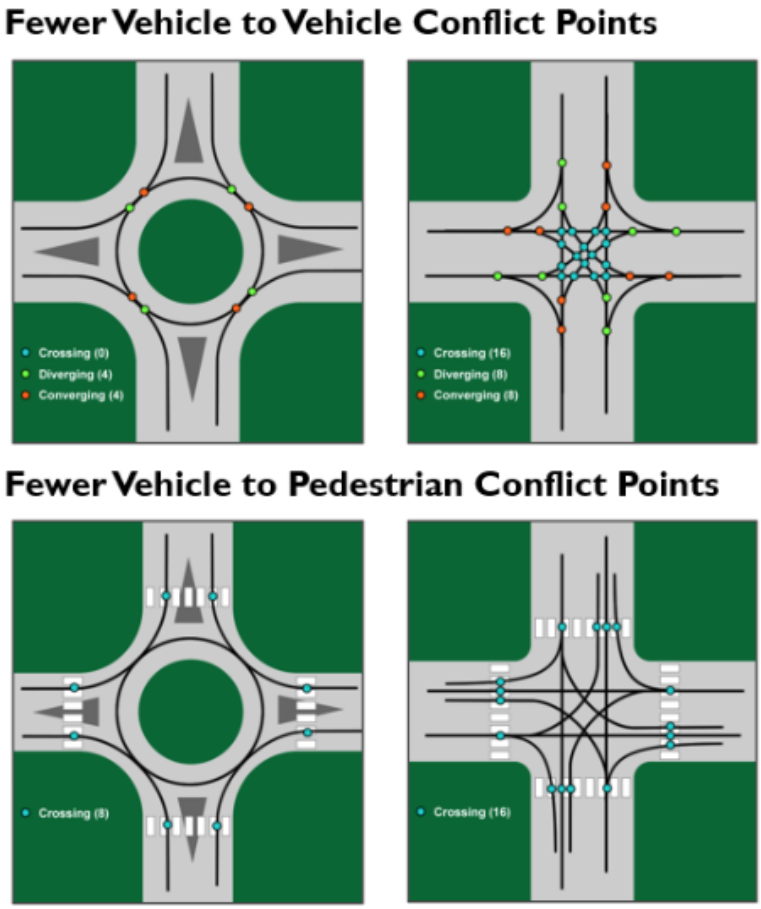


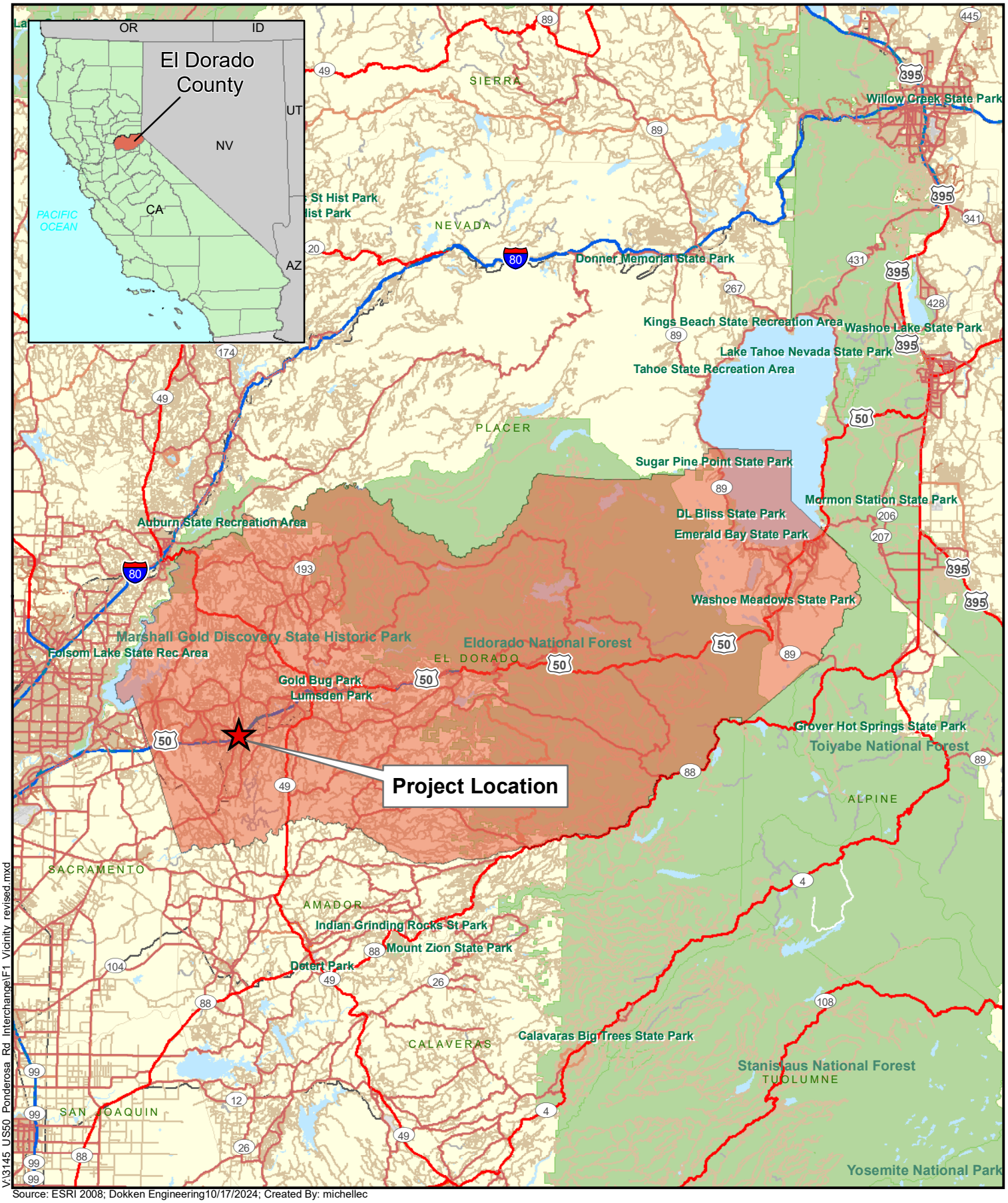
Exhibit A

Lastly, pursuant to the 2023 El Dorado Transit Park-and-Ride Master Plan, the number of parking spaces in the northwest (Wild Chapparal), northeast (North Shingle Road), and southwest (Durock Road) parking lots has changed. The following revisions to Section 2.1.1.2 Parking has been updated to reflect the accurate number of spaces to be removed and replaced as a result of the proposed Project (Build Alternative 1):

Section 2.1.1.2 Parking

Currently there are three park and ride facilities in the project area, located in the northwest, northeast, and southwest quadrants. The northwest lot has ~~113~~ 94 spaces, the northeast lot has ~~28~~ 18 spaces, and the southwest lot has ~~60~~ 44 spaces. Under Build Alternatives 1 and 2, improvements to the interchange on- and off-ramps and the realignment of North Shingle Road would eliminate the park and ride lot in the northeast quadrant which will result in a loss of ~~28~~ 18 parking spaces. Replacement spaces have been incorporated into the project design by adding ~~28~~ 18 spaces to the park and ride lot in the southwest quadrant. As a result, Build Alternatives 1 and 2 would not reduce the number of park and ride parking spaces in the project area.

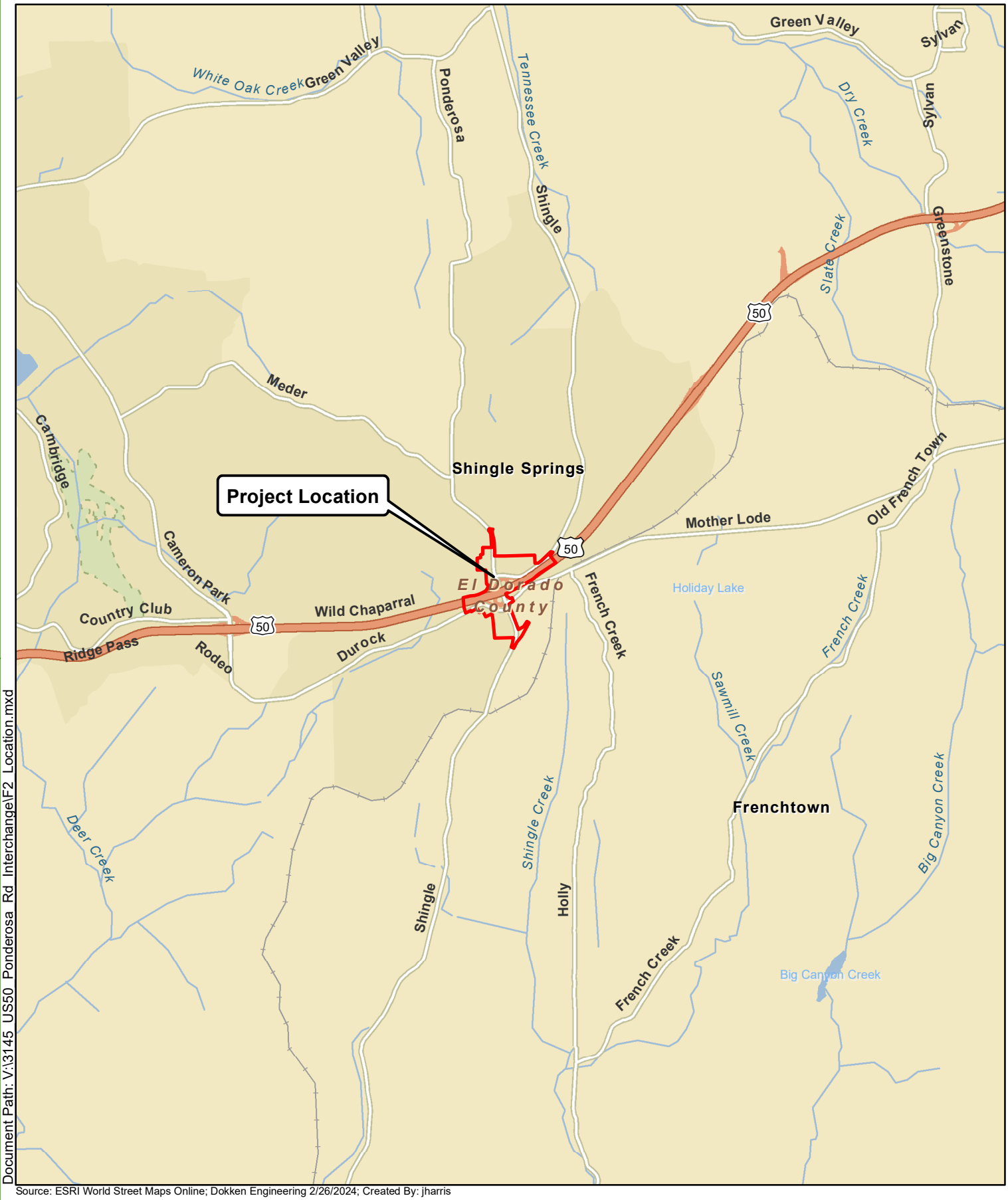
No other changes are proposed as part of this project.



V:\3145_US50_Ponderosa_Rd_Interchange\F1_Vicinity revised.mxd

Source: ESRI 2008; Dokken Engineering10/17/2024; Created By: michellec

FIGURE 1
Project Vicinity
US-50/Ponderosa Road Interchange Improvements Project
El Dorado County, California

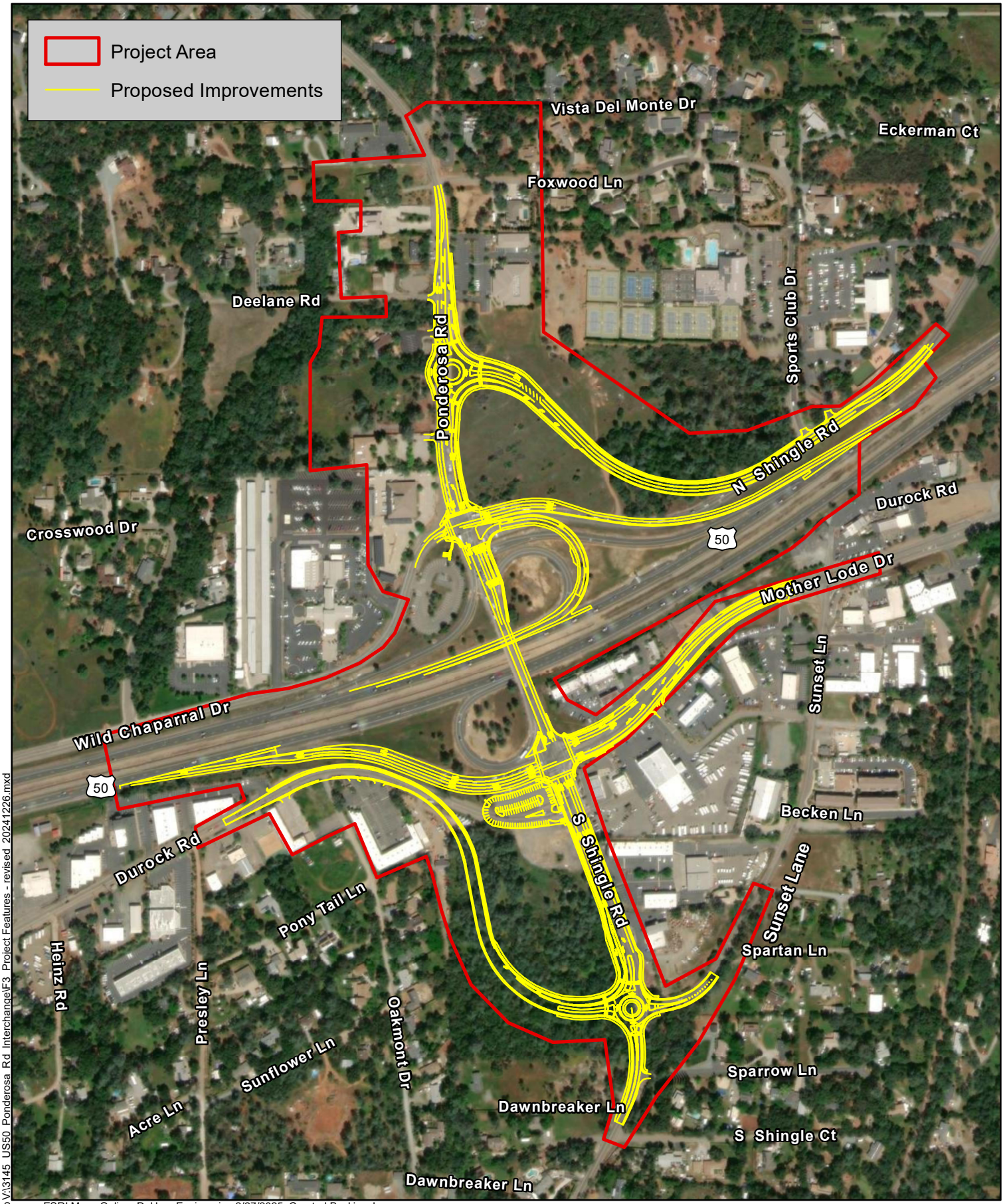


Document Path: V:\3145 US50 Ponderosa Rd Interchange\F2 Location.mxd

Source: ESRI World Street Maps Online; Dokken Engineering 2/26/2024; Created By: jharris

0 0.5 1 1.5 2 Miles

FIGURE 2
Project Location
US-50/Ponderosa Road Interchange Improvements Project
El Dorado County, California



V:\3145 US50 Ponderosa Rd Interchange\F3 Project Features - revised 20241226.mxd

Source: ESRI Maps Online; Dokken Engineering 2/27/2025; Created By: kjacobson

0 300 600 900 1,200 1,500 Feet

Figure 3
Project Features

US-50/Ponderosa Road Interchange Improvements Project
El Dorado County, California

Process and Compliance with CEQA

This document has been prepared to comply with the requirements of the California Environmental Quality Act (CEQA), (PRC §21000, et seq.) as set forth below. El Dorado County is the lead agency for the project for purposes of environmental review under CEQA.

15164. Addendum to an EIR or Negative Declaration

(a) The lead agency or responsible agency shall prepare an addendum to a previously certified EIR if some changes or additions are necessary but none of the conditions described in §15162 calling for preparation of a subsequent EIR have occurred.

(b) An addendum to an adopted negative declaration may be prepared if only minor technical changes or additions are necessary or none of the conditions described in §15162 calling for the preparation of a subsequent EIR or negative declaration have occurred.

(c) An addendum need not be circulated for public review but can be included in or attached to the final EIR or adopted negative declaration.

(d) The decision-making body shall consider the addendum with the final EIR or adopted negative declaration prior to making a decision on the project.

(e) A brief explanation of the decision not to prepare a subsequent EIR pursuant to Section 15162 should be included in an addendum to an EIR, the lead agency's findings on the project, or elsewhere in the record. The explanation must be supported by substantial evidence.

Pursuant to §15164 (e) set forth above, the following is a brief explanation of the decision not to prepare a subsequent EIR pursuant to §15162.

(a) When an EIR has been certified or a negative declaration adopted for a project, no subsequent EIR shall be prepared for that project unless the lead agency determines, on the basis of substantial evidence in the light of the whole record, one or more of the following:

(1) Substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;

Discussion: The change to include roundabouts instead of signalized intersections is not considered a major revision to this Project. As demonstrated in the attached CEQA Checklist, no new significant environmental effects or increase in the severity of previously identified effects will occur as a result of this addendum to include roundabouts as a design feature.

(2) Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR or Negative Declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or

Discussion: As demonstrated in the attached CEQA Checklist, no substantial changes have occurred that require major revisions to the 2020 MND.

(3) New information of substantial importance not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the Negative Declaration was adopted, shows any of the following:

(A) The project will have one or more significant effects not discussed in the previous EIR or negative declaration;

(B) Significant effects previously examined will be substantially more severe than shown in the previous EIR;

(C) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or

(D) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

Discussion: No new information has occurred since certification of the 2020 IS/MND. As demonstrated in the attached CEQA Checklist, no new information occurred or was discovered as a result of this analysis and no new mitigation measures are warranted.

CEQA Checklist

The attached CEQA Checklist provides the supporting documentation demonstrating that no additional impacts or mitigation measures are required for the Project to include roundabouts as a design features (Attachment A).

Mitigation Measures from 2020 IS/MND

All Mitigation Measures set forth in the 2020 IS/MND still apply. The Project site remains the same so no additional studies or surveys are necessary for compliance with CEQA and no additional mitigation measures are required.

ATTACHMENT A

CEQA Guidelines Appendix G
Environmental Checklist Form

1. **Project title**:
   Addendum to the 2020 U.S.50/Ponderosa Road/South Shingle Road Interchange Improvements Project

2. **Lead Agency Name and Address:**
   El Dorado County
   Department of Transportation
   2850 Fairlane Court
   Placerville, CA 95667

3. **Contact Person**:
   Jon Balzer
   Senior Civil Engineer
   (530) 621-5920
   Jon.balzer@edcgov.us

4. **Project Location:**
   The existing U.S.50/Ponderosa Road/South Shingle Road Interchange is located immediately west of Shingle Springs, El Dorado County, California, nine miles west of the City of Placerville and 34 miles east of downtown Sacramento.

5. **General Plan Designation**:
   Commercial, High Density Residential, Medium Density Residential, Low Density Residential, Multi-Family Residential, Industrial, Tourist Recreational, Open Space, Public Facilities

6. **Zoning:**
   Multiple

7. **Description of Project:**
   The proposed improvements entail modifying the existing U.S. 50/Ponderosa Road/South Shingle Road interchange and adjacent frontage roads. Modifications would include increasing the capacity of the overcrossing from three to five lanes; widening the westbound on-ramps; providing acceleration/deceleration lanes at all ramps; adding turn pockets on the local roads at ramp intersections; and adding square ramp junctions and islands to provide safety and ADA compliance for pedestrians and bicycles (Figures 1 through 3). General speaking, the project extends westerly along the mainline for approximately 450 feet and easterly 600 feet. To the north, widening would extend 450 feet just north of the Ponderosa Road and North Shingle Road junction; and in a southern direction 600 feet to the South Shingle Road and Sunset Lane Road junction. The project footprint encompasses approximately 165 acres and would involve partial and full right of way acquisitions. The project has been designed to reduce travel delays through the project area associated with traffic congestion, improve multimodal access and mobility, and accommodate the needs of future local and regional traffic.

Design, right of way acquisitions, utility relocations (including undergrounding), and construction of the ultimate project will be phased. Currently, the tentative phasing plan includes three phases: Phase 1 is the realignment of Durock Road, Phase 2 is the realignment of North Shingle Road and westbound off-ramp improvements, and Phase 3 is the overcrossing widening and remaining ramp improvements. Interim improvements for the Project that are tentatively planned for construction in 2027 include Phases 1 and 2, as shown in Figure 3. Phase 3 will be constructed at a later date. This Air Quality Technical Report Addendum is intended to verify the findings for the ultimate project.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below could result in potentially significant impacts as a result of the new roundabout design feature if mitigation measures are not implemented. As discussed on the following pages, where potentially significant impacts are identified, feasible mitigation was identified to reduce the impacts to a less than significant level. Therefore, potentially significant impacts that are mitigated to “Less Than Significant” are shown here.

☐ Aesthetics	☐ Agriculture and Forestry	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Energy
☐ Geology/Soils	☐ Greenhouse Gas Emissions	☐ Hazards and Hazardous Materials
☐ Hydrology/Water Quality	☐ Land Use/Planning	☐ Mineral Resources
☐ Noise	☐ Population/Housing	☐ Public Services
☐ Recreation	☐ Transportation	☐ Tribal Cultural Resources
☐ Utilities/Service Systems	☐ Wildfire	☐ Mandatory Findings of Significance

No additional impacts would occur as a result of the roundabouts that wasn’t previously disclosed in the 2020 IS/MND.

DETERMINATION:
On the basis of this initial evaluation: (choose appropriate one)

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

X I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required other than this addendum to the U.S. 50/Ponderosa Road/South Shingle Road Interchange Improvement Project Mitigated Negative Declaration.

Signature	*Date*
Jon Balzer	El Dorado County Department of Transportation
Printed Name	*For*

CEQA ENVIRONMENTAL CHECKLIST

Addendum To the U.S. 50/Ponderosa Road/South Shingle Road Interchange Improvement Project 2020 Initial Study/Mitigated Negative Declaration

I. AESTHETICS

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☐	☒
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

Discussion: No additional impacts relative to aesthetics have been identified other than what was previously identified in the 2020 IS/MND and no additional mitigation measures are required.

II. AGRICULTURE AND FOREST RESOURCES

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

Discussion: No agricultural farmland exists in the project area.

III. AIR QUALITY

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☐	☐	☒
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☐	☒

Discussion:

An Air Quality Technical Report Addendum was prepared in 2024 to demonstrate that the proposed Project continues to conform with federal regulations related to air quality and provides the updated modelling results and new input data from the Project Transportation Analysis Report (TAR). The Addendum was also prepared to analyze potential air quality emissions that would result from the addition of roundabouts as a project design feature (see Appendix A). It was determined that the Project does not cause or contribute to any new localized CO, PM2.5, and/or PM10 violations. The U.S. EPA guidance for PM hot-spot analysis and interagency consultation were used to determine whether the Project is a Project of Air Quality Concern (POAQC). The Project obtained concurrence from Regional Planning Partnership that the Project is not a POAQC. While the Project would contribute to short-term temporary construction emissions, the Project with roundabouts as a design feature would meet existing and future traffic demand and contribute to positive progress towards cumulative/regional/indirect effects on air quality standards. See Appendix for the Air Quality Technical Report Addendum.

Therefore, no additional impacts relative to air quality have been identified other than what was previously identified in the 2020 IS/MND and no additional mitigation measures are required.

IV. BIOLOGICAL RESOURCES

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☐	☒

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Discussion: No additional impacts relative to biological resources have been identified other than what was previously identified in the 2020 IS/MND and no additional mitigation measures are required.

V. CULTURAL RESOURCES

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☐	☒
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☐	☐	☒

Discussion: The roundabouts would be constructed within existing roadway. No additional impacts relative to cultural resources have been identified other than what was previously identified in the 2020 IS/MND and no additional mitigation measures are required. Consultation with the Shingle Springs Band of Miwok Indians is on-going.

VI. GEOLOGY AND SOILS

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42?	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☐	☒

iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☒
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒

Discussion: No additional impacts relative to geology and soils have been identified other than what was previously identified in the 2020 IS/MND and no additional mitigation measures are required.

VII. GREENHOUSE GAS EMISSIONS

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☐	☒
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☒

Discussion: No additional impacts relative to greenhouse gas have been identified other than what was previously identified in the 2020 IS/MND and no additional mitigation measures are required.

VIII. HAZARDS AND HAZARDOUS MATERIALS

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☒
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☐	☒

Discussion: No additional impacts relative to hazardous waste have been identified other than what was previously identified in the 2020 IS/MND and no additional mitigation measures are required.

IX. HYDROLOGY AND WATER QUALITY

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☐	☒
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such the project may impede sustainable groundwater management of the basin?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
(i) result in substantial erosion or siltation on- or off-site;	☐	☐	☐	☒
(ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☐	☒
(iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☐	☒
(iv) impede or redirect flood flows?	☐	☐	☐	☒
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☒
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☐	☒

Discussion: No additional impacts relative to hydrology and water quality have been identified other than what was previously identified in the 2020 IS/MND and no additional mitigation measures are required.

X. LAND USE AND PLANNING

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Physically divide an established community?	☐	☐	☐	☒
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

Discussion: No additional impacts relative to Land Use and Planning have been identified other than what was previously identified in the 2020 IS/MND and no additional mitigation measures are required.

XI. MINERAL RESOURCES

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

Discussion: No known mineral resources occur within or adjacent to the Project area.

XII. NOISE

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☒
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Discussion: No additional impacts relative to noise have been identified other than what was previously identified in the 2020 IS/MND and no additional mitigation measures are required

XIII. POPULATION AND HOUSING

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion: No additional impacts relative to population and housing have been identified other than what was previously identified in the 2020 IS/MND and no additional mitigation measures are required.

XIV. PUBLIC SERVICES

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire protection?	☐	☐	☐	☒
b) Police protection?	☐	☐	☐	☒
c) Schools?	☐	☐	☐	☒
d) Parks?	☐	☐	☐	☒
e) Other public facilities?	☐	☐	☐	☒

Discussion: No additional impacts relative to public services have been identified other than what was previously identified in the 2020 IS/MND and no additional mitigation measures are required.

XV. RECREATION

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

Discussion: No recreational facilities are located within or adjacent to the Project area.

XVI. TRANSPORTATION

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☐	☒
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☐	☒
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
d) Result in inadequate emergency access?	☐	☐	☐	☒

Discussion:

A Transportation Analysis Report was prepared for the Project in 2024 to analyze the project design alternatives with roundabouts and their effects on the transportation network (please see Appendix A of the Air Quality Impact Report, attached). Under the No Build Alternative, collision rates would be expected to be similar to existing conditions. With the forecasted increase in traffic volumes, the number of collisions would increase. The ramp with a higher than average fatal and injury collision rate – the eastbound on-ramp – would continue to experience the same collision rate. The exposure for pedestrians and bicyclists would also remain the same. Pedestrians would continue to use the 5-foot-wide sidewalk on the west side of the US 50 overcrossing, and bicyclists would continue to share the roadway with motor vehicles at the US 50 overcrossing.

It was determined in the TAR that the Build Alternative Ultimate Phase with roundabouts would reduce congestion and increase intersection spacing, both of which would reduce collision rates. The northbound to westbound loop on-ramp would be realigned to have a larger radius and higher design speed, which may lead to fewer vehicles leaving the roadway. The Build Alternative would also provide a pedestrian pathway via sidewalks on both sides of the US 50 overcrossing. Signalized crosswalks would be provided for three of the four legs at the US 50 Westbound Ramps intersection and for all four legs at the US 50 Eastbound Ramps intersection. Class II bicycle lanes would be provided for north-south movements across the interchange so that bicycles would no longer have to share a lane with motor vehicles.

The Build Alternative would provide roundabout control at the North Shingle Road and Durock Road/Sunset Lane intersections. Roundabouts have a much lower collision rate than signalized intersections. Roundabouts reduce conflict points and simplify the driving task since drivers need yield to only one direction at the intersection. The slower speeds at roundabouts mean that collisions are less severe when they do happen, especially for vulnerable travelers such as pedestrians and bicyclists.

Therefore, no additional impacts relative to transportation/traffic have been identified other than what was previously identified in the 2020 IS/MND and no additional mitigation measures are required

XVII. TRIBAL CULTURAL RESOURCES

XVII. TRIBAL CULTURAL RESOURCES: Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☐	☐	☒
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☐	☒

Discussion: No additional impacts relative to tribal cultural resources have been identified other than what was previously identified in the 2020 IS/MND and no additional mitigation measures are required.

XVIII. UTILITIES AND SERVICE SYSTEMS

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	☒
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☐	☒
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☐	☒
e) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

Discussion: No additional impacts relative to utilities and service systems have been identified other than what was previously identified in the 2020 IS/MND and no additional mitigation measures are required.

XIX. MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	☒
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☐	☒
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

Discussion: No additional impacts have been identified other than what was previously identified in the 2020 IS/MND and no additional mitigation measures are required.

APPENDIX A – 2024 Air Quality Technical Report Addendum

Air Quality Technical Report Addendum

U.S. 50/Ponderosa Road/South Shingle Springs Road Interchange Improvements Project

El Dorado County
DISTRICT 3 – ED – 50 (PM 8.3/8.7)
EA 03-2E5500

Attention: Jason Lee, PE, Air Quality Specialist,
Caltrans District 3/North Region

From: Ken Chen, Associate Environmental Planner, Dokken Engineering

Subject: Addendum to the 2011 Air Quality Technical Report

Date: January 24, 2025

Introduction

In 2009, an Air Quality Technical Report was prepared by KD Anderson & Associates and approved by Caltrans for the U.S. 50/Ponderosa Road/South Shingle Springs Interchange Improvements Project (Project). At that time, three build alternatives were analyzed (Alternative 1, Alternative 2, and Alternative 3). The alternatives involved differing levels of improvements and different roadway re-alignments in the study area. The Air Quality Technical Report was revised in August 2011 to conduct interagency consultation with the Regional Planning Partnership (RPP), an air quality working group associated with the Sacramento Area Council of Governments (SACOG), and requested concurrence that the Project was not a "Project of Air Quality Concern (POAQC) for $PM_{2.5}$. On August 24, 2011, the RPP concurred with the determination that this Project is not a POAQC for $PM_{2.5}$.

Since then, the El Dorado County Board of Supervisors has approved the CEQA Initial Study with Mitigated Negative Declaration and the layout of the proposed Project, Alternative 1, for the Ponderosa Interchange Project in March of 2020. The Project is currently in the process of completing the final stages of environmental clearance (NEPA) and refining the Project design. In March of 2024, Caltrans requested that the air quality modelling conducted for the Project use average daily traffic (ADT) volumes from the updated November 2024 Transportation Analysis Report (TAR) using EMFAC 2021. This Air Quality Technical Report Addendum demonstrates that the proposed Project continues to conform with federal regulations related to air quality and provides the updated modelling results using EMFAC 2021 and new input data from the Project TAR (See Appendix A).

Project Description

The proposed improvements entail modifying the existing U.S. 50/Ponderosa Road/South Shingle Springs Road interchange and adjacent frontage roads. Modifications would include increasing the capacity of the overcrossing from three to five lanes; widening the westbound on-ramps; providing acceleration/deceleration lanes at all ramps; adding turn pockets on the local roads at ramp intersections; and adding square ramp junctions and islands to provide safety and ADA compliance for pedestrians and bicycles (Figures 1 through 3). General speaking, the project extends westerly along the mainline for approximately 450 feet and easterly 600 feet. To

the north, widening would extend 450 feet just north of the Ponderosa Road and North Shingle Road junction; and in a southern direction 600 feet to the South Shingle Springs Road and Sunset Lane Road junction. The project footprint encompasses approximately 165 acres and would involve partial and full right of way acquisitions. The project has been designed to reduce travel delays through the project area associated with traffic congestion, improve multimodal access and mobility, and accommodate the needs of future local and regional traffic.

Design, right of way acquisitions, utility relocations (including undergrounding), and construction of the ultimate project will be phased. Currently, the tentative phasing plan includes three phases: Phase 1 is the realignment of Durock Road, Phase 2 is the realignment of North Shingle Road and westbound off-ramp improvements, and Phase 3 is the overcrossing widening and remaining ramp improvements. Interim improvements for the Project that are tentatively planned for construction in 2027 include Phases 1 and 2, as shown in Figure 3. Phase 3 will be constructed at a later date. This Air Quality Technical Report Addendum is intended to verify the findings for the ultimate project.

Air Quality Conformity

The proposed Project is located within the Mountain Counties Air Basin (MCAB). The Project site is designated a state and federal attainment area (the area has attained the state and federal air quality standards) for carbon monoxide (CO), a federal non-attainment area for ozone and fine particulate matter smaller than 2.5 microns ($PM_{2.5)}$, and a federal unclassified area for inhalable particulate matter smaller than 10 microns in diameter (designated PM_{10}). The Project site is in a state non-attainment area (the area has not attained the state air quality standards) for ozone and PM_{10}, and is in an unclassified or attainment area for state standards for $PM_{2.5}$.

This Project is included in the 2025-2028 Sacramento Area Council of Governments (SACOG) Metropolitan Transportation Improvement Program (MTIP) and the 2023 SACOG Metropolitan Transportation Plan/Sustainable Communities Strategy(MTP/SCS). On December 16, 2024, the FHWA and FTA issued a finding that the SACOG fiscally-constrained 2025-2028 MTIP was in conformance with federal air quality and planning regulations. On February 6, 2024 FHWA and approved SACOG's air quality conformity analysis for the 2023 SACOG MTP/SCS. As the proposed Project design concept and scope of the proposed Project has not changed from how it appears in the 2023 MTP/SCS and 2025-2028 MTIP, it conforms with the regional emissions analysis conducted for the MTIP and MTP/SCS. The relevant pages from the MTIP and MTP/SCS are included in Appendix B.

Updated Long-Term Effects (Operational Emissions)

Operational emissions take into account long-term changes in emissions due to the Project (excluding the construction phase). The operational emissions analysis compares forecasted emissions for existing/baseline, No-Build, and all Build alternatives. Table 1 below contains a summary of all long-term operational emissions associated with the proposed Project. Additional information regarding each criterion pollutant can be found in the following subsections of this chapter and emission calculations can be found in Appendix C.

Table 1. Summary of Comparative Emissions Analysis During Peak Hour

Scenario/ Analysis Year	CO (lbs)	PM_{10} (lbs)	$PM_{2.5}$ (lbs)	NOx (surrogate for NO_2) (lbs)	CO_2 (lbs)
Baseline (Existing Conditions) 2024	335	30	6	59	127,111
No Build Future (2049)	225	36	7	14	111,864
Future + Project (2049)	226	36	7	14	112,329
Source: CT-EMFAC2021					

For NEPA, future Build scenario emissions are compared with future No-Build scenario emissions; for CEQA, future scenario emissions (Build and No-Build) are compared with Baseline (Existing Conditions) emissions in the following sections.

CO Analysis

The CO Protocol was developed for Project-level conformity (hot-spot) analysis and was approved for use by the U.S. EPA in 1997. It provides qualitative and quantitative screening procedures, as well as quantitative (modeling) analysis methods to assess Project-level CO impacts. The qualitative screening step is designed to avoid the use of detailed modeling for Projects that clearly cannot cause a violation, or worsen an existing violation, of the CO standards. Although the protocol was designed to address federal standards, it has been recommended for use by several air pollution control districts in their CEQA analysis guidance documents and should also be valid for California standards because the key criterion (8-hour concentration) is similar: 9 ppm for the federal standard and 9.0 ppm for the state standard.

Transportation conformity requirements for CO cease to apply after June 1, 2018 (20 years after the effective date of the EPA approval of the first 10-year maintenance plan and redesignation of the areas to attainment for the CO NAAQS. As a result, SACOG may reference the attached letter in Appendix D to show that conformity for CO no longer applies in this region; therefore, discussion of CO conformity does not apply to the region as of June 1, 2018.

PM Analysis

Emissions Analysis

PM emissions were estimated for Baseline (2024), No-Build, and Build alternative for the existing and horizon year (2049). The results can be seen in Table 2 below.

Table 2. PM Emissions During Peak Hour

Scenario/ Analysis Year	PM_{10} Emissions (lbs)	% change from Existing	% increase from No Build to Build	$PM_{2.5}$ Emissions (lbs)	% change from Existing	% increase from No Build to Build
Baseline (Existing Conditions) 2024	30			6		
No Build Future (2049)	36	+20%		7	+17%	
Future + Project (2049)	36	+20%	0%	7	+17%	0%
Source: CT-EMFAC2021						

As shown in Table 2, PM_{10} emissions during peak hour would increase in the horizon year when compared to existing peak hour PM_{10} emissions. PM_{10} emissions would increase by 20% by the horizon year under both No Build conditions and Build conditions. PM_{10} emissions in the horizon year with the Project would be comparable to emissions under No Build conditions.

$PM_{2.5}$ emissions during peak hour would increase in the horizon year when compared to existing peak hour $PM_{2.5}$ emissions. $PM_{2.5}$ emissions would increase by 17% by the horizon year under both No Build conditions and Build conditions. $PM_{2.5}$ emissions in the horizon year with the Project would be comparable to emissions under No Build conditions.

Hot-Spot Analysis

In November 2015, the U.S. EPA released an updated version of Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Non-attainment and Maintenance Areas (Guidance) for quantifying the local air quality impacts of transportation Projects and comparing them to the PM NAAQS (75 FR 79370). The U.S. EPA originally released the quantitative guidance in December 2010 and released a revised version in November 2013 to reflect the approval of EMFAC 2011 and U.S. EPA's 2012 PM NAAQS final rule. The November 2015 version reflects MOVES2014 and its subsequent minor revisions such as MOVES2014a, to revise design value calculations to be more consistent with other U.S. EPA programs, and to reflect guidance implementation and experience in the field. Note that EMFAC, not MOVES, should be used for Project hot-spot analysis in California. The Guidance requires a hot-spot analysis to be completed for a Project of air quality concern (POAQC). The final rule in 40 CFR 93.123(b)(1) defines a POAQC as:

(i) New or expanded highway Projects that have a significant number of or significant increase in diesel vehicles;

(ii) Projects affecting intersections that are at Level-of-Service (LOS) D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the Project;

(iii) New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;

(iv) Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and

(v) Projects in or affecting locations, areas, or categories of sites which are identified in the $PM_{2.5}$ and PM_{10} applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

Table 3 details why the Project does not meet the definition of a Project of Air Quality Concern.

Table 3. Projects of Air Quality Concern

EPA Definition of POAQC		Proposed Project
(i)	New or expanded highway Projects that have a significant number of or significant increase in diesel vehicles;	The proposed Project is not a new or expanded highway Project with a significant number of or significant increase in diesel vehicles. The proposed Project is an interchange improvements Project and is designed to improve current and future condition levels of service. Based on the November 2024 Traffic Analysis Report for the U.S. 50/Ponderosa Road Intersection Improvements Project the traffic volumes along U.S. 50 would be 78,100 ADT and would not exceed the 125,000 average daily traffic trips threshold for a POAQC. The Project is also not an expanded highway Project that would have a significant increase in the quantity of diesel vehicles using the facility. The Project is designed to accommodate the existing and projected future traffic volumes and ADT is not anticipated to change due to the Project.
(ii)	Projects affecting intersections that are at Level-of-Service D, E, or F with a significant number of diesel vehicles, or those that will change to Level-of-Service D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the Project;	Diesel/heavy truck traffic is expected to be 5% within the Project Area. The greatest number of trucks at an intersection is estimated to be 173, which is well below the general recommended threshold of 10,000 diesel trucks (i.e. 125,000 volume of which 8% is diesel). The truck percentage is projected to remain the same for both the opening year and the horizon year at approximately 5%.
(iii)	New bus and rail terminals and transfer points than have a significant number of diesel vehicles congregating at a single location;	Bus and rail terminals and transfer points are not a design feature for this Project.
(iv)	Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single	Expanded bus and rail terminals and transfer points are not a design feature for this Project.

EPA Definition of POAQC		Proposed Project
	location; and	
(v)	Projects in or affecting locations, areas, or categories of sites which are identified in the PM_{10} or $PM_{2.5}$ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.	The Project is not in, nor will it affect, a location of violation or possible violation.

NO_2 Analysis

The U.S. EPA modified the NO_2 NAAQS to include a 1-hr standard of 100 ppb in 2010. Currently there is no federal Project-level nitrogen dioxide (NO_2) analysis requirement; however, NO_2 is among the near-road pollutants of concern. For Project-level analysis, a NO_2 assessment protocol is not available; however, CT-EMFAC provides a NO_x (combination of NO and NO_2) emissions estimate. Near-road NO_2 concentrations will likely be dominated by overall NO_x emissions. As long as ozone is present at relatively low (background) concentrations, most of the directly emitted NO will convert to NO_2 within a few seconds. Therefore, NO_x emissions overall can serve as a useful analysis surrogate for NO_2 (see the Caltrans Near-Road Nitrogen Dioxide Assessment (Caltrans, 2012)).

NO_x emissions were estimated for Baseline, No-Build, and Build alternative for the existing year 2024 and horizon year 2049. The results can be seen in Table 4 below.

Table 4. NO_x Emissions During Peak Hour

Scenario/ Analysis Year	NOx Emissions (lbs)	% change from Existing	% increase from No Build to Build
Baseline (Existing Conditions) 2024	59		
No Build Future (2049)	14	-76%	
Future + Project (2049)	14	-76%	+0%
Source: CT-EMFAC2021			

As shown in Table 4, NO_x emissions during peak hour would decrease in the horizon year when compared to existing peak hour NO_x emissions. NO_x emissions would decrease by 76% by the horizon year under both No Build conditions and Build conditions. NO_x emissions in the horizon year with the Project would be comparable to emissions under No Build conditions.

Mobile Source Air Toxics (MSAT) Analysis

FHWA released updated guidance in January 2023 (FHWA, 2023) for determining when and how to address MSAT impacts in the NEPA process for transportation Projects. FHWA identified three levels of analysis:

- No analysis for exempt Projects or Projects with no potential for meaningful MSAT effects;

- Qualitative analysis for Projects with low potential MSAT effects; and
- Quantitative analysis to differentiate alternatives for Projects with higher potential MSAT effects.

Projects with no impacts generally include those that a) qualify as a categorical exclusion under 23 CFR 771.117, b) qualify as exempt under the FCAA conformity rule under 40 CFR 93.126, and c) are not exempt, but have no meaningful impacts on traffic volumes or vehicle mix.

Projects that have low potential MSAT effects are those that serve to improve highway, transit, or freight operations or movement without adding substantial new capacity or creating a facility that is likely to substantially increase emissions. The large majority of projects fall into this category.

Projects with high potential MSAT effects include those that:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of Diesel Particulate Matter in a single location; or
- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is Projected to be in the range of 140,000 to 150,000, or greater, by the horizon year; and
- Are proposed to be located in proximity to populated areas or, in rural areas, in proximity to concentrations of vulnerable populations (i.e., schools, nursing homes, hospitals).

Given that the proposed Project is an interchange improvement project and is designed to improve current and future condition levels of service, and that design-year traffic volume for the modeled area is predicted to be approximately 78,100 ADT under the Build Alternative, the proposed Project falls within Category 2, a Project with low potential MSAT effects. As such, a qualitative MSAT analysis is appropriate.

For each alternative, the amount of MSAT emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. As the Project is shown to have a marginal increase in overall VMT compared to no-build conditions in the horizon year (See Table 4), it is expected there is a marginal increase in overall MSAT emissions as a result of implementation of the Build Alternative. In addition, emissions are virtually certain to be lower than present levels in the horizon year as a result of the EPA's national control programs that are Projected to reduce annual MSAT emissions by 91 percent from 2010 to 2050 (FHWA 2016). Local conditions may differ from these national Projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for regional VMT growth) that MSAT emissions in the study area are likely to be lower in the future than they are today.

Greenhouse Gas Emissions Analysis

Table 5 gives projected CO_2 emissions for existing, horizon year No-Build, and horizon year Build Alternative conditions using peak hour traffic volumes along U.S. 50, Ponderosa Road, and adjacent roadways where the realignment would occur. In the existing year, CO2 emissions were modeled to be 127,111 pounds during peak hour. CO2 emissions in the horizon year under No Build conditions were modeled to be 111,864 pounds during peak hour. CO2

emissions in the horizon year are expected to decrease 12% during peak hour under no-build conditions. CO2 emissions in the horizon year under Build Conditions were modeled to be 112,329 pounds during peak hour. CO2 emissions in the horizon year are expected to increase by 12%, over existing conditions if the Project is implemented. The CT-EMFAC model does not account for the Project's benefits related to congestion or vehicle delay; however, if modeled, these would yield a reduction in the greenhouse gas emissions estimates for the build alternative. The emission estimate below is the most conservative estimate as it does not take any of these other factors into consideration, which would likely reduce the greenhouse gas emissions estimate for the build alternative.

Table 5. CO_2 Emissions During Peak Hour

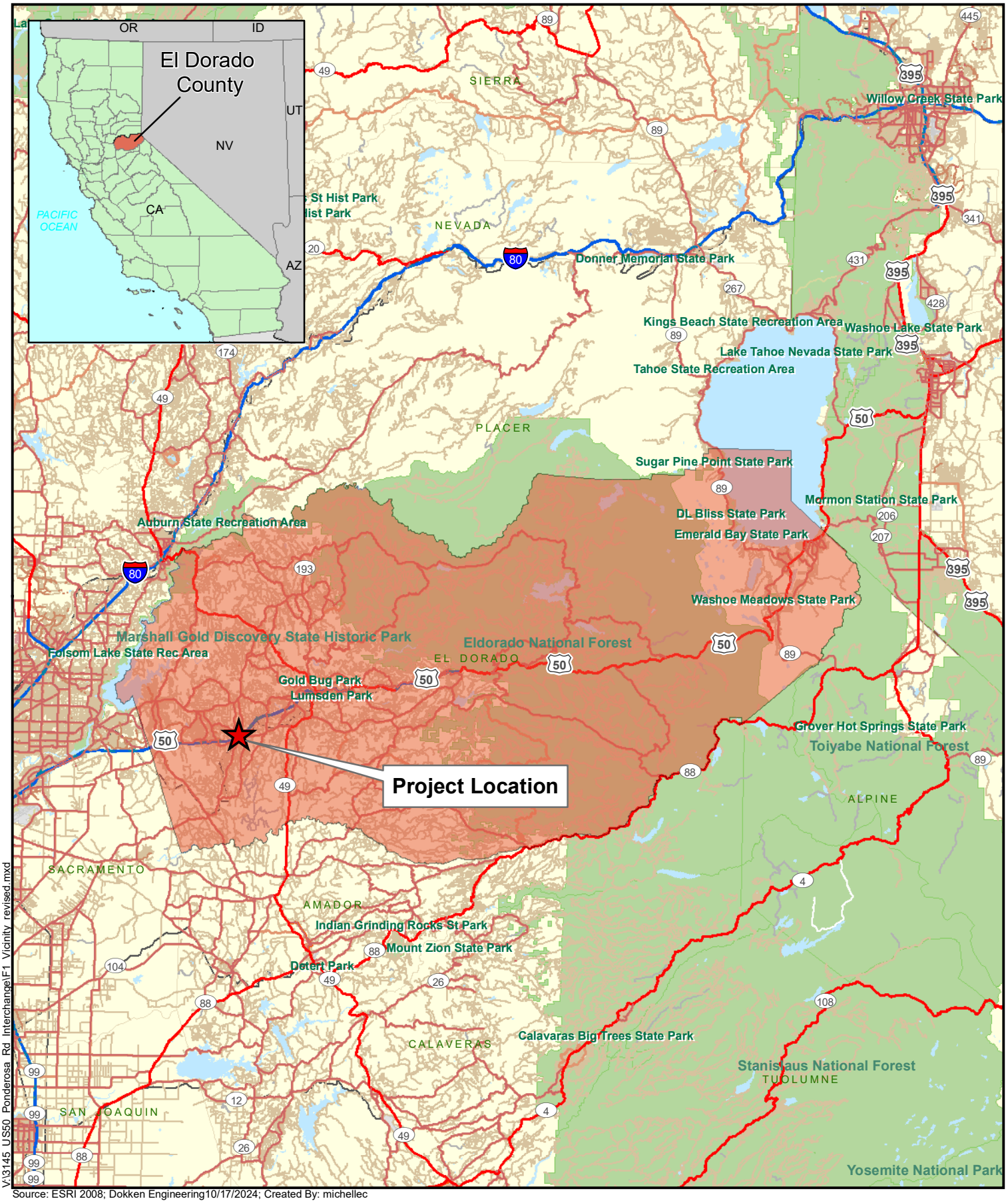
Scenario/ Analysis Year	CO_2 Emissions (lbs)	% change from Existing	% increase from No Build to Build
Baseline (Existing Conditions) 2024	127,111		
No Build Future (2049)	111,864	-12%	
Future + Project (2049)	112,329	-12%	+0.4%
Source: CT-EMFAC2021			

It should be noted that while these emission numbers are useful for comparing alternatives, they do not necessarily accurately reflect what the true CO_2 emissions will be because CO_2 emissions are dependent on other factors that are not part of the model, such as the fuel mix (CT-EMFAC model emission rates are only for direct engine-out CO_2 emissions, not full fuel cycle; fuel cycle emission rates can vary dramatically depending on the amount of additives like ethanol and the source of the fuel components), rate of acceleration, and the aerodynamics and efficiency of the vehicles. The relative magnitudes however, as used for the comparison above, can be assumed to be reasonably accurate.

Conclusion

The Project site is designated a state and federal attainment area for carbon monoxide (CO), a federal non-attainment area for ozone and $PM_{2.5)}$, and a federal unclassified area for PM_{10}. The Project does not cause or contribute to any new localized CO, PM2.5, and/or PM10 violations, or delay timely attainment of any NAAQS or any required interim emission reductions or other milestones during the timeframe of the transportation plan (or regional emissions analysis). The U.S. EPA guidance for PM hot-spot analysis and interagency consultation were used to determine whether the Project is a POAQC. The Project obtained concurrence from RPP that the Project is not a POAQC on August 24, 2011. As the Project design concept and scope of the Project has not changed, this determination remains valid.

While the Project would contribute to short-term temporary construction emissions, the Project is intended to provide and meet existing and future traffic demand. The proposed Project would contribute to SACOG's positive progress towards cumulative/regional/indirect effects on air quality standards.

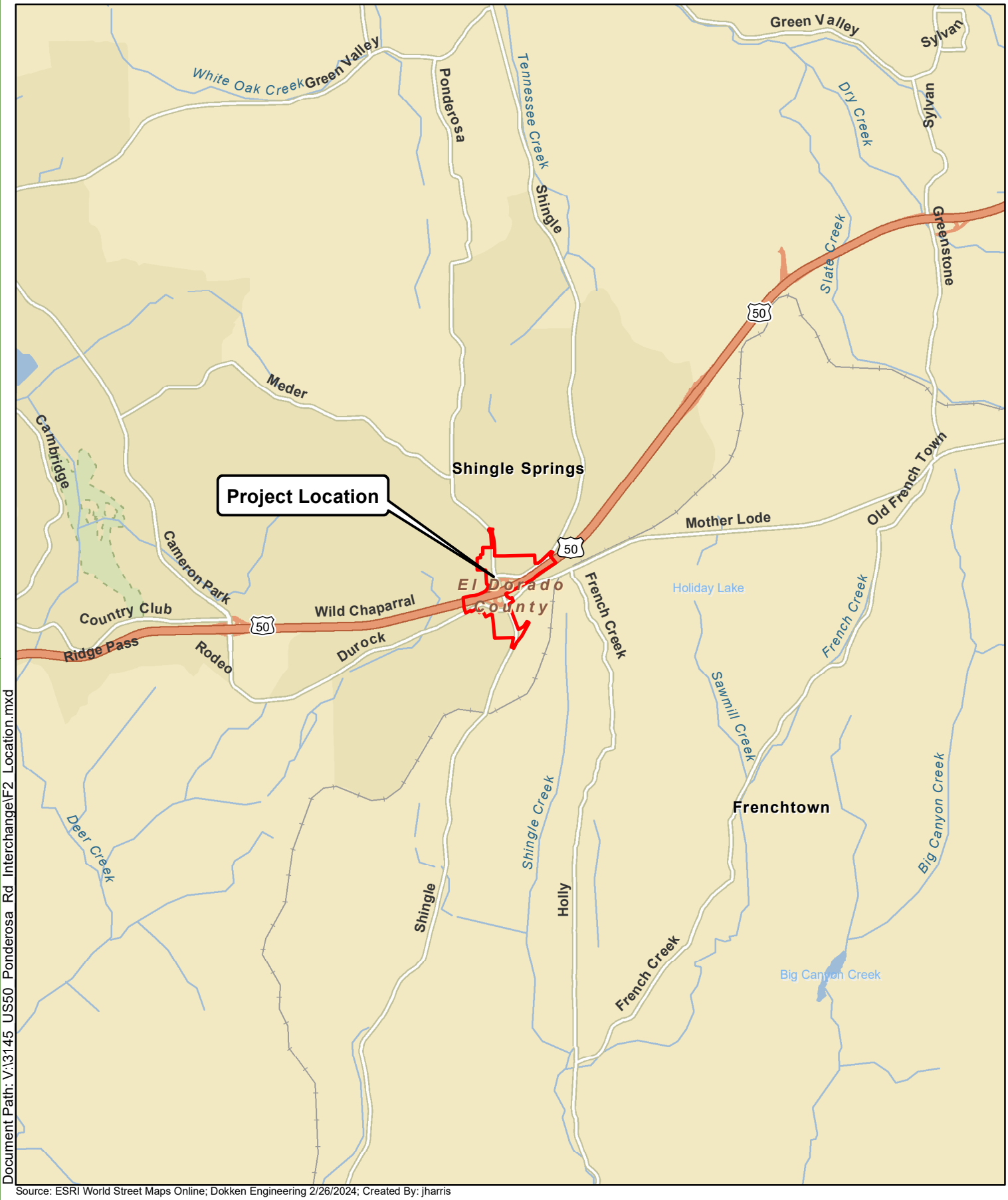


V:\3145_US50_Ponderosa_Rd_Interchange\F1_Vicinity_revised.mxd

Source: ESRI 2008; Dokken Engineering10/17/2024; Created By: michellec

0 10 20 30 40 Miles

FIGURE 1
Project Vicinity
US-50/Ponderosa Road Interchange Improvements Project
El Dorado County, California



Document Path: V:\3145 US50 Ponderosa Rd Interchange\F2 Location.mxd

Source: ESRI World Street Maps Online; Dokken Engineering 2/26/2024; Created By: jharris

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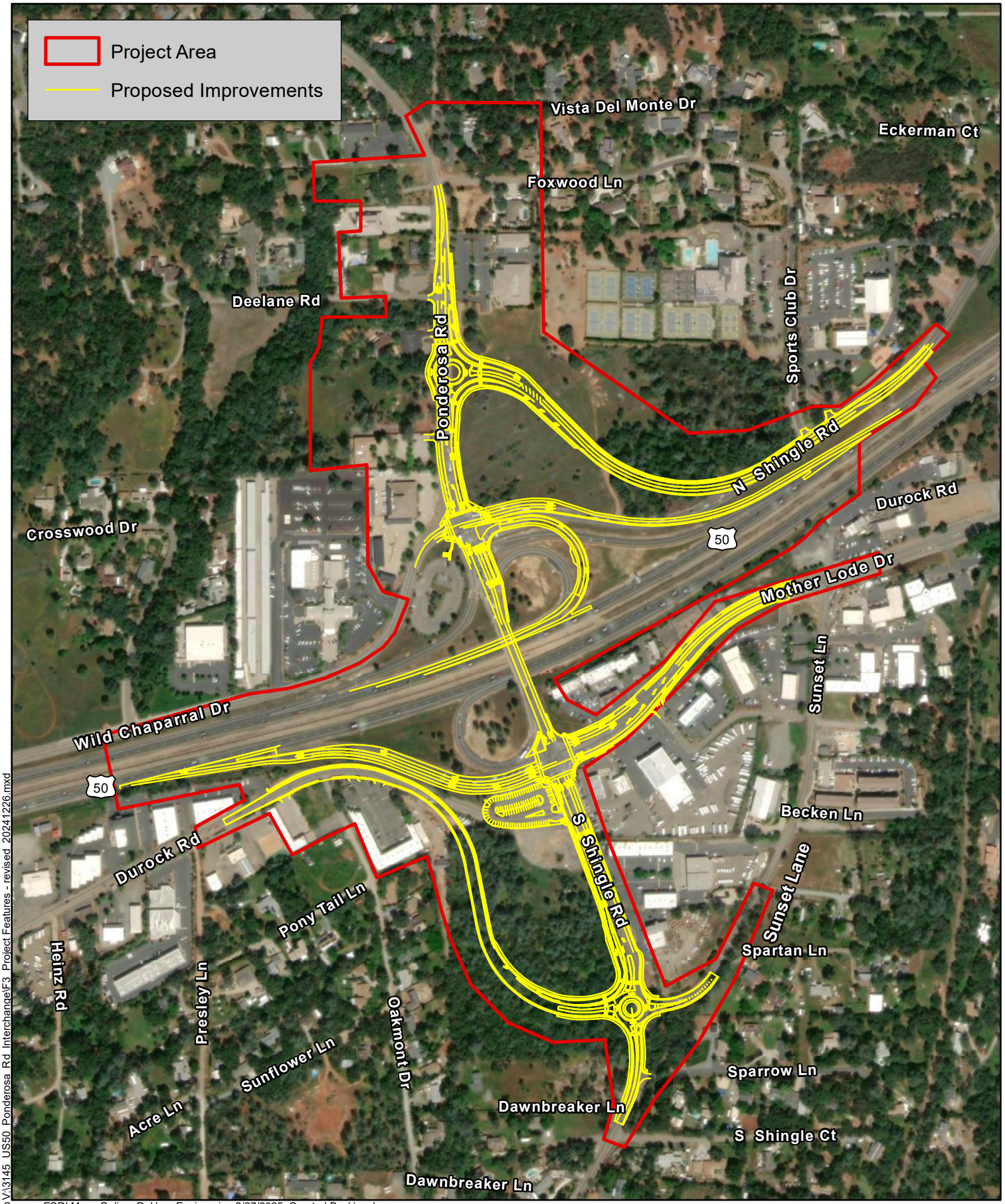
FIGURE 2
Project Location
US-50/Ponderosa Road Interchange Improvements Project
El Dorado County, California



V:\3145 US50 Ponderosa Rd Interchange\F3 Project Features - revised 20241226.mxd

Source: ESRI Maps Online; Dokken Engineering 2/27/2025; Created By: kjacobson

0 300 600 900 1,200 1,500 Feet

Figure 3
Project Features

US-50/Ponderosa Road Interchange Improvements Project
El Dorado County, California

Appendix A November 2024 US 50/Ponderosa Road Interchange Transportation Analysis Report (Fehr & Peers)

US 50 / Ponderosa Road Interchange

Transportation Analysis Report

Prepared for:

November 2024

FEHR PEERS

Transportation Analysis Report

US 50 / Ponderosa Road Interchange

03-ED-50 PM 8.3 to 8.7

EA 03-2E5500
Project ID 03 0000 0352

November 2024

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.

David Stanek 11/15/2024

David Stanek, P.E. Date
Registered Professional Civil Engineer
Fehr & Peers

RS23-4316

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Executive Summary

This transportation analysis report was prepared for the US 50/Ponderosa Road Interchange in Shingle Springs. The purpose of this report is to analyze the project design alternatives and their effects on the transportation network and to document the findings.

The purpose of the US 50/Ponderosa Road Interchange project is summarized below.

- Improve conditions for the ramp intersections and local roadway intersection adjaent to the interchange
- Maintain acceptable LOS on US 50 and at access points to US 50
- Improve multimodal mobility within and through the interchange
- Enhance safety and operations

The initial phase of the project proposes to realign the frontage road away from the ramp terminal intersections and construct roundabouts at their intersections with Ponderosa Road and South Shingle Road. The westbound off-ramp and northbound to westbound on-ramp would be widened and realigned to intersect at Wild Chaparral Drive. Widening for some approaches to the ramp terminal intersections would be included. Sidewalks and Class II bike lanes would be provided on both sides of Ponderosa Road and South Shingle Road between the ramp terminal and frontage road intersections. The planned opening year of the project is 2029.

The ultimate phase would widen the US 50 overcrossing to five lanes and provide sidewalks and Class II bike lanes on both sides of the overcrossing. The southbound to westbound on-ramp would be widened and realigned. Additional widening would be provided for the eastbound off-ramp. The planned opening year for the ultimate phase would be 2039 or later.

The study area includes US 50 from Cameron Park Drive to Shingle Springs Drive and five intersections on the Ponderosa Road/South Shingle Road corridor. Peak period traffic counts were collected in January 2024. The El Dorado County travel demand forecasting model was applied to develop future year forecasts because it has the most detailed land use and roadway network for the study area. Intersection and freeway operations were analyzed using the Vissim traffic analysis software that provides for a peak period network wide analysis so that congestion can be measured over time and across roadway facilities.

Under existing conditions (2024), the closely-spaced signalized intersections at the US 50/Ponderosa Road interchange experience localized congestion that causes queues to extend between the study intersections. The Ponderosa Road/North Shingle Road/Wild Chaparral Drive intersection operates with LOS E during both peak hours. Peak hour queues exist in the southbound and westbound approaches to this intersection. The next most critical intersection is South Shingle Road/Mother Lode Drive/US 50 Eastbound Ramps intersection, which has LOS D conditions during both peak hours. The eastbound off-ramp queue at this intersection was observed to extend to the US 50 mainline under both peak hours. PM peak hour queues

are also long on westbound Mother Lode Drive and eastbound Durock Road. Existing freeway operations are LOS D or better during the peak hours.

A five year collision history for the Ponderosa Road/South Shingle Road corridor showed 13 injury-related collisions and none involved a pedestrian or bicyclist. US 50 mainline and the Ponderosa Road interchange ramps have average total collision rates that are lower than the statewide average.

Traffic forecast volumes were prepared for opening year 2029, interim year 2039, and horizon year 2049. In the Shingle Springs community region, residential land uses are planned to grow by 1.33 percent per year and non-residential land uses are planned to grow by 0.67 percent per year. Residential growth is higher than the adopted growth rate of 0.70 percent for the overall El Dorado County West Slope. Planned roadway network changes include auxiliary lanes on US 50 west of Ponderosa Road and improvements to the US 50 interchanges at Cameron Park Drive and Shingle Springs Drive. Since the Build Alternative would not provide new connections only shift existing roadways, the overall traffic volume forecasts are the same for the project alternatives. The overall average intersection volume growth from existing (2024) to the horizon year (2049) is 31 percent for the AM peak hour and 33 percent for the PM peak hour.

Under opening year 2029 conditions, intersection operations would deteriorate under the No Build Alternative to LOS F conditions at two study intersections during both peak hours. The local road congestion would result in an eastbound off-ramp queue that would extend onto the US 50 mainline causing AM and PM peak period congestion. The Build Alternative Initial Phase would improve intersection operations to LOS D or better during the peak hours and reduce queues. The eastbound US 50 bottleneck would be eliminated to provide LOS D or better conditions.

Under interim year 2039 conditions, intersection operations under the Build Alternative Interim Phase would maintain LOS D or better conditions during the AM peak hour, but operations would deteriorate to LOS E conditions during the PM peak hour at the US 50 Eastbound Ramps intersection. While LOS E is acceptable, peak queues in the southbound direction would extend upstream through the US 50 Westbound Ramps intersection and in the westbound direction along Mother Lode Drive. Potential adjustments to signing, signal timing, and/or roadway geometry may be considered to improve efficiency.

Under horizon year 2049 conditions, intersection operations would further deteriorate under the No Build Alternative to LOS F conditions at most study intersections during both peak hours. The local road congestion would result in an eastbound off-ramp queue that would extend onto the US 50 mainline during the AM peak period and a westbound off-ramp queue that extend to the US 50 mainline during the PM peak period. The resulting congestion would result in at most serving 82 percent of the peak hour demand volume. The Build Alternative Ultimate Phase would improve intersection operations to LOS D or better during both peak hours. As under interim year 2039 conditions, peak hour queues in the southbound direction would extend upstream to the North Shingle Road roundabout, and westbound Mother Lode Drive peak hour queues would be nearly 900 feet. Similar adjustments to signing, signal timing, and/or roadway geometry may be considered to improve efficiency.

1. Introduction

This transportation analysis report was prepared for the US 50/Ponderosa Road Interchange in the El Dorado County. The report contains the results and findings of the transportation operations analyses, while the detailed analysis calculations are compiled in a separate appendix.

The purpose of this report is to analyze the project design alternatives and their effects on the transportation network and to document the findings. A traffic report was completed in 2009 for the Project Study Report/Project Report phase. Given the time that has elapsed since the original study was completed, this traffic operations analysis and safety assessment was prepared using current information.

1.1 Need and Purpose

The following need and purpose statement comes from the Project Study Report/Project Report approved in 2022.

> *The interchange improvements are needed because travel through the interchange, including access to and from US-50 and adjacent local roadways, has deteriorated as a result of increased local and interregional travel in the project area. Increased regional and interregional travel demand, will continue to degrade LOS on existing local roadways and their connections to U.S. 50. Travel delays for the existing condition and the projected design year (2035) condition are shown Section 4.3 below. The eastbound off-ramp currently experiences LOS E conditions in the PM peak hour, and several of the local road intersections within and/or immediately adjacent to the interchange operate at LOS D. With the exception of the S. Shingle/Sunset Lane intersection, all other intersections and ramps are forecasted to operate at LOS F by 2035.*
>
> *Degrading LOS not only impacts single occupancy vehicles, but high occupancy vehicles and El Dorado County Transit Authority commuter bus users as well. The existing facility and geometrics do not provide bicycles and pedestrians with adequate access to and through the interchange. The facility is not Americans with Disabilities Act (ADA) compliant and is not consistent with the El Dorado County Bicycle Master Plan.*
>
> *The project will improve existing conditions for the ramp intersections and local roadway intersections adjacent to the interchange, maintain acceptable LOS on US-50 and at existing access points to and from US-50 through the design year, improve multimodal mobility within and through the interchange, and enhance safety and operational improvements.*

1.2 Project Description

Preliminary transportation operations analysis identified the need for improvements at the US 50/Ponderosa Road interchange to accommodate planned growth in Cameron Park, Shingle Springs, and

the region as a whole. To reduce existing and anticipated congestion, the frontage road intersections are planned to be realigned to be further away from the ramp terminal intersections at the interchange. The intersections would be widened to accommodate future demand volumes. Also, the on-ramps would be widened to provide ramp meter storage as needed.

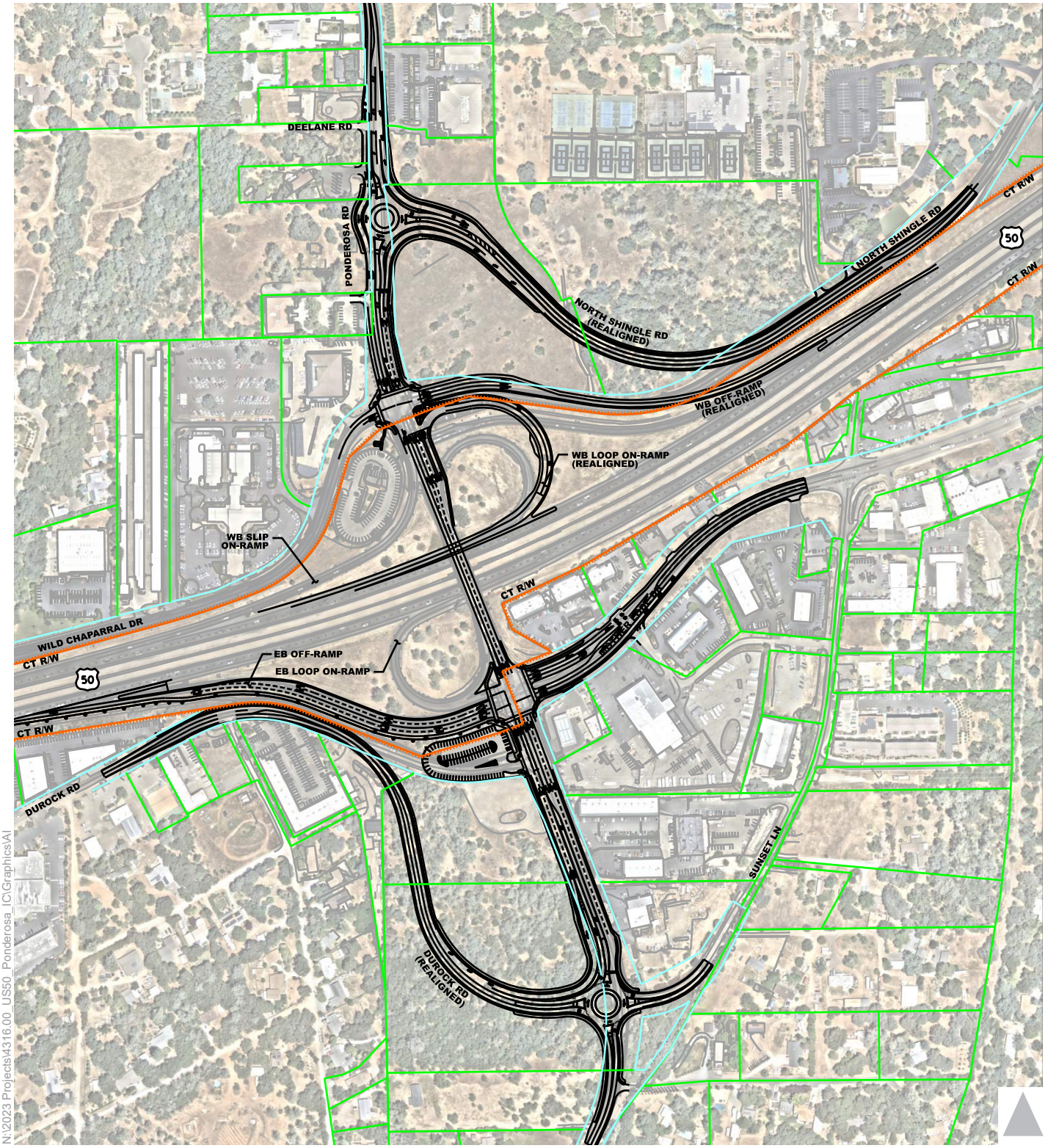
1.3 Project Alternatives

The project alternatives are described below.

- No Build Alternative – Maintain the existing configuration for the Ponderosa Road/South Shingle Road corridor and its interchange at US 50.
- Build Alternative – Widen Ponderosa Road and South Shingle Road to five lanes, realign North Shingle Road, Durock Road, and the westbound on- and off-ramps, and widen the eastbound off-ramp.

The Build Alternative would reconstruct the interchange and widen Ponderosa Road from North Shingle Road to US 50 and South Shingle Road from US 50 to Sunset Lane. The initial and ultimate project phases are shown in **Figure 1** and **Figure 2**, respectively. The initial phase would consist of the following improvements.

- To address the inadequate storage between intersections, Durock Road would be realigned approximately 800 feet south of its current location to form a four-legged intersection at South Shingle Road/Sunset Lane. A single-lane roundabout with a southbound right turn bypass lane would be constructed at the South Shingle Road/Durock Road/Sunset Lane intersection.
- North Shingle Road would be realigned to the north to form a T intersection approximately 600 feet north of its current location. A single-lane roundabout with westbound right turn, northbound right turn, and southbound through bypass lanes would be constructed at the Ponderosa Road/North Shingle Road intersection.
- The westbound off-ramp and northbound to westbound loop on-ramp would be realigned to intersect Ponderosa Road at Wild Chaparral Drive. The loop on-ramp would be widened to provide an HOV preferential lane at the ramp meter.
- North of US 50, Ponderosa Road would be widened to a five-lane cross-section (with the middle lane serving as a two-way left turn lane) through the new North Shingle Road intersection, which would then narrow back to two lanes to the north.
- South of US 50, South Shingle Road would be widened to a five-lane cross-section to the Durock Road/Sunset Lane intersection.
- The westbound off-ramp and eastbound off-ramp approaches would be widened to provide additional vehicle storage.



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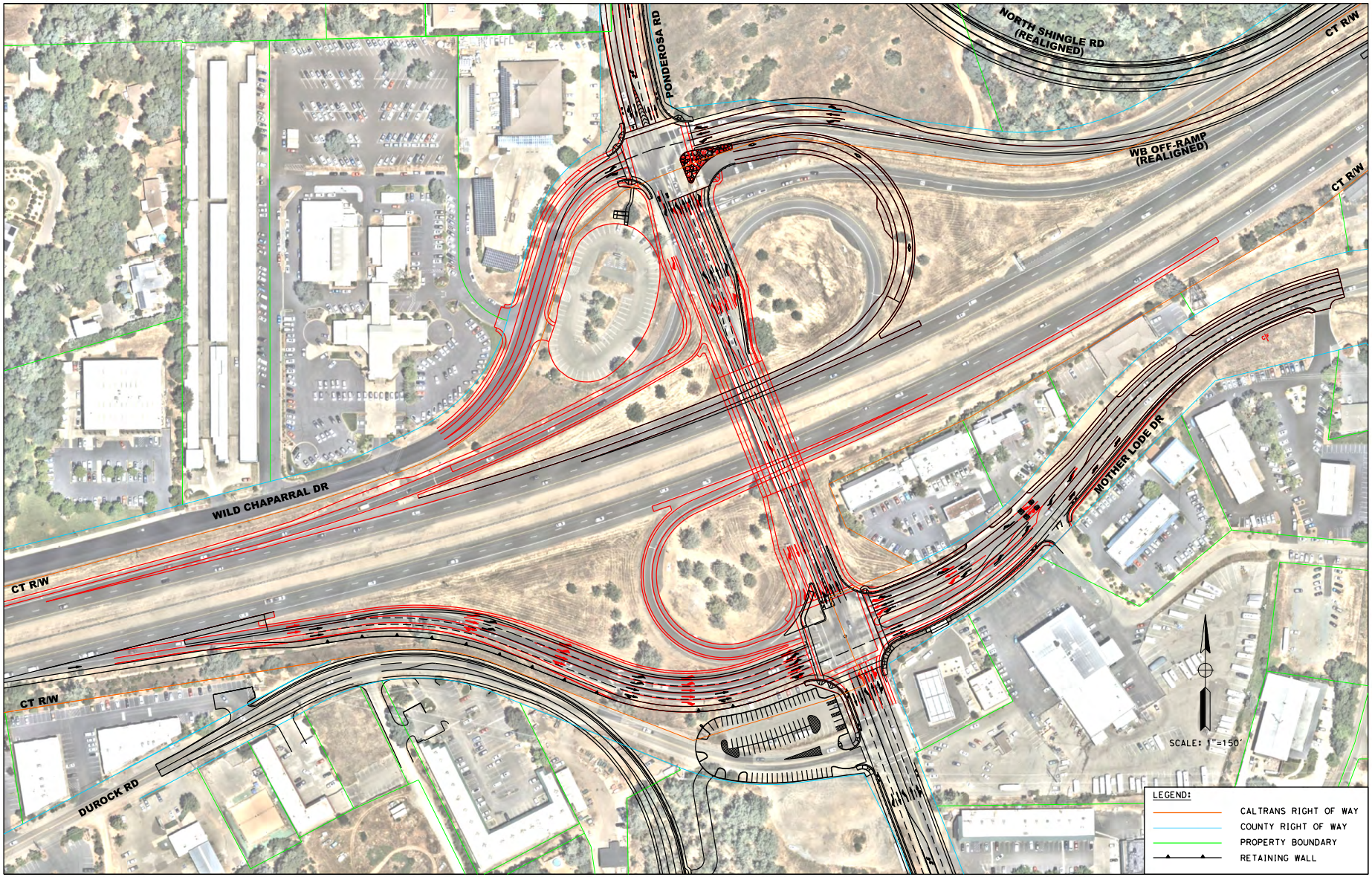
Provided by Dokken Engineering March 2025

Figure 1

Build Alternative - Initial Phase



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Provided by Dokken Engineering November 2024

Figure 2

Build Alternative -
Ultimate Phase

The ultimate phase would consist of the following additional improvements.

- The US 50 overcrossing would be widened to provide a five-lane cross section with on-street bike lanes and sidewalks on both sides of the road.
- A separate eastbound right turn pocket lane and extension of the turn pockets would be provided on the eastbound off-ramp.
- Westbound Mother Lode Drive would be widened to provide additional right turn storage.
- The southbound to westbound on-ramp to US 50 would be realigned and widened to provide an HOV preferential lane.

1.4 Separately Planned Projects

The following separately planned projects in the study area are expected to be constructed and are assumed to be in place for all project alternatives. The following projects (from the SACOG 2020 MTP/SCS project list) located in the study area are planned for construction by 2049:

- Ramp Meters – By 2035, ramp meters are planned to be constructed in the eastbound direction at Cameron Park Drive and Shingle Springs Drive and in the westbound direction at Shingle Springs Drive, northbound Cameron Park Drive and southbound Cameron Park Drive.
- Auxiliary Lanes – Auxiliary lanes are planned in both directions between Cameron Park Drive and Ponderosa Road/South Shingle Road and in the westbound direction between Cameron Park Drive and Cambridge Road by 2040.
- US 50/Cameron Park Drive Interchange – This project will reconstruct the interchange to provide 8 lanes at the undercrossing and widen the ramps by 2040.
- US 50/Shingle Springs Drive Interchange – This project will reconstruct the interchange sometime after 2040.
- Ponderosa Road Bike Lanes – Class II bike lanes will be constructed along Ponderosa Road from US 50 to Meder Road by 2040.

Improvements at the US 50/Cameron Park Drive Interchange has been studied and several alternatives have been considered. For this project, the interchange ramps are assumed to remain in place and all improvements would occur on the local road network. Potential improvements are the US 50/Shingle Springs Drive are unknown, but the improvements are again assumed to be located on the local road network. The MTP/SCS project list includes two projects that would extend the High Occupancy Vehicle (HOV) lanes on US 50 to Ponderosa Road (Phase 2) and then to Greenstone Road (Phase 3).

2. Analysis Methodology

This chapter describes the study area, data collection, and the methods used to analyze the transportation facilities.

2.1 Study Area and Period

The study area is shown in **Figure 3**. The study intersections are listed below.

1. Ponderosa Road/North Shingle Road/Wild Chaparral Drive
2. Ponderosa Road/US 50 Westbound Ramps
3. South Shingle Road/US 50 Eastbound Ramps/Mother Lode Drive
4. South Shingle Road/Durock Road
5. South Shingle Road/Sunset Lane

The existing freeway study area extends from Cameron Park Drive to Shingle Springs Drive. The study area includes all ramp junctions at the three interchanges – Cameron Park Drive, Ponderosa Road/South Shingle Road, and Shingle Springs Drive – and the basic freeway segments in between. In the eastbound direction, the study area includes the Red Hawk Parkway off-ramp so that the weaving section can be analyzed. The freeway study segments are listed below.

Eastbound US 50

- Cameron Park Dr Off-ramp
- Cameron Park Dr Off-ramp to On-ramp
- Cameron Park Dr On-ramp
- Cameron Park Dr to South Shingle Rd
- South Shingle Rd Off-ramp
- South Shingle Rd Off-ramp to On-ramp
- South Shingle Rd On-ramp
- South Shingle Rd to Shingle Springs Dr
- Shingle Springs Dr Off-ramp
- Shingle Springs Dr Off-ramp to On-ramp
- Shingle Springs Dr to Red Hawk Pkwy

● Study Intersections

— Study Freeway Corridor

Figure 3

Study Area

Westbound US 50

- Shingle Springs Dr Off-ramp
- Shingle Springs Dr Off-ramp to On-ramp
- Shingle Springs Dr On-ramp
- Shingle Springs Dr to Ponderosa Rd
- Ponderosa Rd Off-ramp to On-ramp
- Ponderosa Rd Northbound On-ramp
- Ponderosa Rd Southbound On-ramp
- Ponderosa Rd to Cameron Park Drive
- Cameron Park Dr Off-ramp
- Cameron Park Dr Off-ramp to On-ramp
- Cameron Park Dr Northbound On-ramp
- Cameron Park Dr On-Ramp to HOV Lane Addition
- Cameron Park Dr Southbound On-ramp

The analysis periods for the study intersections are 6:00 to 9:00 AM and 3:00 to 6:00 PM, which are the typical peak periods for suburban locations. A review of PeMS speed data from 2024 for the study area showed no recurring congestion during the peak periods.

2.2 Data Collection

At the study intersections, turning movement counts were collected on Wednesday, January 10 and Thursday, January 11, 2024. El Dorado County schools, including nearby Ponderosa High School, were in session. The turning movement counts were collected for the three-hour peak periods (6:00 to 9:00 AM and 3:00 to 6:00 PM). These periods cover the start and end times for Ponderosa High School, which are 8:30 AM to 3:30 PM on Tuesday through Friday. The counts included heavy vehicles, bicycles, and pedestrians at the intersections. The ramp volumes at Cameron Park Drive and Shingle Springs Drive were also collected on the same dates and times. The count data is provided in **Appendix A**.

For the US 50 mainline, the Caltrans PeMS database was used to gather volume data from the same two days in January 2024 that the intersection turning movement counts were collected (VDS 316906, 318458, and 318460). The PeMS station for the Red Hawk Parkway off-ramp (VDS 318469) had no data for these dates, however. For this location, the volumes were taken from an average of three midweek days (Tuesday, Wednesday, and Thursday) for a similar week in January 2020[1], the most recent year in which data was available.

To develop the freeway truck percentage, hourly truck flow rates were reviewed for PeMS stations in the study area. One station in each direction was selected that provided truck percentages that were nearest to the 6 percent daily truck percentage measured in 1983 as reported in the 2019 Annual Average Daily Truck Traffic Volumes on the Caltrans Traffic Census Program website[2]. The peak hour heavy vehicle percentage reported from the PeMS stations (VDS 316888 and 3088051) was 4 to 5 percent.

[1] The COVID-19 pandemic's effects on traffic volumes started in March 2020, so these traffic counts were not affected by the pandemic.

[2] https://dot.ca.gov/programs/traffic-operations/census

Caltrans provided average speed data in 15-minute interval for January 2024 from Inrix for the US 50 corridor (see **Appendix A**). Average speeds were above 60 mph for nearly all locations. Average speeds of 50 to 59 mph were measured for westbound US 50 between 4:45 and 5:45 PM from Red Hawk Parkway to Ponderosa Road. Traffic volumes for the mainline and ramps are higher during the 3:00 to 4:00 PM hour, so the slower speeds do not appear to be caused by turbulence from high traffic volumes.

Collision data for US 50 from Cameron Park Drive to Shingle Springs Drive was provided by Caltrans. Collision data for Ponderosa Road and South Shingle Road was requested from the CHP's SWITRS database.

2.2.1 Intersection Volume

Figure 4 presents the AM and PM peak hour intersection turning movement volumes along with the lane configurations and traffic control. **Table 1** lists the peak hour, peak hour factor, and heavy vehicle percentage for the arterial study corridor.

Table 1: Intersection Volume Characteristics

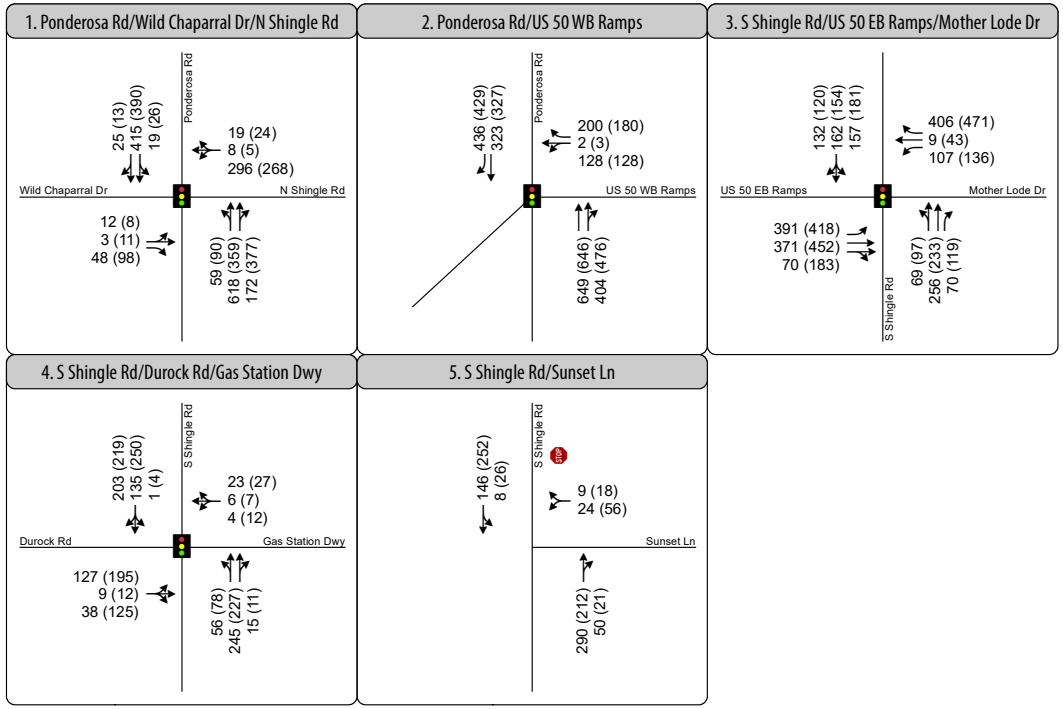
Peak Hour	Peak Hour Factor	Heavy Vehicle Percentage
7:45 to 8:45 AM	0.92	3%
3:00 to 4:00 PM	0.97	4%

The higher of the two days of motor vehicle counts were selected for the analysis. The total volume entering the five study intersections was 8 percent higher on Wednesday, January 10, for the AM peak period and 15 percent higher on Thursday, January 11 for the PM peak period. The weather was rainy during the Wednesday PM peak period, which likely contributed to the lower volumes. Although the weather was foggy during some portions of the AM peak periods on both days, the pavement was generally dry. Conditions were sunny during the Thursday PM peak period.

The peak hours for the Ponderosa Road/South Shingle Road corridor are 7:45 to 8:45 AM and 3:00 to 4:00 PM. These times include the start and end times for Ponderosa High School which is in session from 8:30 AM to 3:30 PM on Tuesday through Friday. The truck percentage is higher during the PM peak hour (4 percent) compared to the AM peak hour (3 percent).

2.2.2 Freeway Volume

Figure 5 shows the AM and PM peak hour freeway volumes in each direction. **Table 2** lists the peak hour, peak hour factor, and heavy vehicle percentage for the freeway study corridor.



Turn Lane

AM (PM) Peak Hour Traffic Volume

Traffic Signal

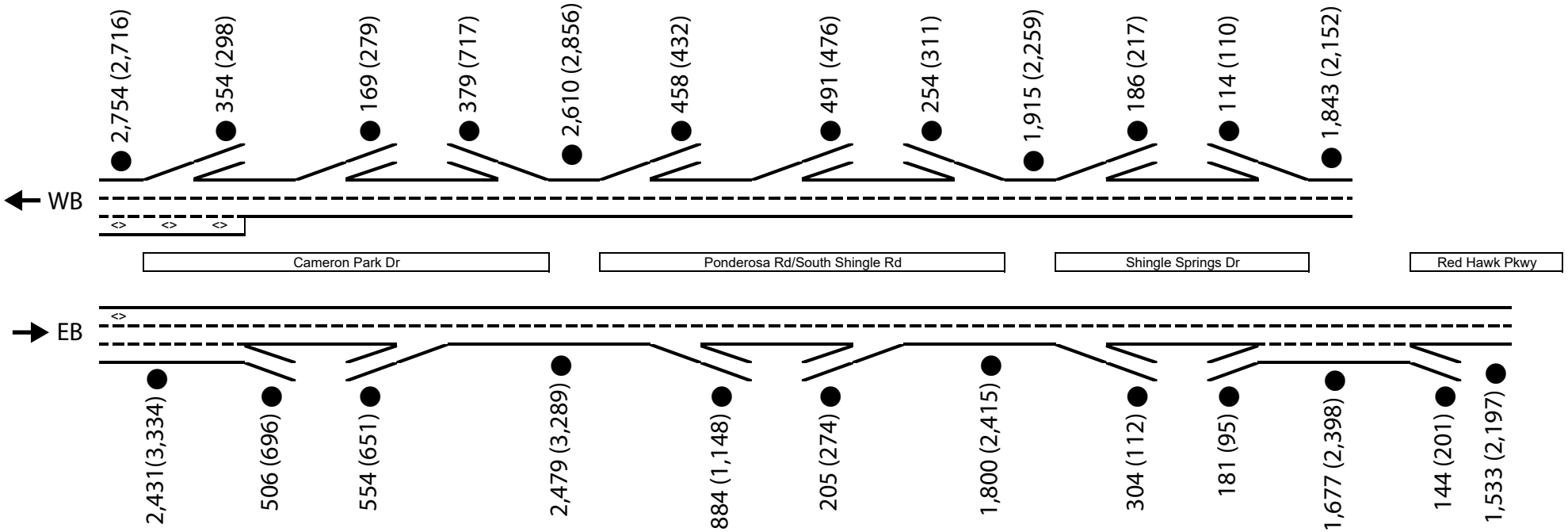
Stop Sign

Study Intersections

Note: Traffic counts collected January 2024.
Peak hours are 7:45 to 8:45 AM and 3:00 to 4:00 PM.

Figure 4

Intersection Peak Hour Volumes and Lane Configurations - Existing Conditions



< > HOV Lane

X,XXX (X,XXX) AM(PM) Peak Hour Volume

Note: Traffic counts collected January 2024.
WB Peak hours are 7:15 to 8:15 AM and 3:00 to 4:00 PM
EB Peak hours are 7:45 to 8:45 AM and 4:15 to 5:15 PM

Figure 5

Freeway Peak Hour Volumes and Lane Configurations - Existing Conditions

Table 2: Freeway Volume Characteristics

Corridor	Peak Hour	Peak Hour Factor	Heavy Vehicle Percentage
Eastbound US 50	7:45 to 8:45 AM	0.90	5%
	4:15 to 5:15 PM	0.96	4%
Westbound US 50	7:15 to 8:15 AM	0.96	5%
	3:00 to 4:00 PM	0.95	5%

The freeway mainline peak hour and peak hour factor were determined from PeMS data collected for Thursday, January 11 because the ramp volumes at Cameron Park Drive and Shingle Springs Drive were collected only on Thursday, January 11. During the AM peak period, the peak hour in the eastbound direction starts later (7:45 AM) than in the westbound direction (7:15 AM). Similarly, the afternoon peak hour starts later in the eastbound direction (4:15 PM) than in the westbound direction (3:00 PM). The PM peak hour for westbound US 50 is related to school traffic, but eastbound US 50's peak hour is related to commuters returning home from the direction of Sacramento.

The heavy vehicle percentages were taken from PeMS stations on the US 50 mainline. The mainline stations in the study area showed a range of heavy vehicle percentages, so the highest (and more reasonable) values in each direction were used. In the eastbound direction, the hourly heavy vehicle percentages ranged from 3.3 to 5.1 percent during the AM peak period and 4.2 to 4.9 percent during the PM peak period. In the westbound direction, the hourly heavy vehicle percentages ranged from 4.9 to 5.9 during the AM peak period and 3.9 to 4.5 during the PM peak period.

The eastern end of the US 50 HOV lanes in the Sacramento region is at Cameron Park Drive. Based on PeMS data for the station west of Cameron Park Drive, the HOV lane volume is 29 percent of the total volume during the AM peak hour and 30 percent during the PM peak hour. The HOV lane volume includes both HOVs and violators, single occupant vehicles that use the HOV lane illegally. Caltrans vehicle occupancy counts on US 50 at Scott Road from September 2019 show a violation rate of 20 to 21 percent during the peak period in the peak direction. As a result, the volume of violators was estimated as 20 percent of the HOV lane volume.

2.2.3 Bicycle and Pedestrian Volume

Overall, the bicycle and pedestrian volumes were low for the two days that were counted. Bicycle and pedestrian volumes are likely higher during non-winter months and when the weather is clear and sunny. On January 10, the total bicycle volume counted at all five study intersections was zero during the AM peak period and one during the PM peak period. On January 11, the total bicycle volume was six during the AM peak period and four during the PM peak period. To account for the potential effect on vehicle operations, the higher bicycle volumes from January 11 were used for the analysis.

Table 3 shows the three-hour peak period bicycle volumes by approach. During the AM peak period, two bicyclists were counted at each of the three northern intersections. During the PM peak period, the

Ponderosa Road/North Shingle Road intersection had two bicyclists, and the US 50 ramp terminal intersections had one bicyclist each. No bicycles were counted at the southern two intersections during either peak period.

Table 3: Peak Period Bicycle Volume – Existing Conditions

Intersection	AM / PM Peak Period Volume by Approach			
	NB	SB	EB	WB
1. Ponderosa Rd/North Shingle Rd/Wild Chaparral Dr	1 / 0	1 / 2	0 / 0	0 / 0
2. Ponderosa Rd/US 50 Westbound Ramps	1 / 0	1 / 1	-	-
3. South Shingle Rd/Mother Lode Dr/US 50 Eastbound Ramps	0 / 0	1 / 1	-	1 / 0
4. South Shingle Rd/Durock Rd	0 / 0	0 / 0	0 / 0	0 / 0
5. South Shingle Rd/Sunset Ln	0 / 0	0 / 0	-	0 / 0

Notes: The bicyclists counted during the 6 to 9 AM and 3 to 6 PM peak periods are reported as "AM bicycles / PM bicycles". The dash (-) indicates that bicycles are prohibited on the US 50 freeway ramp approaches or that the approach does not exist.

Pedestrian volumes at all intersections on January 10 were one during the AM peak period and six during the PM peak period. On January 11, the total pedestrian volume was eight and thirty for the AM and PM peak periods, respectively. To account for the potential effect on vehicle operations, the higher pedestrian volumes from January 11 were used for the analysis.

Table 4 shows the three-hour peak period pedestrian volumes by intersection leg.

Table 4: Peak Period Pedestrian Volume – Existing Conditions

Intersection	AM / PM Peak Period Volume by Leg			
	South	North	West	East
1. Ponderosa Rd/North Shingle Rd/Wild Chaparral Dr	0 / 0	0 / 0	1 / 1	0 / 11
2. Ponderosa Rd/US 50 Westbound Ramps	0 / 0	0 / 0	1 / 0	0 / 15
3. South Shingle Rd/Mother Lode Dr/US 50 Eastbound Ramps	2 / 1	1 / 0	3 / 1	0 / 4
4. South Shingle Rd/Durock Rd	0 / 0	0 / 0	0 / 0	0 / 0
5. South Shingle Rd/Sunset Ln	0 / 0	0 / 0	0 / 0	0 / 0

Notes: The pedestrians counted during the 6 to 9 AM and 3 to 6 PM peak periods are reported as "AM pedestrians / PM pedestrians".

During the AM peak period, one pedestrian each was counted at the two northern intersections crossing the west leg. At South Shingle Road/Mother Lode Drive, six pedestrians were counted. During the PM peak period, twelve pedestrians traveled through the Ponderosa Road/North Shingle Road intersection, fifteen at the Ponderosa Road/US 50 Westbound Ramps intersection, and six at the South Shingle Road/Mother Lode Drive intersection. Most pedestrians crossed the east leg at these intersections. Pedestrians traveled across US 50 using the east side of the overcrossing, which does not have a sidewalk. No pedestrians used the sidewalk on the west side of the overcrossing. The traffic count videos show that the pedestrians are

school-age youths likely traveling to and from the high school. No pedestrians were counted at the southern two intersections during either peak period.

2.3 Demand Forecasting Methodology

Since the US 50/Ponderosa Road interchange is located in the central part of El Dorado County, it was logical for the project team to first consider the El Dorado County travel demand model for developing future year traffic forecasts. The El Dorado County model is a derivative of SACOG's SACMET trip-based model. However, it has much more granularity within the County than the original version, which generally results in improved forecasting accuracy. The El Dorado County model includes future year land use growth for the West Slope of the county based on growth rates adopted by the Board of Supervisors for planning purposes. This is discussed in more detail later in this memo.

The most viable alternative model that could be considered for this area is SACOG's SACSIM19 activity-based travel demand model. However, that model lacks traffic analysis zone detail within the study area. Additionally, its land use growth assumptions likely do not match the county's estimates. Considerable time and effort would have been required to modify the SACSIM base year and future year models to make it suitable for use on this project.

Based on the above comparison, the El Dorado County model was selected to develop traffic forecasts for this project.

2.3.1 Base Year Model Development

The El Dorado County base year model was originally developed to match conditions in 2018. As part of this project, Fehr & Peers made minor edits to the model in the interchange vicinity to ensure roadway configurations are accurately modeled and that the centroids connecting to traffic analysis zones (TAZs) are properly applied. The model's roadway network in the interchange vicinity is shown in **Appendix B**.

Table 5 compares the average daily traffic (ADT) volumes collected by El Dorado County staff in 2018 and 2022 on roadways in the interchange vicinity[3]. Existing volumes can be found in the attachment**.** This table also shows the base year model's estimate of ADT on each of these roadway segments. Key conclusions from this table are the following:

- Traffic volumes were about 5% lower in 2022 than in 2018.

On all segments, the base year model ADT estimates are closer to the 2022 counts than the 2018 counts, with the 2022 volumes being about 19% greater than the base year volumes.

[3] Traffic counts were collected while adjacent schools were in session. Daily counts were not available for 2023 or 2024.

Table 5: Comparison of Average Daily Traffic near US 50/Ponderosa Road Interchange

Roadway	Segment	2018 Traffic Count	2022 Traffic Count	Base Year Model
Durock Road	West of South Shingle Road	7,000	6,100	5,000
Mother Lode Drive	West of Sunset Lane	13,100	13,000	11,300
North Shingle Road	East of Ponderosa Road	8,000	7,200	7,600
Ponderosa Road	North of Wild Chaparral Drive/ North Shingle Road	7,800	7,700	5,500
South Shingle Road	South of Sunset Lane	6,500	6,100	4,300
Total		42,400	40,100	33,700

Note: 1. Volumes rounded to the nearest 100 and represent both directions of travel.

The US 50/Ponderosa Road interchange is situated within the Shingle Springs Community Region (CR) (see **Appendix B**). Population levels in this CR are shown below (based on census data):

- 2000: 2,643 persons
- 2010: 4,432 persons
- 2020: 4,660 persons
- 2023: 4,671 persons

Moderate to substantial (68 percent) residential growth occurred between 2000 and 2010, followed by very modest growth (5 percent) between 2010 and 2020. This trend has continued through 2023. As further evidence of the slow growth, the area added 3 single-family units, 44 multi-family units, and 31 new jobs between 2010 and 2018.[4] County staff has indicated that there have not been any substantial new land developments built in the area since 2018.

Table 6 compares the January 2024 AM peak hour traffic counts on roadways in the interchange vicinity against the base year model projections for these roads. The two key findings from this table are listed below.

1. The base year model substantially underestimates AM peak hour traffic on the following facilities:
    - Ponderosa Road north of North Shingle Road (590 vehicles in both directions versus 1,108 observed).
    - US 50 Eastbound Off-Ramp at South Shingle Road (540 vehicles estimated versus 832 observed).
    - US 50 Westbound Off-Ramp at Ponderosa Road (182 vehicles estimated versus 330 observed).

[4] Source: *El Dorado Countywide Housing and Employment Projections, 2018-2040* (BAE, 2020).

2. The model overestimates the volume of traffic using the westbound US 50 loop and slip on-ramps by a considerable degree.

Table 6: Comparison of AM Peak Hour Traffic at the US 50/Ponderosa Road Interchange

Roadway	Segment	2024 Traffic Count	Base Year Model	Percent Change
Durock Road	West of South Shingle Road	439	489	+11%
Mother Lode Drive	West of Sunset Lane	1,120	1,053	-6%
North Shingle Road	East of Ponderosa Road	517	706	+37%
Ponderosa Road	North of Wild Chaparral Drive / North Shingle Road	1,108	594	-46%
South Shingle Road	South of Sunset Lane	510	370	-28%
US 50 EB Off-Ramp at South Shingle Road		832	544	-35%
US 50 EB On-Ramp at South Shingle Road		210	182	-13%
US 50 WB Off-Ramp at Ponderosa Road		330	182	-45%
US 50 WB Loop On-Ramp at Ponderosa Road		404	518	+28%
US 50 WB Slip On-Ramp at Ponderosa Road		438	531	+21%

Note: 1. Volumes represent both directions of travel on surface streets.

The first finding above is caused by peaks in travel to/from Ponderosa High School. This school is represented by TAZ 283 and includes 1,778 students and 161 non-retail employees. During the AM peak hour, the model estimated the school would generate 554 combined inbound and outbound vehicle trips. According to the *Trip Generation Manual* (Institute of Transportation Engineers, 2021), a high school with 1,778 students is expected to generate about 930 AM peak hour trips. Fortunately, this model limitation is addressed by the difference method forecasting procedure (discussed later) which is used to develop future year forecasts.

The second finding above is likely attributable to changes in commuting habits since the onset of COVID-19 pandemic in 2020 (which are not considered in the base year model). With increased work-from-home capabilities, some employees no longer commute to their workplace on a daily basis. And when they do, they are less likely to travel during the traditional commute peak hours.

Table 7 compares the January 2024 PM peak hour traffic counts on roadways in the interchange vicinity against the base year model projections for these roads. The key finding from this table is listed below.

- The base year model underestimates the amount of existing PM peak hour traffic at 9 of the 10 facility locations (with range of underestimation from 6 to 33 percent).

Table 7: Comparison of PM Peak Hour Traffic at the US 50/Ponderosa Road Interchange

Street	Segment	2024 Traffic Count	Base Year Model	Percent Change
Durock Road	West of South Shingle Road	636	522	-18%
Mother Lode Drive	West of Sunset Lane	1,397	1,046	-25%
North Shingle Road	East of Ponderosa Road	711	715	0%
Ponderosa Road	North of Wild Chaparral Drive / North Shingle Road	820	550	-33%
South Shingle Road	South of Sunset Lane	541	397	-27%
US 50 EB Off-Ramp at South Shingle Road		1,053	988	-6%
US 50 EB On-Ramp at South Shingle Road		265	218	-18%
US 50 WB Off-Ramp at Ponderosa Road		311	223	-28%
US 50 WB Loop On-Ramp at Ponderosa Road		476	338	-29%
US 50 WB Slip On-Ramp at Ponderosa Road		432	294	-32%

Note: 1. Volumes represent both directions of travel on surface streets.

This result is also likely attributable to Ponderosa High School. On regular school days, school begins at 8:30 AM and concludes at 3:30 PM. This later (relative to years past) start/end time has altered the afternoon/evening peak hour of travel in numerous communities. With the PM peak period now extending from 3 to 6 PM, the PM peak hour can occur earlier in the day than in years past (as high school traffic now contributes more greatly to PM peak hour volumes). The base year model estimated Ponderosa High School would generate 390 PM peak hour trips; in contrast, the *Trip Generation Manual* estimates that the PM peak of the generator for a high school with 1,778 students would generate about 570 trips. Similar to the discussion for AM peak hour, it is noted that this modeling limitation is overcome by applying the difference method forecasting procedure.

Based on the above data and analyses, the following conclusions are reached regarding the appropriate year that the base year model now represents.

- The base year El Dorado County model is deemed representative of current (2024) conditions given the lack of any considerable land use growth since its development in 2018.[5]
- The difference method forecasting procedure is a suitable means for addressing the traffic forecasting challenge posed by travel to/from Ponderosa High School.

2.3.2 Future Year Model Development

The future year El Dorado County travel demand model was developed to have a horizon year of 2040. This horizon year is closely tied to projected land use growth from 2018 to 2040 in the West Slope of the County.

[5] This would not be the case if there was considerable new development between 2018 and 2024, or if new roadways were constructed. Neither of these conditions occurred in the interchange vicinity.

This section first presents expected land use growth in the interchange vicinity. It then describes planned transportation system improvements.

2.3.2.1 Future Model Land Use

The *El Dorado Countywide Housing and Employment Projections, 2018-2040* (BAE, 2020) describes the following land use growth in the Shingle Springs CR and county as a whole:

Residential Growth

- The Shingle Springs CR is expected to have growth of 177 units (18 percent increase over existing supply) based on expected demand.
- However, the model allocation includes 537 new units (56 percent growth) to the Shingle Springs CR due to residential development capacity running out in other areas of the West Slope (and being reallocated to this area which has more reserve developable land capacity).
- El Dorado County adopted the 0.70 percent average annual residential growth rate between 2018 and 2040.

Non-residential Growth

- The Shingle Springs CR is expected to add 396 jobs (15% increase over existing job totals) based on expected demand.
- The average annual growth rate for jobs is 0.67% between 2018 and 2040.

Table 8 shows the residential and job growth, both in total and for each side of the freeway. The geographic area corresponds to the 5 TAZs north of US 50 and 8 TAZs south of US 50 (see **Appendix B** for the TAZ map). This table shows a net increase of 547 dwelling units (perfectly matching the BAE report) and 394 jobs. Within the Shingle Springs CR, the residential growth represents a 39 percent increase in units over the base year model. The non-residential growth closely matches the 396 new jobs forecast to occur in the BAE report. More of the growth occurs south of US 50 versus north of US 50. Non-residential growth shows a 19 percent increase, which is slightly above the 15 percent growth adopted by the County.

Table 8: Land Use Growth in Shingle Springs Community Region

Type of Growth	Base Year Model			Future Year Model			Growth		
	North of US 50	South of US 50	Total	North of US 50	South of US 50	Total	North of US 50	South of US 50	Total
Dwelling Units	378	1,022	1,400[1]	585	1,362	1,947	207	340	547
Jobs	397	1,706	2,103	507	1,990	2,497	110	284	394

Notes: The areas north and south of US 50 correspond to TAZs shown in **Appendix B**.
1. This total is less than the 2020 Census total of 1,791 dwelling units for the Shingle Springs Census Designated Place (CDP). The CDP geographic extents are greater than the CR, extending easterly to Shingle Springs Drive.

The residential growth in the Shingle Springs CR (from 1,400 to 1,947 units) corresponds to an average annual growth rate of 1.5 percent based on the assumed 22 years between the base and future year model based on their original horizon year definitions. However, since practically no development has occurred in

this CR from 2018 through 2023, an even higher growth rate would need to occur between 2024 and 2040 to achieve the yield in units implied by the 1.5 percent average annual growth rate.:

Given this information, the future year El Dorado County model can reasonably be associated with a 2049 horizon year (for purposes of forecasting traffic at and near the US 50/Ponderosa Road interchange) by virtue of the following:

- It includes growth of 547 units within the Shingle Springs CR. Based on the base year model corresponding to 2024 and the future year model corresponding to 2049, this would conservatively represent a 1.33 percent annual average growth rate, which is nearly double the West Slope adopted rate of 0.70 percent.
- The non-residential land uses would grow at an average of 0.67 percent annually based on the base year model corresponding to 2024 and the future year model corresponding to 2049. This matches the County's adopted non-residential growth rate.
- The TAZ representing Ponderosa High School is assumed (in the El Dorado County travel demand model) to have 2,089 students, an 18 percent increase in enrollment.

2.3.2.2 Planned Roadway Network Changes

For future year conditions, the traffic operations analysis (and travel demand forecasts) will include background roadway projects for the No Build and Build Alternatives. The following projects (from the SACOG 2020 MTP/SCS project list) located in the study area are planned for construction by 2049:

- Ramp Meters – Ramp meters are planned to be constructed in the eastbound direction at Cameron Park Drive and Shingle Springs Drive and in the westbound direction at Shingle Springs Drive, northbound Cameron Park Drive and southbound Cameron Park Drive by 2035.
- Auxiliary Lanes – Auxiliary lanes are proposed in both directions between Cameron Park Drive and Ponderosa Road/South Shingle Road and in the westbound direction between Cameron Park Drive and Cambridge Road by 2040.
- US 50/Cameron Park Drive Interchange – This project would reconstruct the interchange to provide 8 lanes at the undercrossing and widen the ramps by 2040.
- US 50/Shingle Springs Drive Interchange – This project would reconstruct the interchange sometime after 2040.
- Ponderosa Road Bike Lanes – Class II bike lanes would be constructed along Ponderosa Road from US 50 to Meder Road by 2040.

Improvements at the US 50/Cameron Park Drive Interchange has been studied and several alternatives have been considered. For this project, the interchange ramps are assumed to remain in place and all improvements would occur on the local road network. Potential improvements are the US 50/Shingle Springs Drive are unknown, but the improvements are again assumed to be located on the local road network. The MTP/SCS project list includes two projects that would extend the High Occupancy Vehicle (HOV) lanes on US 50 to Ponderosa Road (Phase 2) and then to Greenstone Road (Phase 3). However, these

projects are listed as project development only. As a result, they were not included in the travel demand forecast model or in the operations analysis model.

2.3.3 Forecasting Process

Horizon year 2049 forecasts were developed for the following two alternatives:

- No Build Alternative – assumes the US 50/Ponderosa Road interchange remains as is.
- Build Alternative – assumes the ultimate planned geometric improvements to the US 50/ Ponderosa Road interchange are constructed as described in **Section 1.3**.

Horizon year 2049 traffic forecasts were developed using the "difference method forecasting" procedure. This method works mathematically as follows:

Future Year Forecast = Existing Traffic Count + (Future Year Model Forecast – Base Year Model Forecast)

The advantage of this forecasting procedure is that inaccuracies in the base year model are not translated to the future year forecasts (which would occur if the future year forecasted volumes were applied directly). This is accomplished by simply adding the expected traffic growth resulting from new land use and roadway network modifications to the existing (measured) volumes.

As was documented previously, the base year model was found to underestimate travel associated with Ponderosa High School. The same would be true of the future year model. But by starting with the actual existing (measured) volumes, and adding forecasted traffic growth, the horizon year forecasts do not underestimate school-related trips. This is critical to proper interchange sizing.

The future year model was run without and with the Build Alternative improvements. Since travel demand models do not include inputs, such as turn pocket lanes or traffic controls at intersections, modifications were made only to the number of travel lanes and roadway configurations.

Appendix B shows side by side comparisons of AM and PM peak hour segment volumes directly from the model for the No Build and Build Alternative model runs. The model results show that the Build Alternative would result in decreases in traffic volumes on most roadways in the interchange vicinity. **Appendix B** also shows a "delta plot" of PM peak hour volumes from the two model runs. This plot indicates that the model is shifting some trips from Durock Road onto the US 50 mainline as a result of its realignment. It also shifts traffic volume from one TAZ centroid connector to another near the realignment of North Shingle Road. The model appears to be over-sensitive to these road realignments, and the model forecasts for the Build Alternative are not reasonable when compared against the No Build Alternative model forecasts.

Given the above, the following two-step approach was utilized to develop the horizon year traffic forecasts:

1. Run the future year model maintaining the current alignments of Durock Road and North Shingle Road and assuming Ponderosa Road/South Shingle Road is four lanes from Sunset Lane to about 500 feet north of the existing Ponderosa Road/North Shingle Road intersection. Forecasts from

this model run will represent the '*future year traffic forecast*' input to be used in the difference method calculation. Prepare the traffic forecasts for the No Build Alternative.

2. Redistribute the horizon year 2049 No Build Alternative AM and PM peak hour traffic forecasts based on the Build Alternative roadway realignments. The resulting forecasts will represent the Build Alternative.

There are two distinct technical advantages to this approach:

- By assuming all planned roadway widenings in the first step model run, the horizon year 2049 Build Alternative traffic forecast considers any increased travel demand associated with that added capacity.
- By manually shifting the horizon year traffic forecasts based on roadway alignment changes between No Build and Build Alternatives (versus relying on the model to predict these shifts), the unreasonable redistributions of traffic away from the study interchange are avoided.

Traffic forecasts for the opening year 2029 and interim year 2039 conditions were developed using linear interpolation. Since there are no major one-time infrastructure or land development projects in the study area that would immediately affect travel patterns, it is appropriate to use linear interpolation between existing year 2024 and horizon year 2049 conditions to develop forecasts for these scenarios. The opening year 2029 scenario represents 20 percent of the total traffic growth, while the interim year 2039 scenario represents 60 percent of the total traffic growth.

2.3.4 Vehicle Classification

The travel demand forecast model does not include HOV or truck volumes. As a result, the HOV and truck percentages are assumed to remain unchanged under future year conditions. The violation rate for the HOV lane was also maintained for all analysis scenarios.

2.3.5 Bicycle and Pedestrian

The travel demand forecast model does not forecast bicycle and pedestrian volumes. Growth in these models was assumed to be the same as the overall growth in traffic volumes. Using the forecast volumes, the total entering volume for the study intersections was calculated. Then, the overall growth rate for opening year 2029, interim year 2039, and horizon year 2049 was calculated for the AM and PM peak hours. This growth rate was applied to the existing bicycle and pedestrian volumes to estimate the future bicycle and pedestrian volume. A minimum volume of two bicycles per hour on each approach and two pedestrians per hour on each crosswalk was used.

2.4 Operations Analysis Methodology

The study intersections and freeway segments were analyzed using the procedures and methodologies consistent with the *Highway Capacity Manual, 7th Edition* (Transportation Research Board, 2022). The

Highway Capacity Manual (HCM) uses level of service (LOS) as a performance measure. LOS is a qualitative description of traffic operating conditions that assigns a letter rating from A (the best) to F (the worst), with E representing "at-capacity" operations. When volumes exceed capacity, stop-and-go conditions result, and operations are designated as LOS F. These ratings represent the perspective of drivers and are an indication of the comfort and convenience associated with driving. The descriptions of letter ratings and the delay thresholds for signalized and unsignalized intersections are provided in **Table 9**. Unsignalized intersection control types are all way stop, side street stop, and roundabout. For unsignalized intersections with some movements uncontrolled (that is, side street stop), the intersection LOS is determined by the controlled movement with the highest delay.

Table 9: Intersection LOS Thresholds

LOS	Description	Delay[1]	
		Signalized	Unsignalized
A	Operations with very low delay occurring with favorable progression and/or short cycle length.	≤10	≤10
B	Operations with low delay occurring with good progression and/or short cycle lengths.	>10 to 20	>10 to 15
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	>20 to 35	>15 to 25
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and individual cycle failures are noticeable.	>35 to 55	>25 to 35
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	>55 to 80	>35 to 50
F	Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	>80 or v/c>1[2]	>50 or v/c>1[2]

Notes: 1. Delay is reported in seconds per vehicle.
2. Volume-to-capacity ratio is greater than 1 (demand exceeds capacity).
Source: *Highway Capacity Manual, 7th Edition* (Transportation Research Board, 2022)

Freeway LOS is based on vehicle density expressed as passenger cars per mile per lane. The thresholds differ for basic freeway sections compared to sections with ramp junctions (merge and diverge) or weaving. **Table 10** describes the letter ratings and thresholds for freeway analysis segments.

Table 10: Freeway LOS Thresholds

LOS	Description	Density[1]	
		Basic	Merge, Diverge, & Weave
A	Free-flow speeds prevail. Vehicles are almost completely unimpeded in their ability to maneuver.	< 11	< 10
B	Free-flow speeds are maintained. The ability to maneuver with the traffic stream is only slightly restricted.	> 11 to 18	> 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.	> 18 to 26	> 20 to 28
D	Speeds decline slightly with increasing flows. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort.	> 26 to 35	> 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 45	> 35 to 43
F	Represents a breakdown in flow.	> 45 or v/c > 1[2]	> 43 or v/c > 1[2]

Notes: 1. Density is reported in passenger cars per mile per lane.
2. Volume-to-capacity ratio is greater than 1 (demand exceeds capacity).
The HCM does not provide an LOS E maximum density for merge and diverge segments. The value of 43 vehicles per mile per lane was used to match the LOS E maximum density for weave segments.
Source: *Highway Capacity Manual, 7th Edition* (Transportation Research Board, 2022)

Traffic operations for both intersections and the freeway are analyzed under AM and PM peak periods conditions using the Vissim 2023 microsimulation traffic analysis software. The Vissim model covers the entire three-hour peak periods (6:00 to 9:00 AM and 3:00 to 6:00 PM) and includes a 15-minute seeding interval. Traffic demand volumes are entered into the model gateways in 15-minute intervals using the arrival patterns from the traffic volumes. To report the peak hour performance measures, the peak hours as identified in **Table 1** and **Table 2** above were used.

The Vissim model includes the study intersections; the US 50 freeway mainline; all ramps at the Cameron Park Drive, Ponderosa Road/South Shingle Road, and Shingle Springs Drive interchanges; and the Red Hawk Parkway eastbound off-ramp. Traffic was routed through the network using hourly flow rates developed from the traffic volumes (that is, one set of travel patterns for each hour in the three-hour peak periods). At the Ponderosa Road/South Shingle Road interchange, the routing was adjusted to prevent off-ramp to on-ramp movements since the volume for this path is typically at or near zero. At the study intersections, the pedestrian crosswalks and bicycle lanes were modeled, and the pedestrian and bicycle count volumes were assigned to these facilities.

For the freeway, the observed heavy vehicle percentages were entered on an hourly basis (that is, 6:00 to 7:00 AM, 7:00 to 8:00 AM, etc.) for the peak periods. Truck percentages for the US 50 mainline and Cameron

Park Drive and Shingle Springs Drive on-ramps were based on the freeway truck percentages. The Ponderosa Road/South Shingle Road corridor used the local street truck percentages. Similarly, the HOV percentages for both the local street and freeway entries are based on the freeway HOV percentages as measured on HOV lane for eastbound US 50 west of Cameron Park Drive.

2.4.1 Model Development Process

Development of the Vissim model included three basic components: (1) setup, (2) calibration, and (3) validation. The model was constructed by drawing the roadway network using aerial photography (Bing Maps) as a background. The number of lanes, vehicle restrictions, and the location of lane additions and drops were confirmed by field observations. Driver behavior parameters were adjusted based on field observations. The distribution of vehicle types was also calibrated to local conditions so that the percentage of heavy vehicles and HOVs match the traffic counts.

Since micro-simulation models like Vissim rely on the random arrival of vehicles, multiple runs are needed to provide a reasonable level of statistical accuracy and validity. Therefore, the results of ten separate runs (each using a different random seed number) were averaged to determine the final results.

The Vissim model was validated to existing conditions using the criteria suggested in the *Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software* (FHWA, 2004) and additional criteria developed by Fehr & Peers. Although the *Traffic Analysis Toolbox: Volume III* was revised in 2019, the updated methodology requires more data than is currently available in the study area. Therefore, the 2004 version was applied for this project, which provides an adequate model validation process that meets the objectives of this project. Several iterations were required to successively adjust the default Vissim parameters for geometrics and driver behavior until the model was validated to observed conditions.

The calibrated and validated model is used to generate measures of effectiveness that are consistent with the *HCM 7th Edition*. The validated Vissim model will serve as the basis for the alternative analysis.

2.4.2 Model Set-Up

The model setup required the input of geometric, traffic control, and traffic flow data. Roadway geometric data was gathered using aerial photographs (Google Maps), vehicle-based photographs (Google Street View), and field observations. The lane configurations that were taken initially from aerial photographs were confirmed based on field observations. Caltrans staff provided signal timing information for the signalized intersections. For ramp meters, mainline volume and occupancy thresholds were used from similar locations in the Sacramento area, and the metering rate was adjusted to match the peak hour demand volume. The meters were assumed to be active during both peak periods. The posted speed limits for the arterial streets, freeway, and ramps were collected during field observations.

2.4.3 Model Calibration

Vissim 2023 (SP 12) was used for the analysis. Adjustments to the model focused on the model components related to driver behavior, driver performance, vehicle fleet mix, and vehicle performance. The following Vissim model parameters were adjusted during the calibration process.

- Vehicle fleet composition (passenger cars, pickup trucks, sport-utility vehicles (SUVs), HOV-lane eligible vehicles, heavy trucks, etc.)
- Vehicle headways
- Distance between stopped vehicles (standstill distance)
- Driver behavior when changing lanes
- Driver behavior at ramp junctions (i.e., weaving sections, ramp merges, etc.)

The model calibration process started by replacing the default values with the values as shown in **Table 11**. The default input parameter values did not represent study-area conditions. The calibrated values represent field observations and experience with similar projects elsewhere in the Sacramento Region (such as the I-80/Rocklin Road and SR 99/Whitelock Parkway Interchange projects). The default vehicle composition contains only standard sedans. However, a sizable portion of vehicles in the Sacramento area (and most U.S. metropolitan areas) are SUVs (including light trucks). As a result, the vehicle composition has been revised to reflect this condition based on observations of parked vehicles in 2019. The distance at which vehicles become aware of off-ramps was increased to 1,500 feet since the modeled vehicles need more decision time when traveling at freeway speeds. The changes to freeway and arterial driving behavior were found to better model the one-to-one merging that occurs at on-ramps and lane drops. The default driving behavior tended to have merging vehicles wait for a gap in through traffic before changing lanes.

The capacity for urban streets was calibrated to the HCM base saturation flow rate. The default values for additive and multiplicative factors for the urban driving behavior yielded a capacity of 2,090 passenger cars per hour per lane. The values were adjusted until the HCM base saturation flow rate of 1,900 passenger cars per hour per lane was achieved.

Table 11: Freeway Operations Calibration Parameters

Category	Parameter	Default Value	Adjusted Value
Vehicle Fleet Composition	SOV/HOV Vehicle Type – Sedans	100%	26-43%
	SOV/HOV Vehicle Type – SUVs	0%	20-33%
	SOV/HOV Vehicle Type – Sports Cars	0%	8-14%
	Truck Vehicle Type – 2 Axles	0%	50%
	Truck Vehicle Type – 3 or More Axles	100%	50%
Off-ramp Connector Links	Emergency Stop Distance	16.4 ft	50 ft
	Lane Change Distance	656.2 ft	1,500 ft
Urban Driving Behavior	Safety Distance Additive Factor	2.00	2.91
	Safety Distance Multiplicative Factor	3.00	3.91
Freeway Driving Behavior	Following – Max Look Ahead Distance	820.21 ft	1,500 ft
	Following – Interaction Objects	2	4
	Car Following Model – Standstill Distance	4.92 ft	15.0 ft
	Car Following Model – Headway Time	0.9 sec	1.0 sec
Ramp Merge Junction Driving Behavior	Car Following Model – Average Standstill Distance	6.56 ft	6.0 ft
	Car Following Model – Additive Part of Safety Distance	2.0	1.0
	Car Following Model – Multiplicative Part of Safety Distance	3.0	1.5
	Lane Change – Necessary Lane Change, Own and Trailing	200 ft	100 ft
	Lane Change – Safety Distance Reduction Factor	0.60	0.10
	Lane Change – Max Deceleration for Cooperative Braking	-9.84 ft/s^2	-29.53 ft/s^2

2.4.4 Model Validation

Table 12 summarizes the validation adjustments made to Vissim model parameters at the bottleneck locations. The eastbound US 50 off-ramp to South Shingle Road was found to be sensitive to the lane change distance in the model. With the base values, vehicles would come to a stop in the left lane to wait for a gap to access the off-ramp. In the field, drivers start looking for a gap earlier to be in the correct lane to exit the freeway. As a result, the model values for emergency stop and lane change distance were increased. Similarly, drivers on northbound South Shingle Road anticipate the right turn to North Shingle Road at the Mother Lode Drive intersection, so the emergency stop, and lane change distances were increased for this connector link to reflect the observed driver behavior. The high northbound right turn demand during the PM peak period means that the northbound right lane at Ponderosa Road/North Shingle Road functions as a de facto right turn only lane, so the model was revised to reflect that so northbound through vehicles do not block northbound right turns on red. On the south side of the interchange, drivers use the wide (approximately 20 feet) southbound lane approaching Durock Road to turn right next to vehicles queued to proceed through.

Table 12: Validation Adjustments

Category	Parameter	Base Value	Adjusted Value(s)
Connector Link for Eastbound Off-ramp to South Shingle Rd	Emergency Stop Distance (PM)	50 ft	200 ft
	Lane Change Distance (PM)	1,500 ft	2,500 ft
Connector Link for Northbound Right Turn at Ponderosa Rd/ North Shingle Rd	Emergency Stop Distance (AM & PM)	16.4 ft	250 ft
	Lane Change Distance (AM/PM)	656.2 ft	1,000 ft
Lane Configuration at Ponderosa Rd/North Shingle Rd	Northbound Right Turn (PM)	Shared	Exclusive
	Second Southbound Through Lane Length (PM)	130 ft	275 ft
Lane Configuration at South Shingle Rd/Durock Rd	Southbound Approach	Shared	Separate right turn lane

During validation, the model estimates are compared against observed data to measure the model's accuracy. FHWA suggests the following validation criteria (Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software, FHWA, 2004).

- Link volumes for more than 85 percent of cases meet the following criteria:
  - For volumes less than 700 vph, within 100 vph
  - For volumes between 700 and 2,700 vph, within 15 percent
  - For volumes greater than 2,700, within 400 vph
- Link volumes for more than 85 percent of cases have a GEH statistic (a measure of goodness of fit) less than 5
- Sum of link volumes within 5 percent
- Sum of link volumes have a GEH statistic less than 4
- Average travel times within 15 percent (or one minute, if higher) for more than 85 percent of cases
- Individual link speeds have a visually acceptable speed-flow relationship
- Bottlenecks create visually acceptable queuing

Table 13 shows how the results for the AM and PM peak period existing conditions models compare to the validation criteria thresholds identified above. See the attachment for detailed reports for volume and travel time validation. Both peak periods met the validation criteria for volume and travel time. Visual inspection of the model showed that freeway speeds and queue lengths at the Ponderosa Road/South Shingle Road intersections matched field observations.

Table 13: Validation Criteria Thresholds Comparison

Criteria		Threshold	Target for % Met	AM Peak Period	PM Peak Period
Link Volumes	Volume	< 700, ±100 vph	>85%	100% / Met	100% / Met
		700-2,700, ±15%			
		> 2,700, ±400 vph			
	GEH	5	>85%	100% / Met	100% / Met
Sum of Link Volumes	Volume	±5%	-	-1.3% / Met	0.1% / Met
	GEH	4	-	2.5 / Met	0.1 / Met
Travel Time		±15%	>85%	100% / Met	100% / Met
Travel Speed		Match observations		Yes / Met	Yes / Met
Queuing		Match observations		Yes / Met	Yes / Met

Table 14 compares the measured and modeled travel time for the freeway corridors – eastbound and westbound US 50 – during each hour of the peak period.

Table 14: Freeway Travel Time Validation

Path	Value	Hour 1	Hour 2	Hour 3
AM Peak Period		***6 to 7 AM***	***7 to 8 AM***	***8 to 9 AM***
Eastbound US 50 from Cameron Park Dr Off-ramp to Red Hawk Pkwy Off-ramp	Measured	3.84 min	3.80 min	3.83 min
	Modeled	3.99 min	4.07 min	4.10 min
	Difference	0.15 min (4.0%)	0.27 min (7.1%)	0.27 min (7.1%)
Westbound US 50 from Shingle Springs Dr Off-ramp to Cameron Park Dr Southbound On-ramp	Measured	3.56 min	3.59 min	3.61 min
	Modeled	3.78 min	3.87 min	3.86 min
	Difference	0.22 min (6.2%)	0.29 min (8.0%)	0.26 min (7.1%)
PM Peak Period		***3 to 4 PM***	***4 to 5 PM***	***5 to 6 PM***
Eastbound US 50 from Shingle Springs Dr Off-ramp to Cameron Park Dr SB On-ramp	Measured	3.80 min	3.82 min	3.90 min
	Modeled	4.15 min	4.19 min	4.15 min
	Difference	0.35 min (9.3%)	0.37 min (9.6%)	0.25 min (6.4%)
Westbound US 50 from Cameron Park Dr Off-ramp to Red Hawk Pkwy Off-ramp	Measured	3.57 min	3.63 min	3.97 min
	Modeled	3.92 min	3.87 min	3.86 min
	Difference	0.35 min (9.8%)	0.23 min (6.4%)	-0.11 min (-2.7%)

For all time periods, the modeled travel time is within 30 seconds of the measured travel time from the Inrix data. Travel time is consistent – at around 4 minutes – across the three hours of the peak period since there is little to no freeway congestion in the study area. Travel time at 65 miles per hour is 3.92 minutes eastbound and 3.67 minutes westbound.

The travel speeds and queuing for the freeway mainline are shown in the speed contour plots in **Appendix C**. During the AM peak period, the observed speed data showed free-flow speed throughout the analysis period in both directions. The model shows slower speeds (55 to 60 mph) at the South Shingle Road off-ramp from 7:45 to 8:45 AM. The slower speeds reflect long off-ramp queues and high off-ramp demand volume.

During the PM peak hour, the Inrix speed data again show average speeds above 60 mph in the eastbound direction, but eastbound off-ramp queues at South Shingle Road were observed to affect eastbound operations similar to the AM peak hour. The model reflects the effect of the off-ramp queues with average speeds in the 55 to 60 mph range for the link upstream of the off-ramp for the 4:00 to 5:00 PM hour. Westbound US 50 operates with free-flow speeds during the PM peak hour in both the Inrix data and the Vissim model.

2.4.5 Alternative Analysis

The existing conditions Vissim model was used to develop the Vissim models under opening year 2029, interim year 2039, and horizon year 2049 conditions. The roadway network was modified to account for planned projects (for both the No Build and Build Alternatives) and the proposed improvements (for the Build Alternative). The future year travel demand forecasts were entered into the respective model for each scenario.

For future conditions, the Vissim model for the No Build and Build Alternatives was updated with the following separate background roadway projects.

- Ramp Meters – By 2035, ramp meters are planned to be constructed in the eastbound direction at Cameron Park Drive and Shingle Springs Drive and in the westbound direction at Shingle Springs Drive, northbound Cameron Park Drive and southbound Cameron Park Drive. At Cameron Park Drive, the eastbound on-ramp would be two lanes, and the westbound on-ramps would add a metered HOV preferential lane (under interim year 2039 and horizon year 2049 only).
- Auxiliary Lanes – Auxiliary lanes are proposed in both directions between Cameron Park Drive and Ponderosa Road/South Shingle Road and in the westbound direction between Cameron Park Drive and Cambridge Road by 2040 (horizon year 2049 only)

At the study intersections, the traffic signals were optimized and coordinated based on the future year demand volume. The initial signal timings were developed using the Synchro traffic analysis software. The timings were then adjusted based on initial Vissim model results to minimize off-ramp queues.

Caltrans provided ramp meter rates for the No Build and Build Alternatives based on the traffic forecast volumes for the AM and PM peak periods.

2.5 Performance Targets

Policy TC-Xd in the *El Dorado County General Plan Transportation and Circulation Element* (August 2019) provides the following roadway performance targets.

> *Level of Service (LOS) for County-maintained roads and state highways within the unincorporated areas of the county shall not be worse than LOS E in the Community Regions or LOS D in the Rural Centers and Rural Regions except as specified in Table TC-2*

The study area is located within the Cameron Park and Shingle Springs Community Regions, and none of the roadways listed in Table TC-2 are in the study area. Thus, study intersections have a LOS E performance target.

The *Route 50 Transportation Concept Report and Corridor System Management Plan* (Caltrans, 2014) lists a concept LOS of E for US 50 in the study area.

As a result, LOS E is used as the performance target for all analysis locations. That is, a study location is deficient when the AM or PM peak hour LOS is F.

2.6 Safety Evaluation

Caltrans provided a five-year collision history for US 50 and the Ponderosa Road/South Shingle Road ramps in the project area. To document collisions on Ponderosa Road and South Shingle Road in the study area, a five-year history of fatality and injury collisions was queried from the California Highway Patrol's Statewide Integrated Traffic Records System using the Transportation Injury Mapping System from the University of California, Berkeley. The collision history was reviewed for location and collision type. The hotspot locations and the more frequent collision types were identified. The potential for the project alternatives to improve safety was evaluated. Chapter 3 presents the detailed collision history.

3. Existing Year 2024 Conditions

The existing year 2024 conditions chapter presents the current operations and safety performance of the study area roadway system. The operations analysis is a detailed evaluation of individual facilities with separate discussions for intersections and freeway segments. Additional details for the operational analysis performance are provided in **Appendix D**. Collision history for the study corridor is presented. The existing year 2024 transit, bicycle, and pedestrian systems are also discussed.

3.1 Study Facilities

Ponderosa Road is a north/south arterial road that connects US 50 on the south to Green Valley Road on the north and terminates near Dry Creek in Rescue. North of the interchange area, land uses are primarily rural residential. Ponderosa High School is located at Ponderosa Road/Meder Road about ¾ mile north of US 50. In the study area, Ponderosa Road has four lanes that narrow to two lanes further north. The posted speed is 40 mph.

South Shingle Road is a north/south arterial road that connects US 50 on the north to Latrobe Road in Latrobe continuing as a minor road to the Sacramento County line. At the study intersections, adjacent land uses are commercial and industrial. South of Sunset Lane, the land uses are primarily rural residential. South Shingle Road has four lanes adjacent to the interchange that narrow to two lanes further south. The posted speed is 45 mph.

North Shingle Road is a north/south arterial road that connects US 50 on the south to Green Valley Road in Rescue. A fitness center and a church are located along the road within ¼ mile of the interchange. Further north, the adjacent land uses are primarily rural residential. North Shingle Road has two lanes and a posted speed of 50 mph.

Wild Chaparral Drive is a two-lane frontage road that extends along the north side of US 50 for about 0.6 miles west of Ponderosa Road. The road provides access to various land uses including a car dealership, a church, a storage facility, and residential neighborhood.

Durock Road is an east/west arterial road that connects South Shingle Road to the east with Cameron Park Drive to the west. Adjacent land uses are a mix of commercial, industrial, and residential neighborhoods. The two-lane road has a posted speed of 45 mph.

Mother Lode Drive is an east/west arterial road that connects US 50 at South Shingle Road in the west to US 50 at Missouri Flat Road in Diamond Springs in the east. In the study area, adjacent land uses are primarily commercial including gas stations, a grocery store, an auto parts store, and restaurants. The former alignment of US 50 is a two-lane road with a posted speed of 35 mph immediately east of the study intersections.

Sunset Lane is a north/south local road that connects South Shingle Road on the south to Mother Lode Drive on the north and continues north to provide access to various commercial properties adjacent to US 50. The two-lane road does not have posted speed limit signs.

US 50 is a transcontinental highway that extends from West Sacramento, CA to Ocean City, MD. In the study area, US 50 serves commuter and commercial traffic in the Sacramento metropolitan area, and freight and recreational traffic between the Sacramento and Lake Tahoe regions. US 50 transitions from a six-lane freeway with HOV lanes east of Cameron Park Drive to a four-lane freeway to the west. An eastbound auxiliary lane exists between Shingle Springs Drive and Red Hawk Parkway.

The US 50/Cameron Park interchange has a tight diamond (Type L-1) configuration in the eastbound direction and a partial cloverleaf (Type L-9) configuration in the westbound direction. The US 50/Ponderosa Road/South Shingle Road interchange has a partial cloverleaf (Type L-7) in the eastbound direction and a partial cloverleaf (Type L-9) in the westbound direction. The US 50/Shingle Springs Drive interchange has a tight diamond (Type L-1) for both directions. In the study area, ramp meters exist and are operating only at Ponderosa Road/South Shingle Road.

3.2 Intersection Operations

Table 15 shows the AM and PM peak hour intersection operations results for existing conditions. During the AM peak hour, intersection operations are LOS E at Ponderosa Road/North Shingle Road. The delay is highest for the southbound approach which is associated with trips from Ponderosa High School. The remaining intersections have LOS D or better conditions.

Table 15: Intersection Operations – Existing Conditions

Intersection	Control	AM Peak Hour	PM Peak Hour
1. Ponderosa Rd/North Shingle Rd/Wild Chaparral Dr	Signal	E / 79	E / 61
2. Ponderosa Rd/US 50 Westbound Ramps	Signal	D / 41	C / 20
3. South Shingle Rd/Mother Lode Dr/US 50 Eastbound Ramps	Signal	D / 55	D / 50
4. South Shingle Rd/Durock Rd	Signal	C / 23	D / 47
5. South Shingle Rd/Sunset Ln	Side Street Stop	A / 7 (WB LT)	A / 9 (WB LT)

Notes: Level of service and delay are shown with delay reported in seconds per vehicle. Bold and underline font indicate deficient LOS F conditions. The peak hours are 7:45 to 8:45 AM and 3:00 to 4:00 PM. For side street stop control, the level of service and delay are reported for the worst movement with the worst movement noted in parentheses.

On the north side of the interchange, the two closely spaced intersections operate with one signal controller that provides a separate phase for each approach to minimize queues between the two intersections. As a result, southbound Ponderosa Road and westbound North Shingle Road have LOS F and northbound through Ponderosa Road at the US 50 Westbound Ramps has LOS E. At the South Shingle Road/Mother Lode Drive intersection, the eastbound approach (US 50 eastbound off-ramp) also has LOS E conditions, with LOS F for the eastbound left turn.

During the PM peak hour, Ponderosa Road/North Shingle Road again has LOS E conditions with LOS F for the southbound and westbound approaches, similar to the AM peak hour. The South Shingle Road/Mother Lode Drive intersection has LOS D as during the AM peak hour, but the South Shingle Road/Durock Road worsens to LOS D. The Mother Lode Drive intersection has LOS E for the southbound and westbound approaches. The eastbound approach at Durock Road is at LOS F.

Table 16 shows the average maximum queue length for selected approaches at the study intersections. During the AM peak hour, vehicle queues are greater than 1,000 feet for the southbound approach and 650 feet for the westbound approach at Ponderosa Road/North Shingle Road, which correspond with the LOS F conditions reported above. The northbound approach at the US 50 Westbound Ramps queues back into the US 50 Eastbound Ramps intersection. The photos[6] below show the observed queues for westbound North Shingle Road and northbound Ponderosa Road during the AM peak hour.

Table 16: Average Maximum Queue Length – Existing Conditions

Intersection	Approach	Storage Length	Queue Length	
			AM Peak Hour	PM Peak Hour
1. Ponderosa Rd/North Shingle Rd/Wild Chaparral Dr	Southbound	>1,000	1,050	800
	Westbound	>1,000	650	700
2. Ponderosa Rd/US 50 Westbound Ramps	Northbound	725	**>750**	725
	Westbound	1,275	325	275
3. South Shingle Rd/Mother Lode Dr/US 50 Eastbound Ramps	Eastbound	1,300	**1,350**	925
	Southbound	725	450	625
	Westbound	>1,000	550	575
4. South Shingle Rd/Durock Rd	Eastbound	>1,000	250	700
	Northbound	>1,000	350	350

Notes: Storage and queue lengths are reported in feet. The peak hours are 7:45 to 8:45 AM and 3:00 to 4:00 PM. Bold and underlined font indicates a queue length that exceeds the storage length. Storage length is either the pocket length or the distance upstream to the nearest intersection or freeway gore point.

[6] The photos were taken on January 9, 2024, which is the day prior to the days that the traffic counts were taken.

Westbound North Shingle Road (left) approaching Ponderosa Road and northbound Ponderosa Road approaching the US 50 WB Ramps (right) during the AM Peak Hour

The AM peak hour eastbound off-ramp queue exceeds the storage length of 1,300 feet. As shown in the photo below, the maximum queue can extend for a short distance onto the US 50 eastbound mainline.

Eastbound US 50 at South Shingle Road Off-ramp at 8:15 AM

During the PM peak hour, the southbound queue at Ponderosa Road/North Shingle Road is shorter than in the AM peak hour, but the westbound queue is about the same. At the US 50 Eastbound Ramps, the southbound queue is longer and approaches the upstream intersection as shown in the photo below on the right. The eastbound off-ramp queue is shorter than in the AM peak hour, but it still uses about 70 percent of the available storage.

Southbound Ponderosa Road at North Shingle Road (left) and Southbound Ponderosa Road at US 50 (right) during the PM Peak Hour[7]

3.3 Freeway Operations

Table 17 and **Table 18** show the AM and PM peak hour LOS and average density under existing conditions. In the eastbound direction, all locations have LOS C or better during the AM peak hour. During the PM peak hour, the South Shingle Road off-ramp and the immediate upstream basic segment operate at LOS D and all other locations have LOS C or better. The higher vehicle density at the off-ramp reflects both the long off-ramp queues from the ramp terminal intersection.

In the westbound direction, US 50 operates with LOS C or better conditions during the AM peak hour. The segments with LOS C are all downstream of the on-ramp from southbound Ponderosa Road. During the PM peak hour, the Cameron Park Drive off-ramp has LOS D, and all other locations have LOS C or better.

[7] Although the photos taken on January 9, 2024, show wet weather, they reflect queuing similar to what occurred on the days that the traffic counts were collected (January 10 and 11), which had dry weather.

Table 17: Freeway Operations Eastbound US 50 – Existing Conditions

Freeway Segment	Facility Type	AM Peak Hour	PM Peak Hour
Cameron Park Dr Off-ramp	Diverge (Basic)	B / 15	C / 20
Cameron Park Dr Off to On-ramp	Basic	B / 18	C / 23
Cameron Park Dr On-ramp	Merge	C / 20	C / 26
Cameron Park Dr to South Shingle Rd	Basic	C / 22	D / 28
South Shingle Rd Off-ramp	Diverge	C / 23	D / 32
South Shingle Rd Off to On-ramp	Basic	B / 14	B / 18
South Shingle Rd On-ramp	Merge	B / 13	B / 17
South Shingle Rd to Shingle Springs Dr	Basic	B / 16	C / 20
Shingle Springs Dr Off-ramp	Diverge	B / 16	C / 20
Shingle Springs Dr Off to On-ramp	Basic	B / 15	C / 19
Shingle Springs Dr to Red Hawk Pkwy	Weave	B / 11	B / 14

Notes: Level of service and density are shown with density reported in vehicles per lane per mile. Bold and underline font indicate deficient LOS F conditions. The peak hours are 7:45 to 8:45 AM and 4:15 to 5:15 PM.

Table 18: Freeway Operations Westbound US 50 – Existing Conditions

Freeway Segment	Facility Type	AM Peak Hour	PM Peak Hour
Shingle Springs Dr Off-ramp	Diverge	B / 15	B / 18
Shingle Springs Dr Off to On-ramp	Basic	B / 15	B / 17
Shingle Springs Dr On-ramp	Merge	B / 13	B / 16
Shingle Springs Dr to Ponderosa Rd	Basic	B / 16	C / 19
Ponderosa Rd Off-ramp	Diverge	B / 16	C / 20
Ponderosa Rd Off to Northbound On-ramp	Basic	B / 14	B / 17
Ponderosa Rd Northbound On-ramp	Merge	B / 16	B / 17
Ponderosa Rd Southbound On-ramp	Merge	C / 20	C / 22
Ponderosa Rd to Cameron Park Dr	Basic	C / 23	C / 25
Cameron Park Dr Off-ramp	Diverge	C / 24	D / 28
Cameron Park Dr Off to Northbound On-ramp	Basic	C / 20	C / 18
Cameron Park Dr Northbound On-ramp	Merge	B / 15	B / 15
HOV Lane Add to Cameron Park Dr SB On-ramp	Basic	C / 20	C / 19
Cameron Park Dr Southbound On-ramp	Merge	C / 18	B / 18

Notes: Level of service and density are shown with density reported in vehicles per lane per mile. Bold and underline font indicate deficient LOS F conditions. The peak hours are 7:15 to 8:15 AM and 3:00 to 4:00 PM.

3.4 Roadway Safety

The Traffic Accident Surveillance and Analysis System (TASAS) was queried to generate the collision history for westbound I-80 from Rocklin Road to SR 65 for a five-year period from January 2018 to December 2022. The covered period includes the COVID-19 pandemic, which resulted in higher statewide collision rates starting in March 2020. **Table 19** summarizes the number of collisions by severity and compares the collision rate to statewide averages. The US 50 mainline had 140 collisions (two that involved fatalities) for both directions from Cameron Park Drive overcrossing to the Red Hawk Parkway Overcrossing. The actual collision rate is lower than the statewide average for similar facilities for the fatality, fatality and injury, and total collisions categories. At the US 50/Ponderosa Road interchange, the eastbound off-ramp had the most collisions with nine during the five-year period. The other four ramps had three or fewer collisions. The only location with an actual collision rate higher than the statewide average was at the eastbound loop on-ramp from South Shingle Road. The fatality plus injury collision rate is almost two-and-a-half times the statewide average. All three collisions on this ramp were injury related.

Table 19: Collision History

Segment	Total Collisions	Total Fatality Collisions	Fatal & Injury Collisions	Actual Collision Rate			Average Collision Rate		
				F	F&I	Total	F	F&I	Total
US 50 from Cameron Park Dr to Red Hawk Pkwy (PM 6.6 to R 10.3)	140	2	52	0.005	0.14	0.37	0.008	0.27	0.81
Eastbound US 50 Off-ramp to South Shingle Rd (PM R8.378)	9	0	3	0.000	0.17	0.50	0.003	0.38	1.04
Westbound US 50 On-ramp from SB Ponderosa Rd (PM R8.416)	2	0	1	0.000	0.12	0.25	0.004	0.23	0.70
Eastbound US 50 On-ramp from South Shingle Rd (PM R8.533)	3	0	3	0.000	**0.64**	0.64	0.002	0.26	0.76
Westbound US 50 On-ramp from NB Ponderosa Rd (PM R8.598)	1	0	0	0.000	0.00	0.10	0.002	0.23	0.77
Westbound US 50 Off-ramp to Ponderosa Rd (PM R8.763)	2	0	1	0.000	0.20	0.41	0.003	0.38	1.04

Notes: The collision rate is in collisions per million vehicle miles. "F" refers to the fatality collision rate, and "F&I" refers to the fatality and injury collision rate. Bold and underline font indicate an actual collision rate that exceeds the average collision rate.

Source: TASAS from January 2018 to December 2022, Caltrans (2024)

Table 20 shows the collision types for the US 50 freeway mainline and Ponderosa Road/South Shingle Road ramps. The most common collision type on US 50 in the study area is hit object collisions (36 percent), which are more common in rural areas and those with rolling or hilly terrain. The next most common collision type is rear end, which are associated with congested conditions. On the eastbound US 50 off-ramp, five of the nine collisions were broadside collisions which may indicate issues at the ramp terminal intersection. On the eastbound on-ramp, which had three injury-related collisions, two collisions were hit object, and the other was a rear end.

Table 20: Collision Type

Segment	Head On	Side-swipe	Rear End	Broad-side	Hit Object	Over-turn	Auto Ped	Other
US 50 from Cameron Park Dr to Red Hawk Pkwy (PM 6.6 to R 10.3)	2	18	38	4	51	23	2	2
Eastbound US 50 Off-ramp to South Shingle Rd (PM R8.378)	0	2	0	5	1	1	0	0
Westbound US 50 On-ramp from SB Ponderosa Rd (PM R8.416)	0	0	0	0	1	1	0	0
Eastbound US 50 On-ramp from South Shingle Rd (PM R8.533)	0	0	1	0	2	0	0	0
Westbound US 50 On-ramp from NB Ponderosa Rd (PM R8.598)	0	0	0	1	0	0	0	0
Westbound US 50 Off-ramp to Ponderosa Rd (PM R8.763)	0	0	2	0	0	0	0	0

Source: TASAS from January 2022 to December 2022, Caltrans (2024)

Collision history was also reviewed for Ponderosa Road and South Shingle Road in the study area during the five-year period from January 2018 through December 2022. The Transportation Injury Mapping System developed by the University of California, Berkeley was used to query the California Highway Patrol's Statewide Integrated Traffic Records System database for fatality or injury related collisions (collisions with property damage only are not included). Of the 13 collisions in the database, none involved fatalities. One collision involved a motorcycle, and no collisions involved bicycles or pedestrians. One collision each occurred at Ponderosa Road/North Shingle Road and Ponderosa Road/US 50 Westbound Ramps. Five collisions occurred at South Shingle Road/US 50 Eastbound Ramps/Mother Lode Drive. Two collisions occurred at South Shingle Road/Durock Road, and three collisions occurred at Sunset Lane. Most collisions were rear end and broadsides (5 each). The rear end collisions occurred near the interchange (from Durock Road to the north), and three of the broadside collisions occurred south of Durock Road.

3.5 Multimodal Facilities

3.5.1 Transit System

Existing transit service in the study area is provided by El Dorado Transit which operates one local and two regional bus routes in the project area.

- Route 40 (Cameron Park) route provides hourly weekday service from 6:30 AM to 7:20 PM in Cameron Park and Shingle Springs traveling between US 50/Ponderosa Road, US 50/Cambridge Road, and Cameron Park Drive/Green Valley Road. In the study area, the bus travels on a loop from eastbound Durock Road to southbound South Shingle Road, and then eastbound on Sunset Lane. The bus reenters the study area from westbound Mother Lode Drive, crosses US 50, and then stops at the park and ride lot on Wild Chaparral Drive. After leaving the park and ride lot, the bus turns south on Ponderosa Road and takes westbound US 50 towards Cameron Park Drive. Bus stops in the study area are located on westbound Mother Lode Drive approaching South Shingle Road and at the park and ride lot on Wild Chaparral Drive.
- The Sac Commuter route provides four weekday trips from Placerville to downtown Sacramento during the morning peak period and four return trips during the evening peak period. Additionally, two reverse commuter trips are provided daily. In both directions, the route stops at the Wild Chaparral Drive park and ride lot. Otherwise, the route travels on US 50 through the study area.
- Route 50X (50 Express) route provides hourly weekday service in both directions from 6:00 AM to 7:00 PM between Placerville and the Iron Point light rail station on Folsom Boulevard in Folsom. Route 50X has a stop at Red Hawk Resort and Casino. Otherwise, this route travels on US 50 in the study area.

Amtrak provides connecting bus service between the Sacramento Valley Station in downtown Sacramento and the Stateline Transit Center in South Lake Tahoe. One bus travels from Sacramento to South Lake Tahoe in the morning and returns to Sacramento in the afternoon. The nearest stop is at US 50/ Cambridge Road. In the study area, the bus travels on US 50.

3.5.2 Bicycle System

Bicycle facilities are limited in the study area. No bicycle route is provided across US 50. There is a Class II on-street bicycle lane on Mother Lode Drive that extends from South Shingle Road about ¾ mile east to North Star Drive. North Shingle Road, Wild Chaparral Drive, Ponderosa Road north of North Shingle Road and South Shingle Road south of Durock Road have paved shoulders in the study area, but they are not marked as bicycle lanes.

3.5.3 Pedestrian System

Pedestrian facilities are limited in the study area. A sidewalk is provided on the west side of the Ponderosa Road/South Shingle Road overcrossing of US 50. The pedestrian path is a mix of asphalt and concrete paving that connects the southwest corner of Ponderosa Road/Wild Chaparral Drive to the northwest corner of South Shingle Road/US 50 Eastbound Ramps. Uncontrolled, one-lane crossings exist at the southbound to westbound and eastbound on-ramps.

A sidewalk is provided along the frontage of the gas station at the southeast corner of South Shingle Road/US 50 Eastbound Ramps. No other sidewalks exist in the study area. This includes the frontages of the three park-and-ride lots.

Crosswalks and pedestrian signal phases are provided at some of the study intersections. At Ponderosa Road/North Shingle Road, crosswalks are provided on the west, north, and east legs. No crosswalks are provided at Ponderosa Road/US 50 Westbound Ramps. The South Shingle Road/US 50 Eastbound Ramps intersection has crosswalks for the west, south, and east legs. The South Shingle Road/Durock Road intersection has crosswalks for the west and south legs. Although the gas station driveway has a sidewalk, no pedestrian phase is provided to cross the driveway. No pedestrian facilities are provided at the South Shingle Road/Sunset Lane intersection.

4. Travel Demand Forecasts

The travel demand forecasts chapter presents the future year demand volumes as developed using the travel demand model. The horizon year 2049 forecasts are presented first followed by the opening year 2029 and then interim year 2039 forecasts since the opening and interim year volumes are developed from the horizon year and existing volumes. The traffic forecasts include study intersections and freeway segments as well as pedestrian and bicycle volumes. The forecasts are presented for the No Build and Build Alternatives.

4.1 Horizon Year 2049

Figure 6 shows the horizon year 2049 weekday AM and PM peak hour traffic volumes, lane configurations, and traffic control for the No Build Alternative. **Figure 7** shows the horizon year 2049 weekday AM and PM peak hour traffic volumes, lane configurations, and traffic control for the ultimate phase of the Build Alternative. The ultimate phase of the Build Alternative includes all improvements shown in **Figure 1** and **Figure 2** including widening of the US 50 overcrossing.

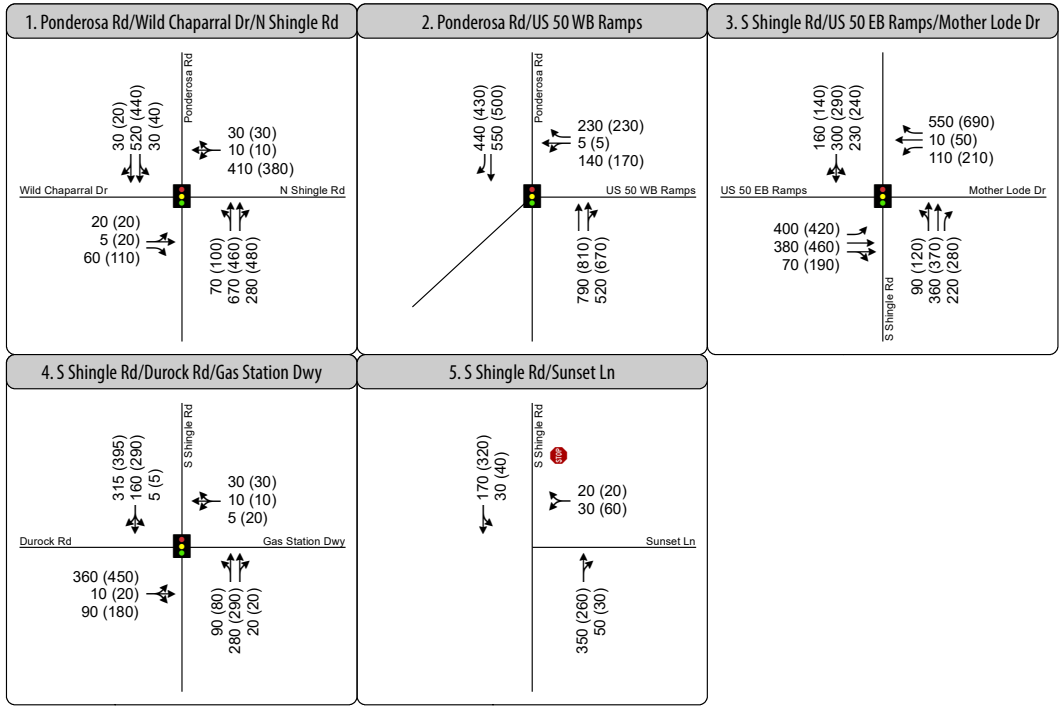
Table 21 shows the growth in traffic by intersection between existing and horizon year 2049 No Build Alternative. Overall, the intersections are expected to experience a 31 to 33 percent increase in traffic during the AM and PM peak hours between existing and horizon year conditions. This is generally in line with the 39 percent residential growth and 19 percent non-residential growth expected in the area between the base and future year models.

Table 21: Traffic Growth Between Existing and Horizon Year 2049 No Build Alternative

Intersection	AM	PM
1. Ponderosa Rd/North Shingle Rd/Wild Chaparral Dr	26%	26%
2. Ponderosa Rd/US 50 Westbound Ramps	25%	29%
3. South Shingle Rd/Mother Lode Dr/US 50 Eastbound Ramps	31%	33%
4. South Shingle Rd/Durock Rd	60%	53%
5. South Shingle Rd/Sunset Ln	23%	25%
Volume Weighted Overall Growth	31%	33%

Note: Intersection volume measured as total entering volume.

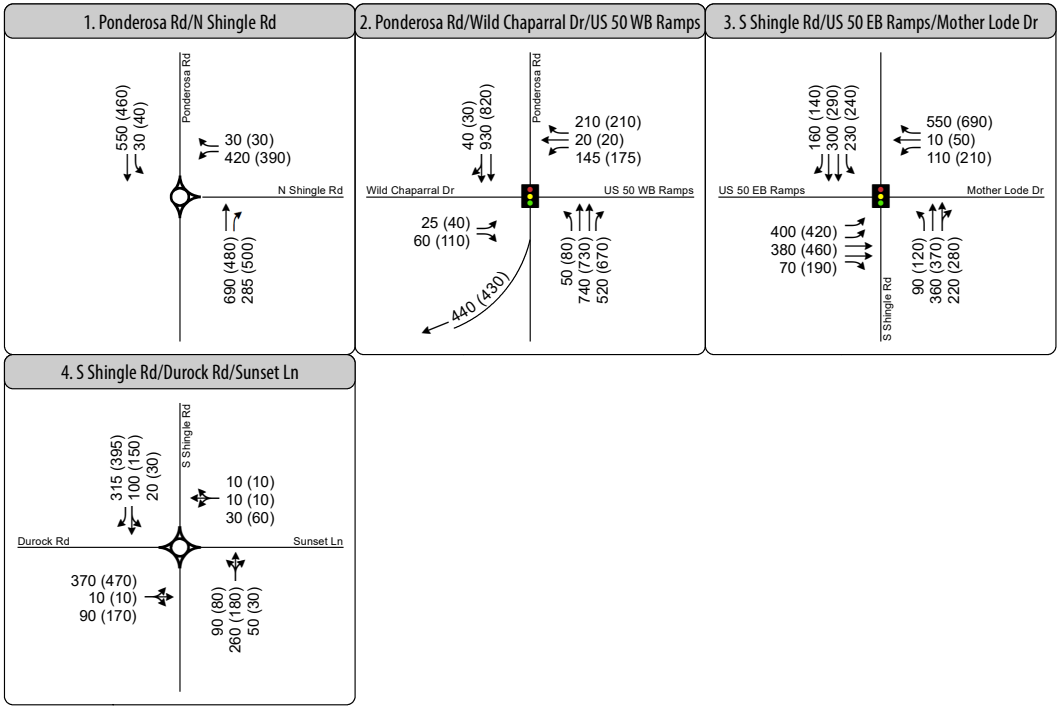
The following turning movement volumes on **Figure 6** are particularly noteworthy (the more conservative or design-influencing peak hour volume is listed):



Study Intersections

Figure 6

Intersection Peak Hour Volumes and Lane Configurations - Horizon Year 2049 No Build Alternative



Turn Lane

AM (PM) Peak Hour Traffic Volume

Traffic Signal

Roundabout

Study Intersections

Figure 7

Intersection Peak Hour Volumes and Lane Configurations - Horizon Year 2049 Build Alternative Ultimate Phase

Ponderosa Road/North Shingle Road

- The westbound left-turn increases from 296 to 420 vehicles during the AM peak hour. The Build Alternative design includes dual left-turn lanes for this movement.
- The northbound right-turn increases from 377 to 500 vehicles during the PM peak hour. The Build Alternative design includes a shared through/right lane for this movement.

Ponderosa Road/Wild Chaparral Drive/US 50 Westbound Ramps

- The northbound right-turn (onto the westbound loop on-ramp) increases from 476 to 670 vehicles during the AM peak hour. The Build Alternative design includes a dedicated right-turn lane for this movement.

South Shingle Road/Mother Lode Drive/US 50 Eastbound Ramps

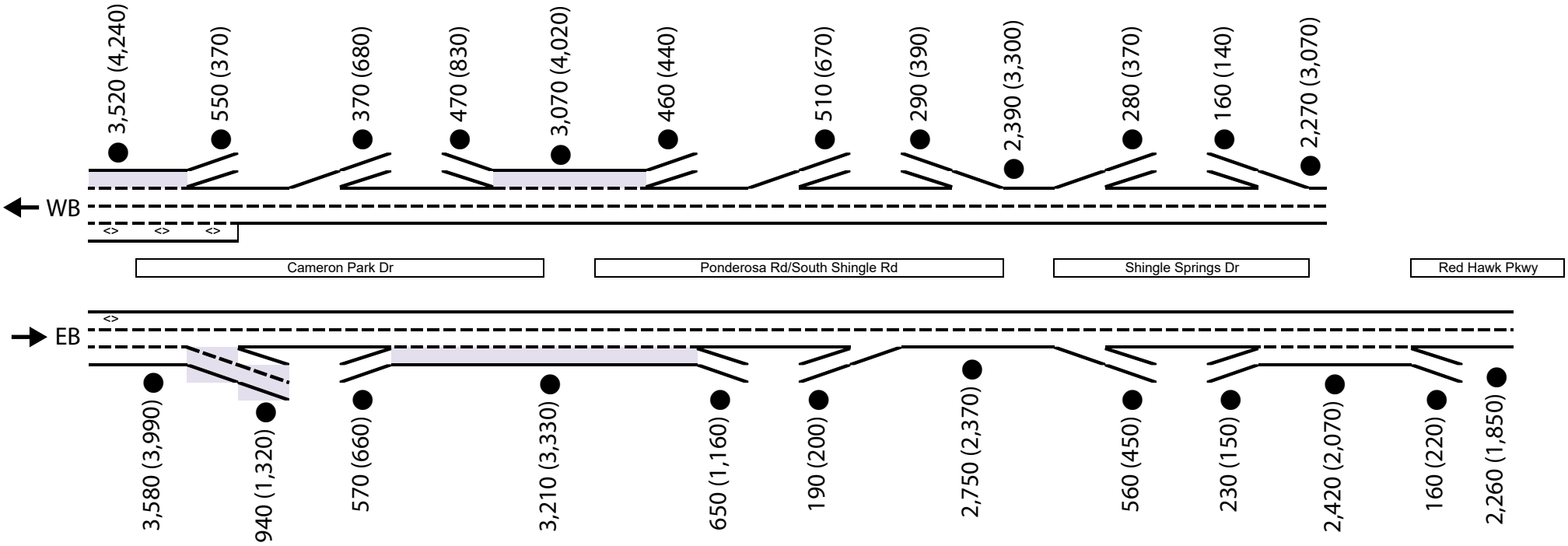
- The southbound left-turn increases from 176 to 240 vehicles during the PM peak hour. The Build Alternative design includes a dedicated left-turn lane for this movement.
- The northbound right-turn increases from 119 to 280 vehicles during the PM peak hour. The Build Alternative design includes a shared through/right lane for this movement.
- The westbound right-turn increases from 471 to 690 vehicles during the PM peak hour. The Build Alternative design includes a single right-turn lane for this movement.

South Shingle Road/Durock Road

- The southbound right-turn increases from 219 to 395 vehicles during the PM peak hour. The Build Alternative design includes a dedicated right-turn lane for this movement.
- The eastbound left-turn increases from 195 to 470 vehicles during the PM peak hour. The Build Alternative design includes dual left-turn lanes for this movement. As a result of these movement increases (and lower overall existing volumes), this intersection experiences a greater percentage growth in traffic relative to existing conditions than the other intersections.

The horizon year 2049 Build Alternative forecasts shown on **Figure 7** contain the same approach and departure volumes on all ramps and surface streets at the US 50/Ponderosa Road interchange as the No Build Alternative. However, the volumes differ slightly at almost all intersections due to the two road realignments and US 50 westbound off-ramp realignment.

Figure 8 shows the horizon year 2049 AM and PM peak hour US 50 mainline and ramp traffic volumes from the Cameron Park Drive to Shingle Springs Drive interchanges. Because the same volumes are used for each alternative and the project would not add or remove a ramp, the volumes are identical for both alternatives.



< > HOV Lane

X,XXX (X,XXX) AM(PM) Peak Hour Volume

Note: Shaded areas indicated changes with planned separate projects.
WB Peak hours are 7:15 to 8:15 AM and 3:00 to 4:00 PM
EB Peak hours are 7:45 to 8:45 AM and 4:15 to 5:15 PM

Figure 8

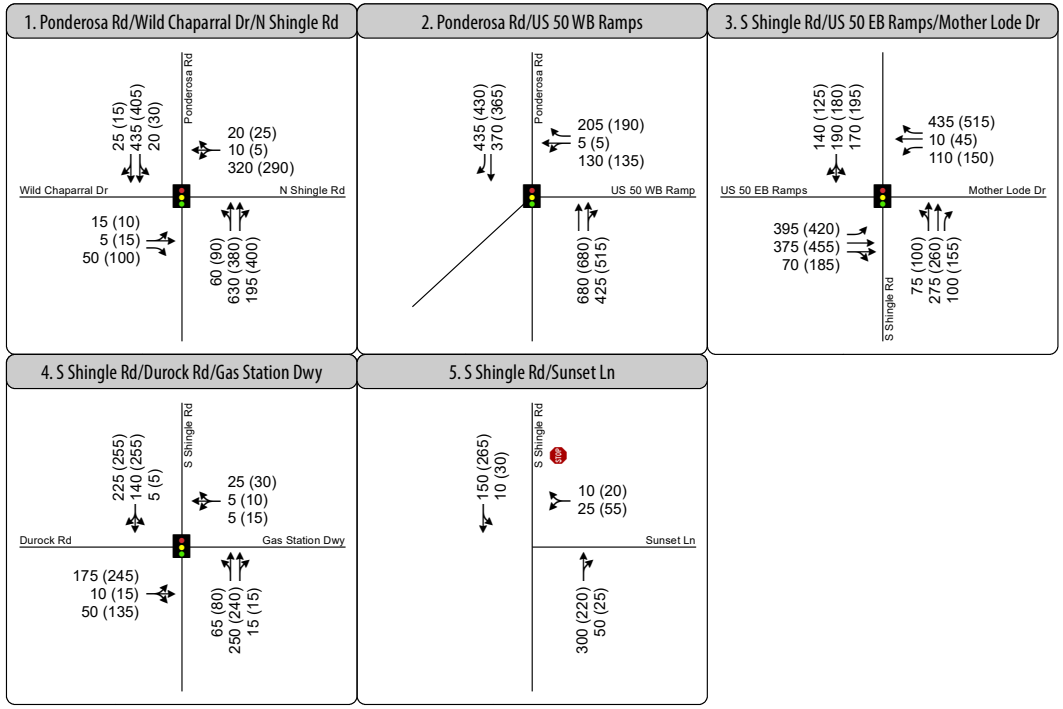
Freeway Peak Hour Volumes and Lane Configurations - Horizon Year 2049

4.2 Opening Year 2029

The opening year scenario represents linear growth between the existing volumes in 2024 and horizon year 2049 conditions. The opening year 2029 conditions represent approximately 20 percent of the traffic growth between 2024 and 2049.

Figure 9 shows the opening year 2029 weekday AM and PM peak hour traffic volumes, lane configurations, and traffic control for the No Build Alternative. **Figure 10** shows the opening year 2029 weekday AM and PM peak hour traffic volumes, lane configurations, and traffic control for the initial phase of the Build Alternative. The initial phase of the Build Alternative includes only the improvements shown in **Figure 1** without the widening of the US 50 overcrossing.

Figure 11 shows the opening year 2029 AM and PM peak hour US 50 mainline and ramp traffic volumes from the Cameron Park Drive to Shingle Springs Drive interchanges. Because the same volumes are used for each alternative and the project would not add or remove a ramp, the volumes are identical for both alternatives. No improvements are planned to the US 50 corridor in the study area by 2029, so the lane configuration is the same as existing conditions.



Turn Lane

AM (PM) Peak Hour Traffic Volume

Traffic Signal

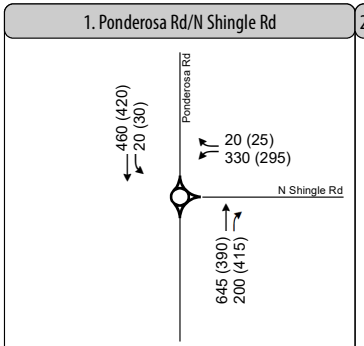
Stop Sign

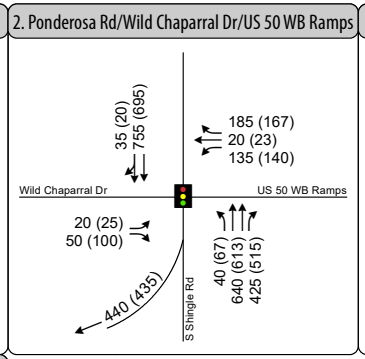
Study Intersections

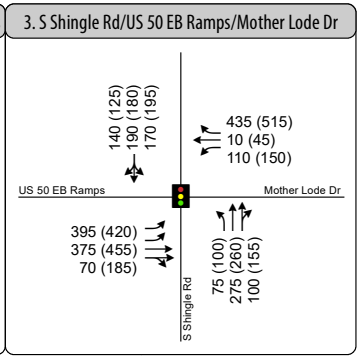
\\fpgisdevApp01\DevGISLibrary\ServiceMXDs\RS\RS234316_US50_Ponderosa_ICIFig09_OYNB_2029_PHTV.mxd

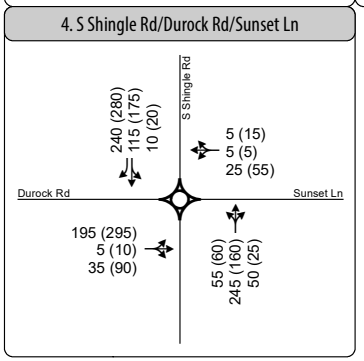
Figure 9

Intersection Peak Hour Volumes and Lane Configurations - Opening Year 2029 No Build Alternative









Turn Lane

AM (PM) Peak Hour Traffic Volume

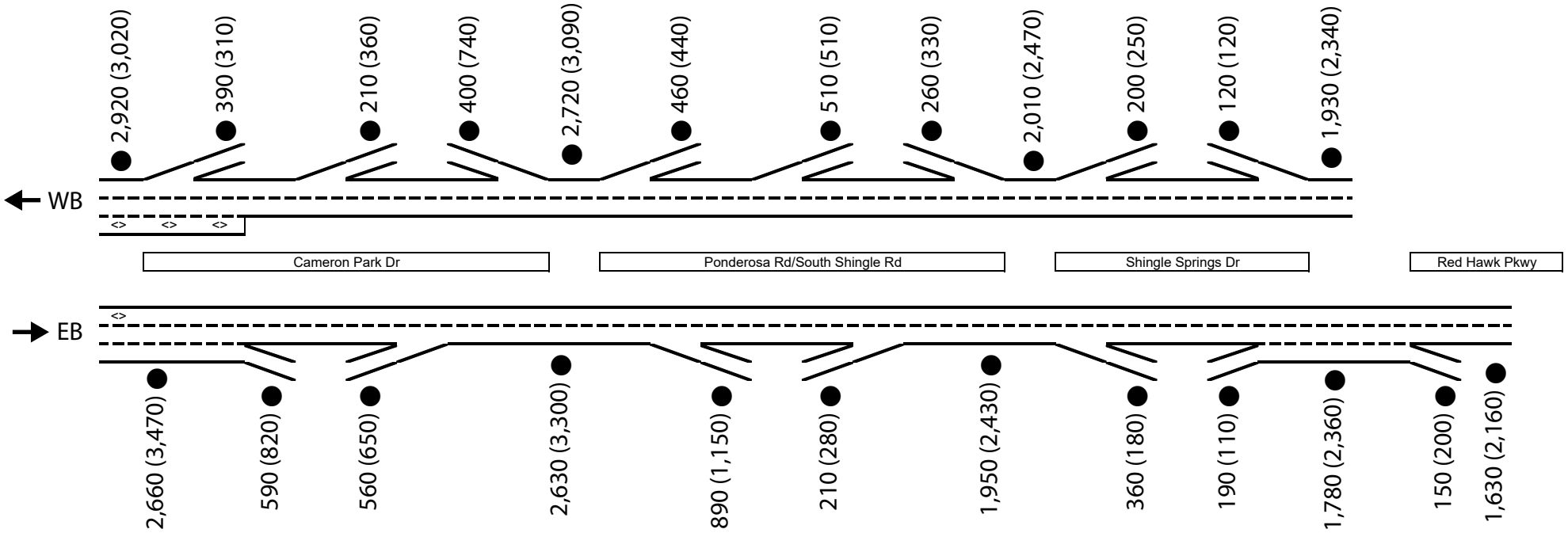
Traffic Signal

Roundabout

Study Intersections

Figure 10

Intersection Peak Hour Volumes and Lane Configurations - Opening Year 2029 Build Alternative Initial Phase



< > HOV Lane

X,XXX (X,XXX) AM(PM) Peak Hour Volume

Note: WB Peak hours are 7:15 to 8:15 AM and 3:00 to 4:00 PM
EB Peak hours are 7:45 to 8:45 AM and 4:15 to 5:15 PM

Figure 11

Freeway Peak Hour Volumes and Lane Configurations - Opening Year 2029

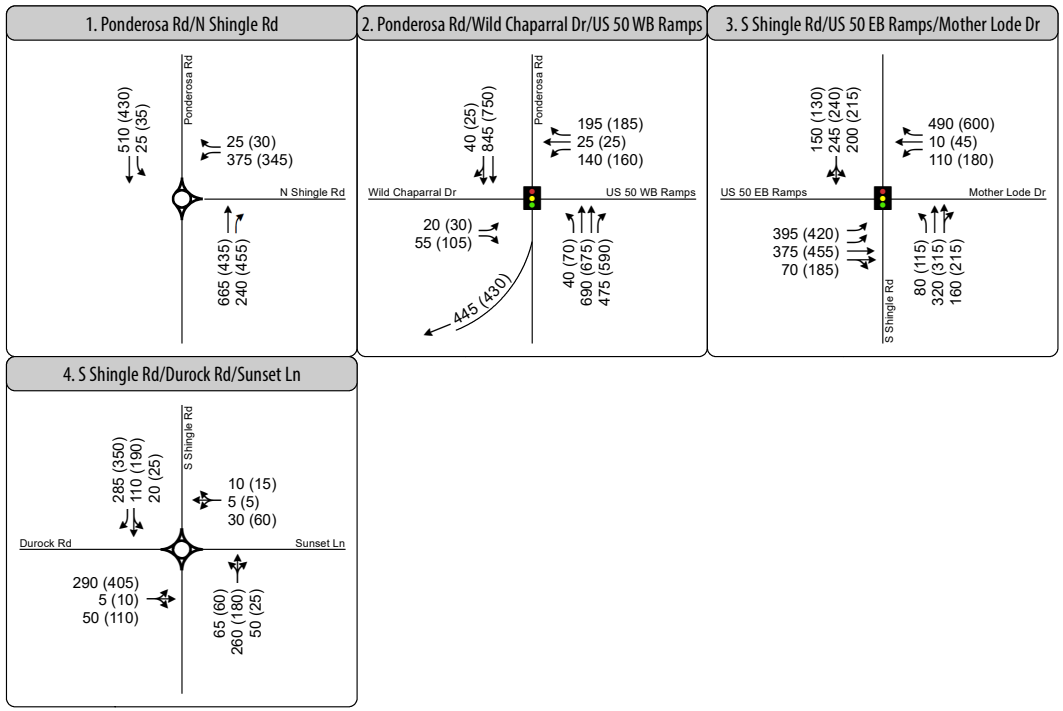
4.3 Interim Year 2039

The interim year scenario represents ten years after the opening year. Forecasts for this year were developed to assess how well the initial phase of the Build Alternative would perform ten years after the opening year.

Similar to opening year 2029 forecasts, the interim year 2039 was developed using linear growth between the existing volumes in 2024 and horizon year 2049 conditions. The interim year 2039 conditions represent approximately 60 percent of the traffic growth between 2024 and 2049.

Figure 12 shows the interim year 2039 weekday AM and PM peak hour traffic volumes, lane configurations, and traffic control for the initial phase of the Build Alternative. The initial phase of the Build Alternative includes only the improvements shown in **Figure 1** without the widening of the US 50 overcrossing.

Figure 13 shows the interim year 2039 AM and PM peak hour US 50 mainline and ramp traffic volumes from the Cameron Park Drive to Shingle Springs Drive interchanges. No improvements are planned to the US 50 corridor in the study area by 2039, so the lane configuration is the same as existing conditions.



Turn Lane

AM (PM) Peak Hour Traffic Volume

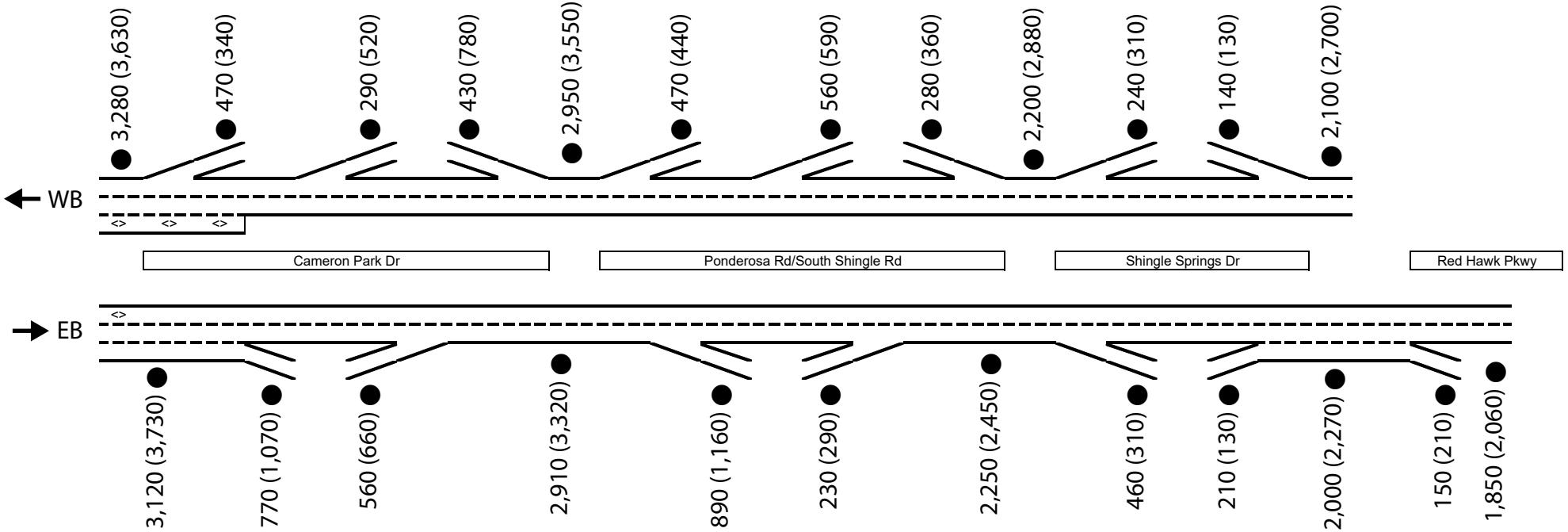
Traffic Signal

Roundabout

Study Intersections

Figure 12

Intersection Peak Hour Volumes and Lane Configurations - Interim Year 2039 Build Alternative Initial Phase



< > HOV Lane

X,XXX (X,XXX) AM(PM) Peak Hour Volume

Note: WB Peak hours are 7:15 to 8:15 AM and 3:00 to 4:00 PM
EB Peak hours are 7:45 to 8:45 AM and 4:15 to 5:15 PM

Figure 13

Freeway Peak Hour Volumes and Lane Configurations - Interim Year 2039

4.4 Bicycle and Pedestrian Volumes

For future conditions, the existing bicycle and pedestrian volumes at the study intersections are expected to grow based on the annual overall growth rate for the study intersections. **Table 22** shows the growth for the total entering volume at the study intersections under each analysis year. For example, the annual growth rate in the 6:00 to 7:00 AM is 39 percent for the study intersections under horizon year 2049, so the horizon year 2049 growth in bicycle and pedestrian volumes was estimated as 39 percent. A minimum volume of 2 pedestrians per hour was used at each crosswalk and 2 through bicyclists at each approach.

Table 22: Bicycle and Pedestrian Growth

Analysis Year	6 to 7 AM	7 to 8 AM	8 to 9 AM	3 to 4 PM	4 to 5 PM	5 to 6 PM
Opening Year 2029	9%	8%	9%	9%	10%	10%
Interim Year 2039	23%	24%	26%	25%	29%	27%
Horizon Year 2049	39%	35%	43%	43%	47%	47%

The road realignments associated with the Build Alternative are not expected to affect bicycle and pedestrian travel. As a result, the future bicycle and pedestrian volumes are the same for both the No Build and Build Alternatives.

4.5 Traffic Index

Table 23 shows the two-way peak hour and annual average daily traffic (AADT) volumes for US 50 between Cameron Park Drive and Ponderosa Road/South Shingle Road.

Table 23: Two-way Peak Hour and AADT Volume

Location	Type	Existing 2024	Opening Year 2029	Horizon Year 2049
US 50: Cameron Park Dr to Ponderosa Rd/S Shingle Rd	Peak Hour	6,145	6,390	7,350
	AADT	65,284	67,890	78,100

The existing daily volume for US 50 comes from the Caltrans PeMS website using the average of monthly arithmetic mean AADT for September 2022 through August 2023 (the latest available when accessed in September 2024). The future daily volume is based on the ratio of the existing peak hour (see **Figure 5**) to annual ADT volume and the peak hour volume for each analysis year (see **Figure 8** and **Figure 11**).

Table 24 provides the traffic index for roadway pavement design according to the *Highway Design Manual Chapter 610* (see **Appendix E**). The distribution of trucks based on the number of axles come from a truck classification count collected on US 50 at postmile R10.295 in 1983[8] as shown in the 2022 Daily Truck Traffic as reported by the Caltrans Traffic Census Program.

Table 24: Traffic Index

Parameter	US 50: Cameron Park Dr to Ponderosa Rd/S Shingle Rd
Directional Split	50%
Trucks	6%
20-year Traffic Index	12.5
40-year Traffic Index	13.5

[8] The nearest truck volume count locations on the US 50 freeway with more recent dates are in Sacramento County at Folsom Boulevard (1985) and Sunrise Boulevard (2002). Total truck percentages are similar at all three locations.

5. Opening Year 2029 Conditions

This chapter presents the operations analysis of the roadway system under the opening year 2029. Additional details for the operational analysis performance are provided in **Appendix F**. The analysis results are presented for the No Build and Build Alternatives.

5.1 Intersection Operations

Using the Vissim operations analysis model, the intersection performance for the project alternatives was analyzed under opening year 2029 conditions. **Table 25** shows the intersection operations results for opening year 2029 conditions for the No Build Alternative.

Table 25: Intersection Operations – Opening Year 2029 No Build Alternative

Intersection	Control	AM Peak Hour	PM Peak Hour
1. Ponderosa Rd/North Shingle Rd/Wild Chaparral Dr	Signal	**F / 119**	**F / 86**
2. Ponderosa Rd/US 50 Westbound Ramps	Signal	D / 50	E / 64
3. South Shingle Rd/Mother Lode Dr/US 50 Eastbound Ramps	Signal	**F / 170**	**F / 132**
4. South Shingle Rd/Durock Rd	Signal	C / 33	D / 50
5. South Shingle Rd/Sunset Ln	Side Street Stop	A / 7 (WB LT)	A / 10 (WB LT)

Notes: Level of service and delay are shown with delay reported in seconds per vehicle. Bold and underline font indicate deficient LOS F conditions. The peak hours are 7:45 to 8:45 AM and 3:00 to 4:00 PM. For side street stop control, the level of service and delay are reported for the worst movement with the worst movement noted in parentheses.

Compared to existing conditions, the No Build Alternative would have LOS F at two intersections during the AM peak hour. The North Shingle Road/Wild Chapparal Drive and US 50 Eastbound Ramps intersections would worsen to LOS F with almost two minutes of delay on average. Delays would be high for southbound Ponderosa Road, westbound North Shingle Road, eastbound US 50 off-ramp, and westbound Mother Lode Drive. Only 85 to 90 percent of the demand volume would be served in the peak hour. During the PM peak hour, conditions would be similar with the same intersections having LOS F conditions. High delays would occur for southbound Ponderosa Road, westbound US 50 off-ramp, and westbound Mother Lode Drive. About 87 to 92 percent of the demand would be served during the peak hour.

Table 26 shows the intersection operations results for opening year 2029 conditions for the Build Alternative Initial Phase. As shown in **Figure 1**, these improvements include the realignment of North Shingle Road, Durock Road, and the westbound off-ramp, roundabouts at North Shingle Road and Durock Road/Sunset Lane, and widening of the US 50 ramp terminal intersections.

Table 26: Intersection Operations – Opening Year 2029 Build Alternative Initial Phase

Intersection	Control	AM Peak Hour	PM Peak Hour
1. Ponderosa Rd/North Shingle Rd	Roundabout	A / 6	A / 4
2. Ponderosa Rd/ Wild Chaparral Dr/US 50 Westbound Ramps	Signal	C / 26	C / 33
3. South Shingle Rd/Mother Lode Dr/US 50 Eastbound Ramps	Signal	D / 41	D / 51
4. South Shingle Rd/Durock Rd/Sunset Ln	Roundabout	A / 3	A / 5

Notes: Level of service and delay are shown with delay reported in seconds per vehicle. Bold and underline font indicate deficient LOS F conditions. The peak hours are 7:45 to 8:45 AM and 3:00 to 4:00 PM.

Under the Build Alternative Initial Phase, intersection operations would be similar during both peak hours. The roundabouts at North Shingle Road and Durock Road/Sunset Lane would operate with LOS A. The US 50 Westbound Ramps intersection would have LOS C conditions, and the US 50 Eastbound Ramps intersection would have LOS D conditions.

Table 27 provides the average maximum queue length for approaches at the study intersections under the No Build Alternative. During the AM peak hour, queues would be greater than 900 feet on the southbound Ponderosa Road, westbound North Shingle Road, eastbound US 50 off-ramp, and westbound Mother Lode Drive approaches to the interchange. Importantly, the eastbound off-ramp queue would extend to the US 50 mainline lanes. During the PM peak hour, queues would be greater than 900 feet for southbound Ponderosa Road, eastbound US 50 off-ramp, and westbound Mother Lode Drive. The eastbound off-ramp queue would again extend to the US 50 mainline.

Table 27: Average Maximum Queue Length – Opening Year 2029 No Build Alternative

Intersection	Approach	Storage Length	Queue Length	
			AM Peak Hour	PM Peak Hour
1. Ponderosa Rd/North Shingle Rd/Wild Chaparral Dr	Southbound	>1,000	1,100	1,075
	Westbound	>1,000	925	450
2. Ponderosa Rd/US 50 Westbound Ramps	Northbound	725	**850**	**850**
	Westbound	1,275	325	700
3. South Shingle Rd/Mother Lode Dr/US 50 Eastbound Ramps	Southbound	725	500	600
	Eastbound	1,300	**2,550**	**2,025**
	Westbound	>1,000	1,025	1,250
4. South Shingle Rd/Durock Rd	Northbound	>1,000	450	500
	Eastbound	>1,000	375	750

Notes: Storage and queue lengths are reported in feet. The peak hours are 7:45 to 8:45 AM and 3:00 to 4:00 PM. Bold and underlined font indicates a queue length that exceeds the storage length. Storage length is either the pocket length or the distance upstream to the nearest intersection or freeway gore point.

Table 28 provides the average maximum queue length for movements at the US 50/Ponderosa Road/South Shingle Road ramp terminal intersections under the Build Alternative Initial Phase. During the AM peak hour, the northbound left turn queue from Ponderosa Road to Wild Chaparral Drive would exceed the pocket length by about 80 feet. However, the northbound through storage length would accommodate the 200-foot long queue. Similarly, the westbound left turn queue from Mother Lode Drive would exceed the pocket length by 125 feet, but the westbound through lane can accommodate the queue. Additionally, the westbound through peak hour volume is 10 vehicles per hour, so the additional delay caused by the queue would affect few motorists. During the PM peak hour, the same turn pockets would experience queues that exceed the storage, but the queue lengths would be longer. In both cases, the adjacent through lane could accommodate the queue.

Table 28: Average Maximum Queue Length – Opening Year 2029 Build Alternative Initial Phase

Intersection	Movement	Storage Length	Queue Length	
			AM Peak Hour	PM Peak Hour
2. Ponderosa Rd/ Wild Chaparral Dr/ US 50 Westbound Ramps	Northbound Left	120	**200**	**350**
	Northbound Through	840	200	350
	Southbound Through/Right	480	425	325
	Westbound Left	300	200	250
	Westbound Through	1,380	100	75
	Westbound Right	300	0	0
3. South Shingle Rd/ Mother Lode Dr/ US 50 Eastbound Ramps	Northbound Left	275	150	150
	Northbound Through/Right	875	250	275
	Southbound Left/Through	860	625	675
	Eastbound Left	700	275	275
	Eastbound Through	1,400	275	375
	Eastbound Right	950	275	375
	Westbound Left	100	**225**	**525**
	Westbound Through	1,000	50	125
	Westbound Right	350	100	350

Notes: Storage and queue lengths are reported in feet. The peak hours are 7:45 to 8:45 AM and 3:00 to 4:00 PM. Bold and underlined font indicates a queue length that exceeds the storage length. Storage length is either the pocket length or the distance upstream to the nearest intersection or freeway gore point.

5.2 Freeway Operations

The peak hour freeway operations for the No Build Alternative and the Build Alternative Initial Phase under opening year 2029 conditions are presented in **Table 29** and **Table 30**, respectively. The speed contour plots, the tables showing average speed along the freeway in 15-minute intervals, are provided in **Appendix F** along with hourly average travel time.

Table 29: Freeway Operations Eastbound US 50 – Opening Year 2029

Freeway Segment	Facility Type	No Build Alternative		Build Alternative Initial Phase	
		AM	PM	AM	PM
Cameron Park Dr Off-ramp	Diverge (Basic)	D / 29	**F / 63**	B / 16	C / 20
Cameron Park Dr Off to On-ramp	Basic	**F / 75**	**F / 85**	C / 19	C / 23
Cameron Park Dr On-ramp	Merge	**F / 91**	**F / 85**	C / 21	C / 26
Cameron Park Dr to South Shingle Rd	Basic	**F / 87**	**F / 78**	C / 23	D / 28
South Shingle Rd Off-ramp	Diverge	**F / 97**	**F / 78**	C / 22	D / 27
South Shingle Rd Off to On-ramp	Basic	B / 16	B / 17	B / 16	B / 17
South Shingle Rd On-ramp	Merge	B / 14	B / 15	B / 15	B / 17
South Shingle Rd to Shingle Springs Dr	Basic	B / 17	C / 18	B / 17	C / 20
Shingle Springs Dr Off-ramp	Diverge	B / 17	C / 18	B / 17	C / 20
Shingle Springs Dr Off to On-ramp	Basic	B / 16	B / 17	B / 16	C / 18
Shingle Springs Dr to Red Hawk Pkwy	Weave	B / 12	B / 13	B / 12	B / 14

Notes: Level of service and density are shown with density reported in vehicles per lane per mile. Bold and underline font indicate deficient LOS F conditions. The peak hours are 7:45 to 8:45 AM and 4:15 to 5:15 PM.

Compared to existing conditions, eastbound US 50 degrades from LOS C or D conditions to LOS F caused by a bottleneck at the South Shingle Road off-ramp due to the queue from the ramp terminal intersection. The bottleneck would cause peak hour congestion extending to the Cameron Park Drive off-ramp in the AM peak hour and beyond the Cameron Park Drive off-ramp in the PM peak hour. Under the Build Alternative Initial Phase, the ramp terminal intersection would have improved operations such that the off-ramp queue would not extend to the mainline. As a result, the bottleneck would be eliminated, and eastbound US 50 would have LOS D or better conditions for both peak hours.

For westbound US 50, both the No Build Alternative and Build Alternative Initial Phase would have similar performance. The AM peak hour would have LOS C or better conditions, and the PM peak hour would have LOS D or better conditions. Average density would be higher under the Build Alternative since more vehicles would be delivered by the Ponderosa Road on-ramps than under the congested No Build Alternative. However, westbound US 50 is able to accommodate the higher served volume without having congested conditions.

Table 30: Freeway Operations Westbound US 50 – Opening Year 2029

Freeway Segment	Facility Type	No Build Alternative		Build Alternative Initial Phase	
		AM	PM	AM	PM
Shingle Springs Dr Off-ramp	Diverge	B / 16	C / 20	B / 16	C / 19
Shingle Springs Dr Off to On-ramp	Basic	B / 16	C / 19	B / 16	C / 19
Shingle Springs Dr On-ramp	Merge	B / 14	B / 18	B / 14	C / 18
Shingle Springs Dr to Ponderosa Rd	Basic	B / 17	C / 22	B / 17	C / 22
Ponderosa Rd Off-ramp	Diverge	B / 17	C / 22	B / 17	C / 22
Ponderosa Rd Off to Northbound On-ramp	Basic	B / 15	C / 19	B / 15	C / 19
Ponderosa Rd Northbound On-ramp	Merge	B / 17	B / 18	B / 17	C / 19
Ponderosa Rd Southbound On-ramp	Merge	C / 21	C / 22	C / 21	C / 24
Ponderosa Rd to Cameron Park Dr	Basic	C / 24	C / 26	C / 24	D / 27
Cameron Park Dr Off-ramp	Diverge	C / 25	D / 29	C / 24	D / 32
Cameron Park Dr Off to Northbound On-ramp	Basic	C / 21	C / 19	C / 21	C / 20
Cameron Park Dr Northbound On-ramp	Merge	B / 16	B / 16	B / 16	B / 16
HOV Lane Add to Cameron Park Dr SB On-ramp	Basic	C / 22	C / 21	C / 21	C / 21
Cameron Park Dr Southbound On-ramp	Merge	C / 20	B / 18	C / 19	C / 19

Notes: Level of service and density are shown with density reported in vehicles per lane per mile. Bold and underline font indicate deficient LOS F conditions. The peak hours are 7:15 to 8:15 AM and 3:00 to 4:00 PM.

6. Interim Year 2039 Conditions

This chapter presents the operations analysis of the roadway system under the interim year 2039. Additional details for the operational analysis performance are provided in **Appendix G**. The analysis results are presented for the Build Alternative Initial Phase only. The analysis results will be used to determine if the initial phase will provide acceptable operations for at least ten years after the opening year.

6.1 Intersection Operations

Using the Vissim operations analysis model, the intersection performance for the project alternatives was analyzed under interim year 2039 conditions. No separate arterial roadway improvements are planned, so the roadway network for the Build Alternative Initial Phase is the same as the opening year 2029. **Table 31** shows the intersection operations results for interim year 2039 conditions.

Table 31: Intersection Operations – Interim Year 2039 Build Alternative Initial Phase

Intersection	Control	AM Peak Hour	PM Peak Hour
1. Ponderosa Rd/North Shingle Rd	Roundabout	B / 11	A / 7
2. Ponderosa Rd/ Wild Chaparral Dr/US 50 Westbound Ramps	Signal	C / 24	C / 27
3. South Shingle Rd/Mother Lode Dr/US 50 Eastbound Ramps	Signal	D / 48	E / 75
4. South Shingle Rd/Durock Rd/Sunset Ln	Roundabout	A / 5	A / 7

Notes: Level of service and delay are shown with delay reported in seconds per vehicle. The peak hours are 7:45 to 8:45 AM and 3:00 to 4:00 PM.

Compared to opening year 2029 conditions, the higher demand volumes in interim year 2039 conditions lead to generally higher intersection delay. The study intersections would have LOS D or better conditions during the AM peak hour and LOS E or better conditions during the PM peak hour. The key intersection would be the US 50 Eastbound Ramps intersection. The southbound approach would have LOS F conditions during the AM peak hour, and the westbound approach would have LOS F conditions during the PM peak hour.

Table 32 provides the average maximum queue length for movements at the US 50/Ponderosa Road/South Shingle Road ramp terminal intersections under the Build Alternative Initial Phase. During the AM peak hour, the southbound approach at the US 50 Eastbound Ramps would queue back into the US 50 Westbound Ramps intersection, which would also queue back into the North Shingle Road roundabout. The queue would be short-lived, lasting less than 15 minutes, due to traffic leaving Ponderosa High School. The single lane for all southbound movements would not provide enough storage length to contain the queue between the ramp terminal intersections even with the realignment of the US 50 westbound off-ramp. Despite this, the signals can be operated so that all other movements but two would have queues less than the available storage including the eastbound and westbound off-ramps. The exceptions would be the northbound left to Wild Chaparral Drive, which would be blocked by the northbound through queue,

and the westbound left from Mother Lode Drive, although the blocking on the adjacent westbound through lane should have a minimal effect given the low westbound through demand volume.

Table 32: Average Maximum Queue Length – Interim Year 2039 Build Alternative Initial Phase

Intersection	Movement	Storage Length	Queue Length	
			AM Peak Hour	PM Peak Hour
2. Ponderosa Rd/ Wild Chaparral Dr/ US 50 Westbound Ramps	Northbound Left	120	**225**	**575**
	Northbound Through	840	225	575
	Southbound Through/Right	480	**625**	**500**
	Westbound Left	300	200	275
	Westbound Through	1,380	75	75
	Westbound Right	300	0	0
3. South Shingle Rd/ Mother Lode Dr/ US 50 Eastbound Ramps	Northbound Left	275	150	200
	Northbound Through/Right	875	300	450
	Southbound Left/Through	860	**925**	**900**
	Eastbound Left	1,300	225	300
	Eastbound Through	990	275	375
	Eastbound Right	380	275	375
	Westbound Left	100	**200**	**>1,100**
	Westbound Through	1,000	75	100
	Westbound Right	350	75	**725**

Notes: Storage and queue lengths are reported in feet. The peak hours are 7:45 to 8:45 AM and 3:00 to 4:00 PM. Bold and underlined font indicates a queue length that exceeds the storage length. Storage length is either the pocket length or the distance upstream to the nearest intersection or freeway gore point.

During the PM peak hour, the same southbound queues would occur at the ramp terminal intersections including backing into the roundabout at North Shingle Road although the queue would be shorter. The northbound queue at the US 50 Westbound Ramps intersection would continue to block access to the northbound left pocket, but the through queue would be contained in the available storage. At US 50 Eastbound Ramps, left and right turn queues on westbound Mother Lode Drive would exceed the pocket storage lengths.

Although the peak southbound queue is relatively brief in duration, steps may be needed to manage the upstream end of the queue at the Ponderosa Road/North Shingle Road roundabout. Additional treatments may be need so that the westbound left turn vehicles entering the roundabout leave a gap for northbound through traffic to exit the roundabout. If the gap is not provided, then the roundabout could lock up and cause a northbound queue to extend back into the US 50 interchange. The additional treatments could include signs, pavement markings, and/or a metering signal.

6.2 Freeway Operations

The peak hour freeway operations for the Build Alternative Initial Phase under interim year 2039 conditions are presented in **Table 33** and **Table 34**. Unlike opening year 2029 conditions, the interim year 2039 conditions has active ramp meters at the Cameron Park Drive and Shingle Springs Drive on-ramps. The speed contour plots, the tables showing average speed along the freeway in 15-minute intervals, are provided in **Appendix G** along with hourly average travel time.

For eastbound US 50, the freeway would operate with LOS B or better conditions during the AM peak hour. During the PM peak hour, operations would primarily be LOS B or C, with LOS D conditions only between Cameron Park Drive and South Shingle Road. For westbound US 50, the freeway would operate with LOS D or better conditions during the AM peak hour and LOS E or better during the PM peak hour. During the AM peak hour, LOS D conditions would only be between Ponderosa Road and Cameron Park Drive. During the PM peak hour, the Ponderosa Road on-ramps and the Cameron Park Drive off-ramp would have LOS E conditions.

Table 33: Freeway Operations Eastbound US 50 – Interim Year 2039

Freeway Segment	Facility Type	Build Alternative Initial Phase	
		AM	PM
Cameron Park Dr Off-ramp	Diverge (Basic)	A / 9	C / 22
Cameron Park Dr Off to On-ramp	Basic	A / 10	C / 24
Cameron Park Dr On-ramp	Merge	A / 11	D / 32
Cameron Park Dr to South Shingle Rd	Basic	B / 12	D / 29
South Shingle Rd Off-ramp	Diverge	B / 12	D / 27
South Shingle Rd Off to On-ramp	Basic	A / 10	B / 18
South Shingle Rd On-ramp	Merge	A / 9	B / 17
South Shingle Rd to Shingle Springs Dr	Basic	A / 11	C / 20
Shingle Springs Dr Off-ramp	Diverge	A / 10	C / 20
Shingle Springs Dr Off to On-ramp	Basic	A / 10	B / 17
Shingle Springs Dr to Red Hawk Pkwy	Weave	A / 8	B / 13

Notes: Level of service and density are shown with density reported in vehicles per lane per mile. Bold and underline font indicate deficient LOS F conditions. The peak hours are 7:45 to 8:45 AM and 4:15 to 5:15 PM.

Table 34: Freeway Operations Westbound US 50 – Interim Year 2039

Freeway Segment	Facility Type	Build Alternative Initial Phase	
		AM	PM
Shingle Springs Dr Off-ramp	Diverge	B / 18	C / 23
Shingle Springs Dr Off to On-ramp	Basic	B / 17	C / 22
Shingle Springs Dr On-ramp	Merge	B / 16	C / 22
Shingle Springs Dr to Ponderosa Rd	Basic	C / 18	C / 25
Ponderosa Rd Off-ramp	Diverge	C / 18	D / 26
Ponderosa Rd Off to Northbound On-ramp	Basic	B / 17	D / 27
Ponderosa Rd Northbound On-ramp	Merge	C / 18	E / 37
Ponderosa Rd Southbound On-ramp	Merge	C / 24	E / 39
Ponderosa Rd to Cameron Park Dr	Basic	D / 26	D / 33
Cameron Park Dr Off-ramp	Diverge	D / 28	E / 42
Cameron Park Dr Off to Northbound On-ramp	Basic	C / 23	C / 24
Cameron Park Dr Northbound On-ramp	Merge	C / 18	C / 21
HOV Lane Add to Cameron Park Dr SB On-ramp	Basic	C / 24	D / 27
Cameron Park Dr Southbound On-ramp	Merge	C / 22	C / 22

Notes: Level of service and density are shown with density reported in vehicles per lane per mile. Bold and underline font indicate deficient LOS F conditions. The peak hours are 7:15 to 8:15 AM and 3:00 to 4:00 PM.

7. Horizon Year 2049 Conditions

This chapter presents the operations analysis of the roadway system under the horizon year 2049 and an assessment of safety and multimodal systems affected by the proposed project. Additional details for the operational analysis performance are provided in **Appendix H**.

7.1 Intersection Operations

Using the Vissim operations analysis model, the intersection performance for the project alternatives was analyzed under horizon year conditions. **Table 35** shows the intersection operations results for the No Build Alternative. Compared to opening year 2029 conditions, average intersection delay would about double at the study intersections. Four of the five intersections would have deficient LOS F conditions during the AM peak hour, and all intersections would have deficient LOS F conditions during the PM peak hour. The ramp terminal intersections and adjacent frontage road intersections would be over capacity for both the peak hours and the shoulder hours of the peak period. The demand served would be about 73 to 83 percent during the AM and PM peak hours.

Table 35: Intersection Operations – Horizon Year 2049 No Build Alternative

Intersection	Control	AM Peak Hour	PM Peak Hour
1. Ponderosa Rd/North Shingle Rd/Wild Chaparral Dr	Signal	**F / 124**	**F / 204**
2. Ponderosa Rd/US 50 Westbound Ramps	Signal	E / 62	**F / 102**
3. South Shingle Rd/Mother Lode Dr/US 50 Eastbound Ramps	Signal	**F / 172**	**F / 96**
4. South Shingle Rd/Durock Rd	Signal	**F / 145**	**F / 128**
5. South Shingle Rd/Sunset Ln	Side Street Stop	**F / 142 (WB RT)**	**F / 162 (WB RT)**

Notes: Level of service and delay are shown with delay reported in seconds per vehicle. Bold and underline font indicate deficient LOS F conditions. The peak hours are 7:45 to 8:45 AM and 3:00 to 4:00 PM. For side street stop control, the level of service and delay are reported for the worst movement with the worst movement noted in parentheses.

Table 36 shows the intersection operations results for the ultimate phase of the Build Alternative. As shown in **Figure 2**, the ultimate phase adds widening of the US 50 overcrossing, realignment and widening of the southbound to westbound on-ramp, and widening of the US 50 Eastbound Ramps intersection. The study intersections would operate with LOS D or better during both peak hours. Operations at the US 50 Eastbound Ramps intersection would be at the LOS D/E threshold of 55 seconds per vehicle during the PM peak hour. All intersections would operate acceptably.

Table 36: Intersection Operations – Horizon Year 2049 Build Alternative Ultimate Phase

Intersection	Control	AM Peak Hour	PM Peak Hour
1. Ponderosa Rd/North Shingle Rd	Roundabout	B / 11	A / 8
2. Ponderosa Rd/ Wild Chaparral Dr/US 50 Westbound Ramps	Signal	B / 20	C / 24
3. South Shingle Rd/Mother Lode Dr/US 50 Eastbound Ramps	Signal	D / 45	D / 55
4. South Shingle Rd/Durock Rd/Sunset Ln	Roundabout	A / 10	B / 12

Notes: Level of service and delay are shown with delay reported in seconds per vehicle. Bold and underline font indicate deficient LOS F conditions. The peak hours are 7:45 to 8:45 AM and 3:00 to 4:00 PM.

Table 37 provides the average maximum queue length for key approaches at the US 50/Ponderosa Road interchange under the No Build Alternative. Due to the congested conditions, average maximum queue lengths would be near or greater than 1,000 feet for most approaches during both peak hours. Importantly, the eastbound off-ramp queue would extend to the US 50 mainline during the AM peak hour, and the westbound off-ramp queue would extend to the US 50 mainline during the PM peak hour.

Table 37: Average Maximum Queue Length – Horizon Year 2049 No Build Alternative

Intersection	Approach	Storage Length	Queue Length	
			AM Peak Hour	PM Peak Hour
1. Ponderosa Rd/North Shingle Rd/Wild Chaparral Dr	Southbound	>1,000	>1,200	>1,200
	Westbound	>1,000	>1,200	>1,200
2. Ponderosa Rd/US 50 Westbound Ramps	Northbound	725	**850**	**750**
	Westbound	1,275	700	**>2,500**
3. South Shingle Rd/Mother Lode Dr/US 50 Eastbound Ramps	Southbound	725	700	**750**
	Eastbound	1,300	**>2,500**	825
	Westbound	>1,000	>1,200	>1,200
4. South Shingle Rd/Durock Rd	Northbound	>1,000	875	975
	Eastbound	>1,000	975	875

Notes: Storage and queue lengths are reported in feet. The peak hours are 7:45 to 8:45 AM and 3:00 to 4:00 PM. Bold and underlined font indicates a queue length that exceeds the storage length. Storage length is either the pocket length or the distance upstream to the nearest intersection or freeway gore point.

Table 38 provides the average maximum queue length for movements at the US 50/Ponderosa Road ramp terminal intersections under the ultimate phase of the Build Alternative. At the US 50 Westbound Ramps intersection, the northbound left turn queue and the southbound approach queue would exceed the storage during both peak hours. The northbound left turn queue would extend into the northbound through lanes, but the queue would not extend to the upstream intersection. The conflicting southbound approach queue would extend back into the adjacent roundabout at North Shingle Road. Since these are conflicting movements, shifting green time would be difficult, but the cycle length could be increased, which would affect overall intersection delay.

Table 38: Average Maximum Queue Length – Horizon Year 2049 Build Alternative Ultimate Phase

Intersection	Movement	Storage Length	Queue Length	
			AM Peak Hour	PM Peak Hour
2. Ponderosa Rd/ Wild Chaparral Dr/ US 50 Westbound Ramps	Northbound Left	150	**400**	**725**
	Northbound Through	840	400	725
	Southbound Through/Right	480	**600**	**525**
	Westbound Left	300	225	275
	Westbound Through	1,380	50	50
	Westbound Right	300	125	150
3. South Shingle Rd/ Mother Lode Dr/ US 50 Eastbound Ramps	Northbound Left	275	100	225
	Northbound Through/Right	875	100	450
	Southbound Left	200	100	**500**
	Southbound Through	860	100	150
	Southbound Right	75	**100**	**150**
	Eastbound Left	700	325	350
	Eastbound Through	1,400	250	350
	Eastbound Right	950	275	350
	Westbound Left	100	**300**	**875**
	Westbound Through	1,000	300	875
	Westbound Right	350	300	**875**

Notes: Storage and queue lengths are reported in feet. The peak hours are 7:45 to 8:45 AM and 3:00 to 4:00 PM. Bold and underlined font indicates a queue length that exceeds the storage length. Storage length is either the pocket length or the distance upstream to the nearest intersection or freeway gore point.

At the US 50 Eastbound Ramps intersection, only the westbound left turn from Mother Lode Drive would exceed the storage during the AM peak hour. During the PM peak hour, the westbound right turn queue would block access to both the through and left turn lanes from Mother Lode Drive. Additionally, the southbound left turn and southbound right turn queues would exceed the pocket lengths. The southbound left turn storage length could be lengthened some, but the northbound left turn at US 50 Westbound Ramps also would benefit from additional storage. The southbound right turn pocket cannot be extended without widening the bridge, but a right-turn overlap signal could be considered.

7.2 Freeway Operations

The peak hour freeway operations for the No Build and Build Alternatives are presented in **Table 39** and **Table 40**. The speed contour plots, which are tables showing average speed along the freeway in 15-minute intervals, are provided in **Appendix H** along with hourly average travel time. As shown in **Figure 8**, auxiliary lanes would be added under a separate project that would connect the on and off-ramps in both directions between Cameron Park Drive and Ponderosa Road/South Shingle Road and in the westbound direction west of Cameron Park Drive. The resulting weaving sections between Cameron Park Drive and Ponderosa Road/South Shingle Road would be longer than one and a quarter miles. As a result, they would not function as a weaving section according to the HCM methodology because the weaving length would be too long. As a result, the freeway segments are analyzed as separate basic segments considering that the merge segments have a lane addition and the diverge segments have a lane drop.

Table 39: Freeway Operations Eastbound US 50 – Horizon Year 2049

Freeway Segment	Facility Type	No Build Alternative		Build Alternative Ultimate Phase	
		AM	PM	AM	PM
Cameron Park Dr Off-ramp	Diverge (Basic)	C / 24	C / 26	C / 24	C / 26
Cameron Park Dr Off to On-ramp	Basic	C / 25	C / 24	C / 25	C / 24
Cameron Park Dr On-ramp	Merge (Basic)	C / 22	C / 19	C / 20	C / 19
Cameron Park Dr to South Shingle Rd	Basic	C / 25	C / 19	C / 19	C / 19
South Shingle Rd Off-ramp	Diverge (Basic)	E / 37	C / 24	C / 18	C / 18
South Shingle Rd Off to On-ramp	Basic	C / 21	B / 18	C / 21	B / 18
South Shingle Rd On-ramp	Merge	C / 19	B / 17	C / 19	B / 17
South Shingle Rd to Shingle Springs Dr	Basic	C / 22	C / 20	C / 23	C / 20
Shingle Springs Dr Off-ramp	Diverge	C / 22	C / 20	C / 24	C / 21
Shingle Springs Dr Off to On-ramp	Basic	C / 20	B / 16	C / 20	B / 16
Shingle Springs Dr to Red Hawk Pkwy	Weave	B / 15	B / 12	B / 16	B / 12

Notes: Level of service and density are shown with density reported in vehicles per lane per mile. Bold and underline font indicate deficient LOS F conditions. The peak hours are 7:45 to 8:45 AM and 4:15 to 5:15 PM.

For eastbound US 50, the No Build Alternative would have a queue on the South Shingle Road off-ramp that would back up into the auxiliary lane during the AM peak hour. This would result in LOS E conditions at the South Shingle Road off-ramp. PM peak hour conditions would be LOS C or better. Compared to opening year No Build Alternative, freeway performance would improve with the elimination of the AM peak hour off-ramp bottleneck in the Build Alternative. The change would be caused by increased capacity on Ponderosa Road and South Shingle Road that allows more throughput at the US 50 Eastbound Ramps intersection. For the Build Alternative Ultimate Phase, eastbound US 50 would have LOS C or better conditions for both peak hours.

Table 40: Freeway Operations Westbound US 50 – Horizon Year 2049

Freeway Segment	Facility Type	No Build Alternative		Build Alternative Ultimate Phase	
		AM	PM	AM	PM
Shingle Springs Dr Off-ramp	Diverge	C / 19	**F / 95**	C / 19	D / 26
Shingle Springs Dr Off to On-ramp	Basic	C / 18	**F / 96**	B / 18	C / 25
Shingle Springs Dr On-ramp	Merge	B / 17	**F / 92**	B / 17	D / 29
Shingle Springs Dr to Ponderosa Rd	Basic	C / 20	**F / 95**	C / 20	E / 40
Ponderosa Rd Off-ramp	Diverge	C / 21	**F / 81**	C / 20	**F / 52**
Ponderosa Rd Off to Northbound On-ramp	Basic	C / 18	D / 30	B / 18	**F / 65**
Ponderosa Rd Northbound On-ramp	Merge	C / 19	D / 33	C / 20	**F / 72**
Ponderosa Rd Southbound On-ramp	Merge (Basic)	C / 19	C / 20	C / 19	D / 33
Ponderosa Rd to Cameron Park Dr	Basic	B / 18	C / 19	C / 19	E / 44
Cameron Park Dr Off-ramp	Diverge (Basic)	B / 18	C / 20	C / 19	**F / 47**
Cameron Park Dr Off to Northbound On-ramp	Basic	C / 24	D / 31	C / 25	**F / 77**
Cameron Park Dr Northbound On-ramp	Merge	C / 20	E / 43	C / 23	**F / 80**
HOV Lane Add to Cameron Park Dr SB On-ramp	Basic	C / 25	D / 35	D / 28	**F / 47**
Cameron Park Dr Southbound On-ramp	Merge (Basic)	B / 15	B / 15	B / 16	B / 17

Notes: Level of service and density are shown with density reported in vehicles per lane per mile. Bold and underline font indicate deficient LOS F conditions. The peak hours are 7:15 to 8:15 AM and 3:00 to 4:00 PM.

In the westbound direction, the No Build Alternative would have LOS C or better conditions during the AM peak hour. The PM peak hour would have a bottleneck at the Ponderosa Road off-ramp caused by queuing from the ramp terminal intersection. The bottleneck would cause congested conditions that would extend upstream beyond Shingle Springs Drive. Downstream, the merge segment at the on-ramp from northbound Cameron Park Drive would have LOS E conditions. The Build Alternative Ultimate Phase would have similar AM peak hour performance although the segment at the Cameron Park Drive undercrossing would have LOS D conditions due to the higher volume served at the Ponderosa Road interchange. During the PM peak hour, two bottlenecks would be present. The upstream location at the northbound Ponderosa Road on-ramp would cause congestion back to the Ponderosa Road off-ramp. The downstream location would be at the southbound Cameron Park Drive on-ramp, and congestion would extend back to the Cameron Park Drive off-ramp. As shown in the speed contour plots, the extent and duration of congestion would be smaller for the Build Alternative compared to the No Build Alternative.

7.3 Roadway Safety

Under the No Build Alternative, collision rates would be expected to be similar to existing conditions. With the forecasted increase in traffic volumes, the number of collisions would increase. The ramp with a higher than average fatal and injury collision rate – the eastbound on-ramp – would continue to experience the

same collision rate. The exposure for pedestrians and bicyclists would also remain the same. Pedestrians would continue to use the 5 foot wide sidewalk on the west side of the US 50 overcrossing, and bicyclists would continue to share the roadway with motor vehicles at the US 50 overcrossing.

The Build Alternative Ultimate Phase would reduce congestion and increase intersection spacing, both of which would reduce collision rates. The northbound to westbound loop on-ramp would be realigned to have a larger radius and higher design speed, which may lead to fewer vehicles leaving the roadway. The Build Alternative would also provide a pedestrian pathway via sidewalks on both sides of the US 50 overcrossing. Signalized crosswalks would be provided for three of the four legs at the US 50 Westbound Ramps intersection and for all four legs at the US 50 Eastbound Ramps intersection. Class II bicycle lanes would be provided for north-south movements across the interchange so that bicycles would no longer have to share a lane with motor vehicles.

The Build Alternative would provide roundabout control at the North Shingle Road and Durock Road/Sunset Lane intersections. Roundabouts have a much lower collision rate than signalized intersections. Roundabouts reduce conflict points and simplify the driving task since drivers need yield to only one direction at the intersection. The slower speeds at roundabouts mean that collisions are less severe when they do happen, especially for vulnerable travelers such as pedestrians and bicyclists.

7.4 Multimodal Facilities

7.4.1 Transit System

The Western El Dorado County 2019 Short- and Long-Range Transit Plan (LSC Transportation Consultants, 2019) concludes that population growth by horizon year 2049 conditions will likely require two additional round trips for the Sac Commuter route and splitting Route 40 (Cameron Park) into two separate routes.

The Build Alternative includes modernizing and expanding the existing park and ride lots in the northwest and southwest quadrants of the interchange to offset the closure of the existing park and ride lot in the northeast quadrant. The park and ride lots will help to encourage further transit use. The project also will provide HOV preferential lanes for the westbound on-ramps that could be used by El Dorado Transit bus routes to provide a travel time savings to passengers.

7.4.2 Bicycle System

The El Dorado Active Transportation Plan (Alta Planning & Design, 2020) shows planned Class II bike lanes on Ponderosa Road, North Shingle Road, Wild Chaparral Drive, Durock Road, and South Shingle Road in the study area. Additionally, the El Dorado Trail, a Class I shared use path, is planned to be extended from its current western end in El Dorado west to the Sacramento County Lane. The trail crosses Mother Lode Drive just east of Sunset Lane. The Build Alternative Ultimate Phase would construct proposed Class II bike lanes in the project area to be consistent with the planned improvements and maintain the existing Class II bike lanes on Mother Lode Drive.

7.4.3 Pedestrian System

The El Dorado Active Transportation Plan (Alta Planning & Design, 2020) shows planned sidewalks on Ponderosa Road, North Shingle Road, Wild Chaparral Drive, Durock Road, Mother Lode Drive, and South Shingle Road in the study area. The Build Alternative Ultimate Phase would construct sidewalks on both sides of Ponderosa Road and South Shingle Road between North Shingle Road and Durock Road/Sunset Lane. Sidewalks would be provided on one side of the road for the realigned sections of North Shingle Road and Durock Road.

As noted above, signalized crosswalks would be provided for three of the four legs at the US 50 Westbound Ramps intersection and for all four legs at the US 50 Eastbound Ramps intersection. The Build Alternative adds a crosswalk across the westbound off-ramp and across the north leg of the US 50 Eastbound Ramps intersection. The roundabouts at North Shingle Road and Durock Road/Sunset Lane would provide pedestrian crossings of all intersection legs and bypass lanes.

7.5 Transportation System and Demand Management

The proposed project needs to include or allow for the subsequent installation of the following planned transportation system management devices.

- Roadside weather information systems
- Dynamic message signs
- CCTV cameras
- Traffic monitoring stations
- Census stations
- Ramp metering

The existing ramp meters on westbound US 50 at Ponderosa Road are planned to be rebuilt under the Build Alternative. The initial phase will realign the northbound Ponderosa Road to westbound US 50 on-ramp and widen the ramp to provide one general purpose lane and one HOV preferential lane. The ultimate phase has a similar improvement for the southbound Ponderosa Road to westbound US 50 On-ramp. The proposed storage length under the Build Alternative is shown in **Table 41** along with the storage length recommendation based on the horizon year 2049 peak hour demand volume.

Table 41: Ramp Meter Storage – Horizon Year 2049

Ramp	Configuration	Storage Length	Storage Recommendation	
			AM Peak Hour	PM Peak Hour
South Shingle Rd to Eastbound US 50	1 general purpose lane	560	390	410
NB Ponderosa Rd to Westbound US 50	1 general purpose lane & 1 HOV preferential lane	525	**740**	**955**
SB Ponderosa Rd to Westbound US 50	1 general purpose lane & 1 HOV preferential lane	800	665	630

Notes: Storage length reported in feet per lane. Storage recommendations based on *Ramp Meter Design Manual* (Caltrans, 2022) guidance. The HOV lane percentage was estimated as 29 percent for the AM peak hour and 30 percent for the PM peak hour based on the PeMS data reported in Section 2.2.2.

The adequacy of the proposed storage length was evaluated using guidance from the *Ramp Meter Design Manual* (Caltrans, 2022). The ramp meter should accommodate storage of 7 percent of the peak hour demand volume assuming an average vehicle length of 29 feet. The forecasted demand volume was evaluated for both the AM and PM peak hours under horizon year 2049 conditions. The proposed storage length was measured from the ramp meter stop bar upstream to where the ramp diverges from South Shingle Road for the eastbound on-ramp. For the westbound on-ramps, the storage length includes the ramp upstream of the stop bar and the right turn pockets from Ponderosa Road.

The eastbound on-ramp and the southbound to westbound on-ramp would provide more storage than the recommended storage length according the manual guidance. The northbound to westbound on-ramp storage length would be inadequate for both the AM and PM peak hours. The recommended storage length would be about 430 feet more than the provided storage length during the PM peak hour. Adding additional storage would require widening the US 50 overcrossing structure, which would not be cost effective. Converting the HOV preferential lane to a general purpose lane is a potential option although this would eliminate the travel time advantage for transit and carpool passengers.

Caltrans policy (Deputy Directive 35-R1) requires that HOV preferential lanes be provided when ramp meters are installed. The Build Alternative does not include the addition of an HOV preferential lane for the eastbound on-ramp. The peak hour demand volume is less than 240 vehicles per hour, which is the minimum practical metering rate. As a result, the peak hour queue length will be short so that the potential travel time savings for HOVs would be small.

Transportation demand management strategies include encouraging ridesharing using carpools and transit. Park and ride lots are a critical component of transportation demand management. The Build Alternative includes modernizing and expanding the existing park and ride lots in the northwest and southwest quadrants of the interchange to offset the closure of the existing park and ride lot in the northeast quadrant. The park and ride lots will help to encourage further carpool and transit use.

8. References

The references cited in the Transportation Analysis Report are listed below.

- 2020 Metropolitan Transportation Plan/Sustainable Communities Strategy, https://www.sacog.org/2020-metropolitan-transportation-plansustainable-communities-strategy-update, Sacramento Area Council of Governments, 2019
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- Transportation Analysis Framework, Caltrans, 2020, https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/sb-743/2020-09-10-1st-edition-taf-fnl-a11y.pdf
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- Route 50 Transportation Concept Report and Corridor System Management Plan, Caltrans, June 2014
- Transportation Injury Mapping System, University of California, Berkeley, https://tims.berkeley.edu, accessed September 2024
- Trip Generation Manual, Institute of Transportation Engineers, 2021
- Western El Dorado County 2019 Short- and Long-Range Transit Plan, LSC Transportation Consultants, November 2019

Appendix B SACOG 2025-2028 MTIP Project Listing and 2023 MTP Listing

CAL21372	Caltrans D3	I-5 Corridor Improvement Project – Phase 1 Freight	On I-5 in Sacramento County, from 0.5 mile south of Arena Blvd Interchange to 0.4 mile south of Yolo County line (PM 27.6 /34.3): Construct Intelligent Transportation System infrastructure and the following acceleration, deceleration, and auxiliary lanes: 1.) NB auxiliary lane from Metro Air Parkway On-ramp to Airport Blvd. Off-ramp, 2.) SB auxiliary lane from Airport Blvd. On-ramp to Metro Air Parkway Off-ramp, 3.) SB auxiliary lane from Metro Air Parkway On-ramp to NB SR 99 Off-ramp, 4.) SB auxiliary lane from Arena Blvd. Off-ramp to Arena Blvd. On-ramp, 5.) NB acceleration lane from Airport Blvd. On-ramp to PM 33.5, and 6.) SB auxiliary* lane from Elkhorn Rest Area On-ramp to Airport Blvd. Off-ramp. (Split from CAL21275). Toll Credits for ENG, CON	$36,958,000	9
ELD15990	El Dorado County	Diamond Springs Pkwy - Phase 1B	Construct new 4-lane divided arterial roadway from Missouri Flat Rd east of Golden Center Dr to a new T-intersection with SR-49 south of Bradley Dr; includes planning, environmental clearance, grading and right of way, required improvements to SR-49 and three new signals. See ELD19348/CIP72375 for Phase 1A and ELD19203/CIP72368 for Phase 2. (CIP72334)	$38,753,157	10
ELD19180	El Dorado County	US 50/Ponderosa Rd/So. Shingle Rd Interchange Improvements	Interchange Improvements: includes detailed study to identify alternatives and select preferred alternative; widening existing US 50 overcrossing to accommodate 5 lanes, and realignment of WB loop on-ramp, ramp widenings, and widening of Ponderosa Rd, Mother Lode Dr, and So. Shingle Rd, realignment of Durock Rd and North Shingle Rd.; includes PE for all phases; (See ELD19170/CIP71339 and ELD19244/CIP71333). Coordinates with ELD19289/CIP53116, ELD19219/CIP#GP150. Toll Credits for ENG. Toll Credits for ENG	$46,565,900	11
ELD19185	City of Placerville	Placerville Dr Bridge Widening	Hangtown Creek Bridge at Placerville Drive, 0.3 mi west of Cold Springs Rd: Replace existing functionally obsolete 2-lane bridge with a new 4-lane bridge.	$10,423,800	12
ELD19345	El Dorado County	US 50/El Dorado Hills Blvd Interchange Phase 2B - Eastbound Ramps	Reconstruct eastbound diagonal on-ramp and eastbound loop off-ramp; add a lane to northbound El Dorado Hills Blvd under the overpass (eliminates merge lane and improves traffic flow from the eastbound loop off-ramp); eastbound diagonal on-ramp will be metered and have an HOV bypass. Project split from ELD15630(CIP71323).	$20,261,178	13
ELD19468	Southeast Connector JPA	Capital SouthEast Connector - E1	In El Dorado Hills, on White Rock Rd between Carson Crossing Dr and Winfield Way: widen from 2 to 4 lanes (Thoroughfare). (To be constructed with Capital SouthEast Connector – D3, SAC24250.)	$5,200,000	14
ELD19567	City of Placerville	Western Placerville Interchanges Phase 2.3	On US Highway 50 in the City of Placerville, construct the westbound US 50 off-ramp to Ray Lawyer Drive, construct intersection improvements at the US 50 Ramps/Ray Lawyer Drive intersection, and provide bicycle and pedestrian facility improvements along Ray Lawyer Driver within the project limits.	$15,000,000	15
PLA15100	City of Roseville	Baseline Road	In Roseville, Baseline Road from Fiddyment Road to Sierra Vista Western edge west of Watt Avenue: Widen from 2 to 4 lanes.	$12,852,055	16
PLA15105	Placer County	Baseline Road Widening (Phase 1)	Baseline Rd, from City of Roseville to Palladay Road: widen from 2 to 4 lanes	$19,200,000	17
PLA15390	Placer County	Sierra College Boulevard (Phase 1)	Sierra College Boulevard, in vicinity of Bickford Ranch Road: widen from 2 to 4 lanes (and signalization).	$2,280,000	18
PLA15660	City of Roseville	Baseline Rd. Widening	In Roseville, Baseline Rd., from Brady Lane to Fiddyment Road: widen from 3 to 4 lanes.	$6,106,889	19
PLA15760	City of Roseville	Pleasant Grove Blvd. Widening	In Roseville, Pleasant Grove Blvd., from Foothills Blvd. to Woodcreek Oaks Blvd.: Widen from 4 to 6 lanes.	$7,000,000	20
PLA15850	City of Roseville	Roseville Road Widening	Widen Roseville Rd. from 2 to 4 lanes Between Cirby Way and southern city limit.	$2,500,000	21
PLA18390	Placer County	Placer Creek Drive (Phase 1)	Placer Creek Drive (formerly Dyer Lane), from Baseline Road to Town Center Avenue: construct 2 lane road.	$1,400,000	22
PLA18490	Placer County	PFE Rd. Widening	PFE Rd, from Watt Ave. to Walerga Rd: Widen from 2 to 4 lanes and realign.	$13,085,000	23
PLA20700	Placer County	Watt Avenue Widening (Phase 1)	Watt Avenue, Sacramento County to Dyer Lane: widen from 2 lanes to 4 lanes.	$2,600,000	24
PLA25044	Placer County	Sunset Boulevard Widening (Phase 1)	Widen Sunset Boulevard from State Route 65 to Cincinnati Avenue from 2 to 6 lanes. Project includes widening Industrial Blvd / UPRR overcrossing from 2 to 6 lanes.	$51,250,000	25
PLA25170	Placer County	Sunset Boulevard Extension (Phase 1)	Sunset Blvd, from Foothills Boulevard to Fiddyment Rd: Construct a 4-lane road	$12,238,000	26

Projects listed as "Project Development Only" are anticipated to begin early stages of development including project planning, design, preliminary engineering, environmental clearance, and ROW acquisition by 2044. Under the financial constraint requirements for forecasting revenues, the construction phase is not included in the Draft Plan. If/when additional revenues for these projects become available to cover full construction costs, these projects can be considered as part of an amendment to the MTP/SCS following a technical analysis and reviewing consistency with plan requirements.

ID	County	Status (Planned, Programmed or Project Development Only)	Lead Agency	Budget Category	Title	Description	Total Project Cost (2018 dollars)	Year of Expenditure Cost for planned projects	Completion Timing
ELD19234	ELD	Planned	El Dorado County	B- Road & Highway Capacity	Saratoga Wy. (Phase 2)	Phase 2 will widen the existing two-lane road to four-lanes from the Sacramento County line to El Dorado Hills Boulevard with full curb, gutter and sidewalk on the north side only. Environmental clearance and preliminary engineering will be completed under Phase 1 project CIP#71324.	3,300,000	4,779,384	By 2035
ELD19181	ELD	Planned	El Dorado County	B- Road & Highway Capacity	US 50/Cambridge Rd Interchange	Phase 1 Improvements to Cambridge Road Interchange. Phase I project consists of widening the existing eastbound and westbound off-ramps; addition of new westbound on-ramp from southbound Cambridge Road; reconstruction of the local intersections to provide for additional capacity, both turning and through; and the installation of traffic signals at eastbound ramp terminal intersection. Also includes preliminary engineering for Phase 2 improvements to Cambridge Interchange. This project shall also be coordinated with the US 50 Eastbound Auxiliary Lane from Bass Lake Road Interchange to Cambridge Road Interchange (GP148/36104018), US 50 Eastbound Auxiliary Lane from Cambridge Road Interchange to Cameron Park Interchange (53126/36104019). (CIP 71332/36104006)	9,173,000	13,617,370	By 2044
ELD19177	ELD	Planned	El Dorado County	B- Road & Highway Capacity	US 50/Cameron Park Dr Interchange Improvements	Interchange Improvements: this project includes detailed study to identify capacity improvements alternatives and selection of preferred alternative; assumes reconstruction of existing US50 bridges to widen Cameron Park Dr to 8 lanes under the overcrossing; road and ramp widenings. (CIP 72361/36104007)	61,116,000	100,145,682	By 2044
ELD19178	ELD	Planned	El Dorado County	B- Road & Highway Capacity	US 50/El Dorado Rd Interchange - Phase 1	Phase 1 project includes sinalization and widening of existing ramps and minor widening/lane adjustments on El Dorado Road. See project 71376/36104012 for Phase 2 improvements. (CIP 71347/36104011)	5,488,000	8,146,967	By 2044
ELD19272	ELD	Project Development Only	El Dorado County	B- Road & Highway Capacity	US 50/El Dorado Rd Interchange - Phase 2	Project would involve construction of left and right turn lanes and additional through traffic lanes as follows: noth/southbound El Dorado Road, and east/westbound on-/off-ramps for US 50. Will require either widening of the existing El Dorado Road/US50 overcrossing structure and/or construction of a new adjacent structure. Refer to 2000 PSR. See project No. 71347/36104011 for Phase 1 improvements. (CIP 71376/36104012)	11,165,000	11,444,125	Post-2044
ELD19180	ELD	Programmed	El Dorado County	B- Road & Highway Capacity	US 50/Ponderosa Rd/So. Shingle Rd Interchange Improvements	Interchange Improvements: includes detailed study to identify alternatives and select preferred alternative; widening existing US 50 overcrossing to accommodate 5 lanes, and realignment of WB loop on-ramp, ramp widenings, and widening of Ponderosa Rd, Mother Lode Dr, and So. Shingle Rd, realignment of Durock Rd and North Shingle Rd.; includes PE for all phases; (See ELD19170/CIP71339 and ELD19244/CIP71333). Coordinates with ELD19289/CIP53116, ELD19219/CIP#GP150. Toll Credits for ENG. Toll Credits for ENG	47,731,400	-	By 2044
ELD19291	ELD	Planned	El Dorado County	B- Road & Highway Capacity	US 50/Silva Valley Pkwy Interchange - Phase 2	Final phase of US 50/Silva Valley Parkway Interchange. Due to future growth in the area this project will be necessary to accomodate traffic projected for 2030. Project includes eastbound diagonal and westbound loop on-ramps to US 50. Project is in the preliminary planning phase. (CIP 71345/36104004)	8,156,000	12,107,628	By 2044
ELD19525	ELD	Planned	El Dorado County	B- Road & Highway Capacity	White Rock Road Widening - Windfield Way to Sacramento County Line	Widen White Rock Road between the County line and Windfield Way from two to four-lane divided roadway with curb, gutter and Class I bike/pedestrian trail and/or an on-street Class II bike facility. This roadway is part of the Capital Southeast Connector.(CIP 72381/36105041)	4,404,000	5,365,846	By 2030
ELD19559	ELD	Programmed	El Dorado County	C- Maintenance & Rehabilitation	Bass Lake Road at Bridlewood Roundabout	In El Dorado Hills at the intersection of Bass Lake Road and Bridlewood Drive: Construct a single-lane roundabout.. Toll Credits for ROW	4,197,739	-	By 2030
ELD19562	ELD	Programmed	El Dorado County	C- Maintenance & Rehabilitation	Breedlove Road Bridge Replacement	North of Buckeye in El Dorado County, Breedlove Road Over Canyon Creek, 1 mi. North of Wentworth S. Rd.: Replace 1-lane timber bridge with 2-lane bridge. Not capacity increasing.	2,558,000	-	By 2030

Appendix C Operational Emissions Calculation

```
          File Name:   El Dorado (MC) - 2024 - Annual_Intersections.EM
CT-EMFAC2021 Version:   1.0.2.0
            Run Date:   12/23/2024 4:30:33 PM
                Area:   El Dorado (MC)
       Analysis Year:   2024
              Season:   Annual

======================================================================

Vehicle Category        VMT Fraction            Diesel VMT Fraction     Gas VMT Fraction
                        Across Category         Within Category         Within Category
         Truck 1             0.029                   0.622                   0.376
         Truck 2             0.011                   0.946                   0.050
       Non-Truck             0.960                   0.011                   0.949

======================================================================

              Road Type:       Major/Collector
     Silt Loading Factor:               CARB    0.032 g/m2
Precipitation Correction:               CARB    P = 98 days     N = 365 days

======================================================================

     Road Length:           2.9 miles
          Volume:         8,213 vehicles per hour
 Number of Hours:             1 hours
             VMT:       23817.7 miles

VMT Distribution by Speed Bin (mph):
        <= 5 mph                   0.28%
          10 mph                   0.87%
          15 mph                   2.07%
          20 mph                  10.90%
          25 mph                   5.88%
          30 mph                   7.19%
          35 mph                  12.52%
          40 mph                  11.73%
          45 mph                   8.18%
          50 mph                   6.17%
          55 mph                  13.60%
          60 mph                  16.17%
          65 mph                   2.43%
          70 mph                   1.96%
          75 mph                   0.03%

=============================================================================================================================================

Summary of Emissions

                    Running Exhaust    Running Loss       Tire Wear      Brake Wear       Road Dust           Total           Total           Total
       Pollutant Name         (grams)         (grams)         (grams)         (grams)         (grams)         (grams)        (pounds)      (US tons)
                PM2.5            57.2               -            48.8            97.8           356.4           560.2           1.235         < 0.001
                PM10             61.1               -           195.1           279.4         2,375.9         2,911.6           6.419           0.003
                 NOx         3,510.2               -               -               -               -         3,510.2           7.739           0.004
                  CO        21,833.7               -               -               -               -        21,833.7          48.135           0.024
                  HC           735.0         1,012.7               -               -               -         1,747.7           3.853           0.002
                 TOG           820.6         1,082.7               -               -               -         1,903.2           4.196           0.002
                 ROG           623.5         1,082.7               -               -               -         1,706.2           3.761           0.002
         1,3-Butadiene             2.9             0.0               -               -               -             2.9           0.006         < 0.001
          Acetaldehyde            14.0               -               -               -               -            14.0           0.031         < 0.001
              Acrolein             0.3               -               -               -               -             0.3         < 0.001         < 0.001
               Benzene            29.0            15.6               -               -               -            44.6           0.098         < 0.001
            Diesel PM             26.6               -               -               -               -            26.6           0.059         < 0.001
          Ethylbenzene             9.0            10.1               -               -               -            19.1           0.042         < 0.001
          Formaldehyde            31.5               -               -               -               -            31.5           0.070         < 0.001
           Naphthalene             2.3             0.0               -               -               -             2.3           0.005         < 0.001
                   POM             0.8               -               -               -               -             0.8           0.002         < 0.001
                  DEOG           106.6               -               -               -               -           106.6           0.235         < 0.001
                   CO2     8,170,139.2               -               -               -               -     8,170,139.2      18,012.072           9.006
                   N2O           262.0               -               -               -               -           262.0           0.578         < 0.001
                   CH4           128.4               -               -               -               -           128.4           0.283         < 0.001
                    BC            13.7               -               -               -               -            13.7           0.030         < 0.001
                   HFC               -            15.6               -               -               -            15.6           0.034         < 0.001

=============================================================================================================================================

Summary of GHG Emissions

                         Emissions               CO2e
       Pollutant Name     (metric tons)          (metric tons)
                  CO2             8.170                 8.170
                  N2O         < 0.001                   0.078
                  CH4         < 0.001                   0.003
                   BC         < 0.001                   0.006
                  HFC         < 0.001                   0.022
             Total CO2e               -                 8.280

=============================================================================================================================================

Summary of Consumptions

             Gasoline           899.074         gallons
               Diesel            71.436         gallons
          Natural Gas             0.086         diesel-equivalent gallons
          Electricity           320.371         kilowatt-hours

=========================================================END=================================================================
```

File Name:	El Dorado (MC) - 2024 - Annual_Freeways.EM
CT-EMFAC2021 Version:	1.0.2.0
Run Date:	12/23/2024 4:32:08 PM
Area:	El Dorado (MC)
Analysis Year:	2024
Season:	Annual

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category	Gas VMT Fraction Within Category
Truck 1	0.036	0.622	0.376
Truck 2	0.014	0.946	0.050
Non-Truck	0.950	0.011	0.949

Road Type:	Freeway		
Silt Loading Factor:	CARB	0.015 g/m2	
Precipitation Correction:	CARB	P = 98 days	N = 365 days

Road Length:	4.8 miles
Volume:	29,633 vehicles per hour
Number of Hours:	1 hours
VMT:	142238.4 miles

VMT Distribution by Speed Bin (mph):

<= 5 mph	0.28%
10 mph	0.87%
15 mph	2.07%
20 mph	10.90%
25 mph	5.88%
30 mph	7.19%
35 mph	12.52%
40 mph	11.73%
45 mph	8.18%
50 mph	6.17%
55 mph	13.60%
60 mph	16.17%
65 mph	2.43%
70 mph	1.96%
75 mph	0.03%

Summary of Emissions

Pollutant Name	Running Exhaust (grams)	Running Loss (grams)	Tire Wear (grams)	Brake Wear (grams)	Road Dust (grams)	Total (grams)	Total (pounds)	Total (US tons)
PM2.5	370.0	-	292.9	616.7	1,093.8	2,373.4	5.232	0.003
PM10	394.7	-	1,171.8	1,761.9	7,291.7	10,620.0	23.413	0.012
NOx	23,182.0	-	-	-	-	23,182.0	51.108	0.026
CO	129,941.5	-	-	-	-	129,941.5	286.472	0.143
HC	4,468.2	6,027.4	-	-	-	10,495.6	23.139	0.012
TOG	5,020.4	6,444.0	-	-	-	11,464.4	25.275	0.013
ROG	3,829.6	6,444.0	-	-	-	10,273.6	22.649	0.011
1,3-Butadiene	17.2	0.0	-	-	-	17.2	0.038	< 0.001
Acetaldehyde	92.7	-	-	-	-	92.7	0.204	< 0.001
Acrolein	1.8	-	-	-	-	1.8	0.004	< 0.001
Benzene	175.1	93.0	-	-	-	268.1	0.591	< 0.001
Diesel PM	190.0	-	-	-	-	190.0	0.419	< 0.001
Ethylbenzene	53.6	60.2	-	-	-	113.8	0.251	< 0.001
Formaldehyde	206.9	-	-	-	-	206.9	0.456	< 0.001
Naphthalene	14.1	0.0	-	-	-	14.1	0.031	< 0.001
POM	4.8	-	-	-	-	4.8	0.011	< 0.001
DEOG	775.4	-	-	-	-	775.4	1.709	< 0.001
CO2	49,486,618.7	-	-	-	-	49,486,618.7	109,099.312	54.550
N2O	1,699.5	-	-	-	-	1,699.5	3.747	0.002
CH4	769.1	-	-	-	-	769.1	1.695	< 0.001
BC	88.3	-	-	-	-	88.3	0.195	< 0.001
HFC	-	95.2	-	-	-	95.2	0.210	< 0.001

Summary of GHG Emissions

Pollutant Name	Emissions (metric tons)	CO2e (metric tons)
CO2	49.487	49.487
N2O	0.002	0.506
CH4	< 0.001	0.019
BC	< 0.001	0.041
HFC	< 0.001	0.136
Total CO2e	-	50.189

Summary of Consumptions

Gasoline	5,348.959	gallons
Diesel	512.768	gallons
Natural Gas	0.580	diesel-equivalent gallons
Electricity	1,895.746	kilowatt-hours

END

```
          File Name:   El Dorado (MC) - 2049 - Annual_Intersection.EM No Build
CT-EMFAC2021 Version:   1.0.2.0
            Run Date:   12/23/2024 4:52:24 PM
                Area:   El Dorado (MC)
       Analysis Year:   2049
              Season:   Annual
```

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category	Gas VMT Fraction Within Category
Truck 1	0.022	0.209	0.344
Truck 2	0.018	0.463	0.029
Non-Truck	0.960	0.005	0.902

```
              Road Type:       Major/Collector
     Silt Loading Factor:               CARB    0.032 g/m2
Precipitation Correction:               CARB    P = 98 days     N = 365 days
```

```
     Road Length:           2.9 miles
          Volume:        10,900 vehicles per hour
 Number of Hours:             1 hours
             VMT:         31610 miles
```

VMT Distribution by Speed Bin (mph):

<= 5 mph	0.32%
10 mph	0.92%
15 mph	2.25%
20 mph	10.99%
25 mph	6.55%
30 mph	8.59%
35 mph	13.48%
40 mph	11.51%
45 mph	7.31%
50 mph	7.31%
55 mph	13.99%
60 mph	13.13%
65 mph	1.86%
70 mph	1.74%
75 mph	0.04%

Summary of Emissions

Pollutant Name	Running Exhaust (grams)	Running Loss (grams)	Tire Wear (grams)	Brake Wear (grams)	Road Dust (grams)	Total (grams)	Total (pounds)	Total (US tons)
PM2.5	19.5	-	64.8	119.2	476.9	680.3	1.500	< 0.001
PM10	21.0	-	259.0	340.5	3,179.2	3,799.7	8.377	0.004
NOx	909.7	-	-	-	-	909.7	2.005	0.001
CO	15,800.2	-	-	-	-	15,800.2	34.833	0.017
HC	277.9	926.3	-	-	-	1,204.2	2.655	0.001
TOG	304.6	990.3	-	-	-	1,294.9	2.855	0.001
ROG	225.9	990.3	-	-	-	1,216.2	2.681	0.001
1,3-Butadiene	1.1	0.0	-	-	-	1.1	0.002	< 0.001
Acetaldehyde	3.9	-	-	-	-	3.9	0.008	< 0.001
Acrolein	0.1	-	-	-	-	0.1	< 0.001	< 0.001
Benzene	11.2	14.3	-	-	-	25.5	0.056	< 0.001
Diesel PM	4.8	-	-	-	-	4.8	0.011	< 0.001
Ethylbenzene	3.5	9.3	-	-	-	12.8	0.028	< 0.001
Formaldehyde	9.1	-	-	-	-	9.1	0.020	< 0.001
Naphthalene	0.9	0.0	-	-	-	0.9	0.002	< 0.001
POM	0.2	-	-	-	-	0.2	< 0.001	< 0.001
DEOG	18.2	-	-	-	-	18.2	0.040	< 0.001
CO2	7,742,042.6	-	-	-	-	7,742,042.6	17,068.281	8.534
N2O	171.4	-	-	-	-	171.4	0.378	< 0.001
CH4	63.0	-	-	-	-	63.0	0.139	< 0.001
BC	4.6	-	-	-	-	4.6	0.010	< 0.001
HFC	-	0.7	-	-	-	0.7	0.002	< 0.001

Summary of GHG Emissions

Pollutant Name	Emissions (metric tons)	CO2e (metric tons)
CO2	7.742	7.742
N2O	< 0.001	0.051
CH4	< 0.001	0.002
BC	< 0.001	0.002
HFC	< 0.001	< 0.001
Total CO2e	-	7.798

Summary of Consumptions

Gasoline	880.801	gallons
Diesel	45.153	gallons
Natural Gas	0.111	diesel-equivalent gallons
Electricity	1,599.270	kilowatt-hours

END

File Name:	El Dorado (MC) - 2049 - Annual_Freeways_NoBuild.EM
CT-EMFAC2021 Version:	1.0.2.0
Run Date:	12/23/2024 5:02:32 PM
Area:	El Dorado (MC)
Analysis Year:	2049
Season:	Annual

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category	Gas VMT Fraction Within Category
Truck 1	0.027	0.209	0.344
Truck 2	0.023	0.463	0.029
Non-Truck	0.950	0.005	0.902

Road Type:	Freeway	
Silt Loading Factor:	CARB	0.015 g/m2
Precipitation Correction:	CARB	P = 98 days N = 365 days

Road Length:	4.8 miles
Volume:	36,290 vehicles per hour
Number of Hours:	1 hours
VMT:	174192 miles

VMT Distribution by Speed Bin (mph):

<= 5 mph	0.32%
10 mph	0.92%
15 mph	2.25%
20 mph	10.99%
25 mph	6.55%
30 mph	8.59%
35 mph	13.48%
40 mph	11.51%
45 mph	7.31%
50 mph	7.31%
55 mph	13.99%
60 mph	13.13%
65 mph	1.86%
70 mph	1.74%
75 mph	0.04%

Summary of Emissions

Pollutant Name	Running Exhaust (grams)	Running Loss (grams)	Tire Wear (grams)	Brake Wear (grams)	Road Dust (grams)	Total (grams)	Total (pounds)	Total (US tons)
PM2.5	112.0	-	359.0	684.1	1,360.6	2,515.7	5.546	0.003
PM10	120.5	-	1,436.0	1,954.5	9,070.4	12,581.4	27.737	0.014
NOx	5,250.5	-	-	-	-	5,250.5	11.575	0.006
CO	86,369.2	-	-	-	-	86,369.2	190.411	0.095
HC	1,532.8	5,095.2	-	-	-	6,627.9	14.612	0.007
TOG	1,684.9	5,447.4	-	-	-	7,132.3	15.724	0.008
ROG	1,251.5	5,447.4	-	-	-	6,698.9	14.768	0.007
1,3-Butadiene	6.1	0.0	-	-	-	6.1	0.013	< 0.001
Acetaldehyde	22.4	-	-	-	-	22.4	0.049	< 0.001
Acrolein	0.6	-	-	-	-	0.6	0.001	< 0.001
Benzene	61.5	78.6	-	-	-	140.2	0.309	< 0.001
Diesel PM	31.7	-	-	-	-	31.7	0.070	< 0.001
Ethylbenzene	19.3	50.9	-	-	-	70.2	0.155	< 0.001
Formaldehyde	52.6	-	-	-	-	52.6	0.116	< 0.001
Naphthalene	5.1	0.0	-	-	-	5.1	0.011	< 0.001
POM	1.3	-	-	-	-	1.3	0.003	< 0.001
DEOG	121.0	-	-	-	-	121.0	0.267	< 0.001
CO2	42,998,515.0	-	-	-	-	42,998,515.0	94,795.493	47.398
N2O	1,028.2	-	-	-	-	1,028.2	2.267	0.001
CH4	346.1	-	-	-	-	346.1	0.763	< 0.001
BC	26.1	-	-	-	-	26.1	0.058	< 0.001
HFC	-	4.1	-	-	-	4.1	0.009	< 0.001

Summary of GHG Emissions

Pollutant Name	Emissions (metric tons)	CO2e (metric tons)
CO2	42.999	42.999
N2O	0.001	0.306
CH4	< 0.001	0.009
BC	< 0.001	0.012
HFC	< 0.001	0.006
Total CO2e	-	43.332

Summary of Consumptions

Gasoline	4,827.620	gallons
Diesel	304.176	gallons
Natural Gas	0.690	diesel-equivalent gallons
Electricity	9,510.837	kilowatt-hours

END

File Name:	El Dorado (MC) - 2049 - Annual_Intersections_Build.EM
CT-EMFAC2021 Version:	1.0.2.0
Run Date:	12/23/2024 5:18:19 PM
Area:	El Dorado (MC)
Analysis Year:	2049
Season:	Annual

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category	Gas VMT Fraction Within Category
Truck 1	0.022	0.209	0.344
Truck 2	0.018	0.463	0.029
Non-Truck	0.960	0.005	0.902

Road Type:	Major/Collector	
Silt Loading Factor:	CARB	0.032 g/m2
Precipitation Correction:	CARB	P = 98 days N = 365 days

Road Length:	3.3 miles
Volume:	9,840 vehicles per hour
Number of Hours:	1 hours
VMT:	32472 miles

VMT Distribution by Speed Bin (mph):

<= 5 mph	0.32%
10 mph	0.92%
15 mph	2.25%
20 mph	10.99%
25 mph	6.55%
30 mph	8.59%
35 mph	13.48%
40 mph	11.51%
45 mph	7.31%
50 mph	7.31%
55 mph	13.99%
60 mph	13.13%
65 mph	1.86%
70 mph	1.74%
75 mph	0.04%

Summary of Emissions

Pollutant Name	Running Exhaust (grams)	Running Loss (grams)	Tire Wear (grams)	Brake Wear (grams)	Road Dust (grams)	Total (grams)	Total (pounds)	Total (US tons)
PM2.5	20.0	-	66.5	122.4	489.9	698.8	1.541	< 0.001
PM10	21.6	-	266.1	349.8	3,265.9	3,903.3	8.605	0.004
NOx	934.5	-	-	-	-	934.5	2.060	0.001
CO	16,231.0	-	-	-	-	16,231.0	35.783	0.018
HC	285.5	951.5	-	-	-	1,237.0	2.727	0.001
TOG	312.9	1,017.3	-	-	-	1,330.2	2.933	0.001
ROG	232.1	1,017.3	-	-	-	1,249.4	2.754	0.001
1,3-Butadiene	1.1	0.0	-	-	-	1.1	0.002	< 0.001
Acetaldehyde	4.0	-	-	-	-	4.0	0.009	< 0.001
Acrolein	0.1	-	-	-	-	0.1	< 0.001	< 0.001
Benzene	11.5	14.7	-	-	-	26.2	0.058	< 0.001
Diesel PM	4.9	-	-	-	-	4.9	0.011	< 0.001
Ethylbenzene	3.6	9.5	-	-	-	13.1	0.029	< 0.001
Formaldehyde	9.4	-	-	-	-	9.4	0.021	< 0.001
Naphthalene	1.0	0.0	-	-	-	1.0	0.002	< 0.001
POM	0.2	-	-	-	-	0.2	< 0.001	< 0.001
DEOG	18.7	-	-	-	-	18.7	0.041	< 0.001
CO2	7,953,166.5	-	-	-	-	7,953,166.5	17,533.730	8.767
N2O	176.1	-	-	-	-	176.1	0.388	< 0.001
CH4	64.7	-	-	-	-	64.7	0.143	< 0.001
BC	4.7	-	-	-	-	4.7	0.010	< 0.001
HFC	-	0.7	-	-	-	0.7	0.002	< 0.001

Summary of GHG Emissions

Pollutant Name	Emissions (metric tons)	CO2e (metric tons)
CO2	7.953	7.953
N2O	< 0.001	0.052
CH4	< 0.001	0.002
BC	< 0.001	0.002
HFC	< 0.001	0.001
Total CO2e	-	8.010

Summary of Consumptions

Gasoline	904.820	gallons
Diesel	46.384	gallons
Natural Gas	0.114	diesel-equivalent gallons
Electricity	1,642.882	kilowatt-hours

END

File Name: El Dorado (MC) - 2049 - Annual_Freeways_Build.EM
CT-EMFAC2021 Version: 1.0.2.0
Run Date: 12/23/2024 5:19:50 PM
Area: El Dorado (MC)
Analysis Year: 2049
Season: Annual

Vehicle Category	VMT Fraction Across Category	Diesel VMT Fraction Within Category	Gas VMT Fraction Within Category
Truck 1	0.027	0.209	0.344
Truck 2	0.023	0.463	0.029
Non-Truck	0.950	0.005	0.902

Road Type: Freeway
Silt Loading Factor: CARB 0.015 g/m2
Precipitation Correction: CARB P = 98 days N = 365 days

Road Length: 4.8 miles
Volume: 36,290 vehicles per hour
Number of Hours: 1 hours
VMT: 174192 miles

VMT Distribution by Speed Bin (mph):

<= 5 mph	0.32%
10 mph	0.92%
15 mph	2.25%
20 mph	10.99%
25 mph	6.55%
30 mph	8.59%
35 mph	13.48%
40 mph	11.51%
45 mph	7.31%
50 mph	7.31%
55 mph	13.99%
60 mph	13.13%
65 mph	1.86%
70 mph	1.74%
75 mph	0.04%

Summary of Emissions

Pollutant Name	Running Exhaust (grams)	Running Loss (grams)	Tire Wear (grams)	Brake Wear (grams)	Road Dust (grams)	Total (grams)	Total (pounds)	Total (US tons)
PM2.5	112.0	-	359.0	684.1	1,360.6	2,515.7	5.546	0.003
PM10	120.5	-	1,436.0	1,954.5	9,070.4	12,581.4	27.737	0.014
NOx	5,250.5	-	-	-	-	5,250.5	11.575	0.006
CO	86,369.2	-	-	-	-	86,369.2	190.411	0.095
HC	1,532.8	5,095.2	-	-	-	6,627.9	14.612	0.007
TOG	1,684.9	5,447.4	-	-	-	7,132.3	15.724	0.008
ROG	1,251.5	5,447.4	-	-	-	6,698.9	14.768	0.007
1,3-Butadiene	6.1	0.0	-	-	-	6.1	0.013	< 0.001
Acetaldehyde	22.4	-	-	-	-	22.4	0.049	< 0.001
Acrolein	0.6	-	-	-	-	0.6	0.001	< 0.001
Benzene	61.5	78.6	-	-	-	140.2	0.309	< 0.001
Diesel PM	31.7	-	-	-	-	31.7	0.070	< 0.001
Ethylbenzene	19.3	50.9	-	-	-	70.2	0.155	< 0.001
Formaldehyde	52.6	-	-	-	-	52.6	0.116	< 0.001
Naphthalene	5.1	0.0	-	-	-	5.1	0.011	< 0.001
POM	1.3	-	-	-	-	1.3	0.003	< 0.001
DEOG	121.0	-	-	-	-	121.0	0.267	< 0.001
CO2	42,998,515.0	-	-	-	-	42,998,515.0	94,795.493	47.398
N2O	1,028.2	-	-	-	-	1,028.2	2.267	0.001
CH4	346.1	-	-	-	-	346.1	0.763	< 0.001
BC	26.1	-	-	-	-	26.1	0.058	< 0.001
HFC	-	4.1	-	-	-	4.1	0.009	< 0.001

Summary of GHG Emissions

Pollutant Name	Emissions (metric tons)	CO2e (metric tons)
CO2	42.999	42.999
N2O	0.001	0.306
CH4	< 0.001	0.009
BC	< 0.001	0.012
HFC	< 0.001	0.006
Total CO2e	-	43.332

Summary of Consumptions

Gasoline	4,827.620	gallons
Diesel	304.176	gallons
Natural Gas	0.690	diesel-equivalent gallons
Electricity	9,510.837	kilowatt-hours

END

Appendix D March 2018 Letter addressing Transportation Conformity Requirements for CO in California Carbon Monoxide Maintenance Areas

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

MAR 2 t 2018

Muhaned Aljabiry, Chief
Office of Federal Transportation Management Program
California Department of Transportation
1120 N Street, Rm 4400, MS-82
Sacramento, CA 95814

Dear Mr. Aljabiry:

The U.S. Environmental Protection Agency (EPA) is providing this letter to document that the transportation conformity requirements under Clean Air Action (CAA) section l 76(c) for the Carbon Monoxide (CO) maintenance areas included in the table below will end on June I, 2018. This date marks 20 years from the redesignation of the areas to attainment for the CO National Ambient Air Quality Standard **(NAAQ S)**[1].

California Carbon Monoxide Maintenance Areas

Bake rsfield	Chico
Fresno	Modesto
Lake Tahoe N011h Shore	Lake Tahoe South Shore
Sacramento	San Dieg o
San Francisco-Oakland-San Jose	Stockton

Under 40 CFR 93.102(b)(4) of the EPA's regulations, transportation conformity applies to maintenance areas through the 20-year maintenance planning period, unless the maintenance plan specifies that the transportation conformity requirements apply for a longer time period. Pursuant to CAA's section 176(c)(5) and as explained in the preamble of the 1993 final rule, conformity applies to areas that are designated nonattainment or are subject to a maintenance plan approved under CAA section 175A. The section 175A maintenance planning period is 20 years, unless the applicable implementation plan specifies a longer maintenance period.[2] The EPA further clarified this conformity provision in its January 24, 2008 final rule[3].

The approved maintenance plan for these areas did not extend the maintenance plan period beyond 20 years from redesignation. Consequently, transportation conformity requirements for CO will cease to apply after June 1, 2018 (i.e., 20 years after the effective date of the EPA's approval of the first 10-year maintenance plan and redesignation of the areas to attainment for the CO **NAAQS).** As a result, these areas' Metropolitan Planning Organizations may reference this letter to indicate that as of June 1, 2018,

I *See* 63 **FR** 15305 (March 31, 1998) (approval of redesignation request and first I 0-year maintenance plan) and 70 FR 71776 (November 30. 2005) (approval of second IO-year maintenance plan)
2 *See* 58 FR 62188, 62206 (November 24, 1993)
3 *See* 73 FR 4420, at 4434-5 (January 24, 2008)

transportation conformity requirements no longer apply for the CO NAAQS for Federal Highway Administration/ Federal Transit Association projects as defined in 40 CFR 93.IO1. Even though the conformity obligation for CO has ended, the terms of the maintenance plans remain in effect and all measures and requirements contained in the plans apply until the state submits, and the EPA approves, a revision to the state plan[4]. Such a State Implementation Plan revision would have to comply with the anti-backsliding requirements of CAA section 110(1), and if applicable, CAA section 193, if the intent ofthe revision is to remove a control measure or to reduce its stringency.

If you have any questions about the transportation conformity requirements, please contact me at (415) 972-3183 or Karina O'Connor of my staff at (775) 434-8176.

Sincerely,

Elizabeth J. Adams
Acting Director, Air Division

cc: Rodeny Langstaff, Caltrans
Nesamani Kalandiyur, California Air Resources Board
Tasha Clemons, Federal Highway Administration
Stew Sonnenberg, Federal Highway Administration
Christina Leach, Federal Highway Administration
Ted Matley, Federal Transit Administration
Ahron Hakimi, Kern Council of Governments
Jon Clark, Butte County Association of Governments
Steve Heminger, Metropolitan Transportation Commission
James Corless, Sacramento Area Council of Governments
Kim Kawanda, San Diego Association of Governments
Tony Boren, Fresno Council of Governments
Rosa De Leon Park, Stanislaus Council of Governments
Andrew Chesley, San Joaquin Council of Governments
Joanne Marchetta, Tahoe Regional Planning Association

4 *See General Mo tors Corp. v. United States,* 496 U.S. 530 (1990)