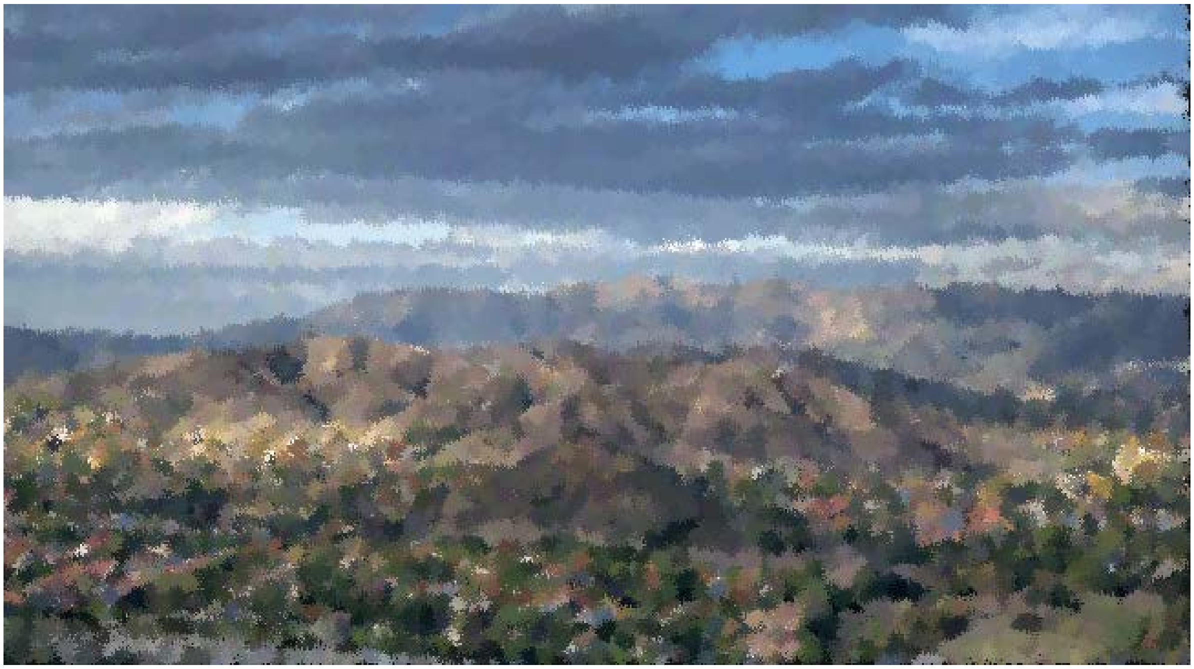

2022 Regional Transportation Plan & Sustainable Communities Strategy

Draft Program Environmental Impact Report
SCH # 2021030198

prepared by

Tulare County Association of Governments
210 North Church Suite B
Visalia, California 93291
Contact: Gabriel Gutierrez, Senior Regional Planner

prepared with the assistance of

Rincon Consultants, Inc.
7080 N. Whitney Avenue, Suite 101
Fresno, California 93720

May 2022

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Table of Contents

Tables

Figures

Appendices

Executive Summary

This document is an Environmental Impact Report (EIR) analyzing the environmental effects of the proposed 2022 Regional Transportation Plan & Sustainable Communities Strategy (proposed project). This section summarizes the characteristics of the proposed project, alternatives to the proposed project, and the environmental impacts and mitigation measures associated with the proposed project.

Lead Agency Contact Person

Gabriel Gutierrez, Senior Regional Planner
TCAG
210 North Church Suite B
Visalia, California 93291
559-623-0465

Project Description

This EIR has been prepared to examine the potential environmental effects of the proposed 2022 Regional Transportation Plan & Sustainable Communities Strategy (hereafter referred to as the proposed 2022 RTP/SCS). The following is a summary of the full project description, which can be found in Chapter 2, *Project Description*.

The proposed 2022 RTP/SCS covers the entire area of Tulare County and includes all the incorporated cities and unincorporated communities contained therein. Refer to Figure 2-1 in Chapter 2, *Project Description,* for a map of the project location. Capital improvement projects identified in the proposed 2022 RTP/SCS are located on State highways, county roads and locally owned streets, as well as on transit district property and public utility lands.

Project Objectives

The proposed 2022 RTP/SCS establishes planning goals and objectives to guide the development of the plan and establish the guiding principles for decision-making. Regional projects and programs are developed, funded, and implemented based on these goals. TCAG's general objectives for the proposed 2022 RTP/SCS are to ensure that the SCS and the transportation system planned for the TCAG region accomplishes the following:

- Serves regional goals, objectives, policies and plans.
- Responds to community and regional transportation needs.
- Promotes energy efficient, environmentally sound modes of travel and facilities and services.
- Promotes equity and efficiency in the distribution of transportation projects and services

Specific goals of the proposed 2022 RTP/SCS are as follows:

- Environmental Justice: Ensure that transportation investments do not discriminate based on race, color, national origin, sex, age, or disability.
- Air Quality: Promote the improvement of air quality and greenhouse gas reductions through congestion management coordination of land use, housing, and transportation systems;

provision of alternative modes of transportation; and provision of incentives that reduce vehicle miles traveled.

- Public Health: Promote public health in the region by providing opportunities for residents to bicycle and walk to destinations such as home, work, school, medical facilities, and commercial and service businesses.
- Comprehensive: Provide an efficient, integrated, multi-modal transportation system for the movement of people and goods that enhances the physical, economic, and social environment in the Tulare County region.
- Reliability and Congestion: Maintain or improve reliability of the transportation network and maintain or reduce congestion; Achieve a safe transportation system for all motorized and non-motorized users on all public roads in Tulare County; and Support more efficient use of the transportation system through the implementation of Intelligent Transportation Systems (ITS) technology.
- Transit: Provide a safe, secure, coordinated, and efficient public transit system that can reasonably meet the needs of residents.
- Active Transportation: Improve, enhance, and expand the region's bicycle and pedestrian systems and connectivity to those systems, while keeping them safe and convenient.
- Goods Movement: Provide a transportation system that efficiently and effectively transports goods to, from, within, and throughout Tulare County; and Improve goods movement within the region to increase economic vitality, meet the growing needs of freight and passenger services, and improve traffic safety, air quality, and overall mobility.
- Rail: Promote safe, economical, convenient rail systems and schedules that meet the needs of passenger and freight services in the region.
- Aviation: Support development of a regional system of airports that meets the air commerce and general aviation needs of the county.
- Emerging Technologies: Support the development and implementation of emerging technologies in the Surface Transportation System.
- SCS: Develop an integrated land use plan that meets CARB targets.

Project Characteristics

The proposed 2022 RTP/SCS is an update to the current 2018 RTP/SCS that was adopted in August 2018. The proposed 2022 RTP/SCS reflects changes in legislative requirements, local land use policies, and resource constraints that have occurred since adoption of the current 2018 RTP/SCS. The 2022 update to the 2018 RTP/SCS is focused on continued implementation of the 2018 RTP/SCS, with updates to ensure consistency with federal, State, and local planning requirements.

The proposed 2022 RTP/SCS shows how TCAG will meet the transportation needs of the region for the period from 2022 to 2046, considering existing and projected future land use patterns as well as forecasted population and job growth. The proposed 2022 RTP/SCS plans for and programs approximately $7.4 billion in revenues expected to be available to TCAG from all transportation funding sources over the course of the planning period. It identifies and prioritizes expenditures of anticipated funding for transportation projects that involve all transportation modes: highways, streets and roads, transit, rail, bicycle and pedestrian; transportation demand management (TDM); and transportation system management (TSM).

The proposed 2022 RTP/SCS transportation improvements project list is an update the 2018 RTP/SCS project list. As such it removes projects that have been completed since 2018, modifies some projects that continue to be on the list based on new information, and adds new projects to the list. None of the modified projects on the proposed 2022 RTP/SCS list would be substantially different in terms of geographical location, type of project, or the size of the project to those on the 2018 RTP/SCS list. A list of the transportation improvement projects included in the proposed 2022 RTP/SCS is shown in Table 2-1.

The land use scenario envisioned by the proposed 2022 RTP/SCS is similar to that contained in the 2018 RTP/SCS. The principles of the preferred land use scenario, the Cross Valley Corridor Blueprint Plus (CVCBP), guides the allocation of future development sufficient to accommodate the forecasted growth in population, households, and employment through 2046. Most notable of these principles is an increase in average densities county-wide by generally 30% over the status quo densities. This is articulated in a growth pattern that is reflective of the CVCBP's potential for increasing multi-modal travel and transit-oriented development. Reference Section 2.4.2 below for additional information regarding the Sustainable Communities Strategy (SCS) and the CVCBP land use scenario.

2020 RTP/SCS Organization. TCAG adopted the previous 2018 RTP/SCS in August 2018. The proposed 2022 RTP/SCS reflects changes in legislative requirements, local land use policies, and resource constraints and is organized into four chapters:

Policy Element. The Policy Element provides guidance to decision-makers of the implications, impacts, opportunities, and foreclosed options that will result from implementation of the RTP. California statue states that each RTP shall include a Policy Element that: describes the transportation issues in the region, identifies and qualifies regional needs expressed within both short and long-range planning horizons and maintains internal consistency with the Financial Element and fund estimates.

Sustainable Communities Strategy. Demonstrates the ability of TCAG to meet the GHG targets that CARB has set for the TCAG region from on-road light-duty trucks and passenger vehicles. The proposed 2022 RTP/SCS updates the current RTP/SCS, adopted by TCAG in August 2018, and incorporates new strategies to address rapidly changing regional, national, and global context.

Action Element. Consists of short-term and long-term activities that address regional transportation issues and needs for all transportation modes. The Action Element would establish assumptions which form the definition of what is acceptable based upon adopted goals, policies and objectives and are part of the projection equation. Further, the Action Element would be separated into two parts: a discussion of regional issues, mandated transportation services, air quality, forecasting, regionally significant roads, alternatives, social impacts and RTP analysis; and a concluding section discussing each mode of transportation.

Financial Element. Identifies the current and anticipated revenue sources and financing techniques available to fund the planned transportation investments described in the Action Element. The intent of the Financial Element would be to define realistic transportation financial constraints and opportunities with current available data. Discussion would center of three main topics: current funding revenues, transportation expenditures, and potential funding sources for the future

Of these four chapters of the proposed 2022 RTP/SCS, the Sustainable Communities Strategy, Policy Element, and the Action Element are the three that include provisions with the potential to create physical changes to the environment and are the primary focus for analysis in this EIR.

Alternatives

As required by the California Environmental Quality Act (CEQA), this EIR examines alternatives to the proposed project. Studied alternatives include the following three alternatives. Based on the alternatives analysis, Alternative 4 was determined to be the environmentally superior alternative.

- **Alternative 1: No Project Alternative**. The No Project Alternative is comprised of a land use pattern that reflects a linear trend of densities and building types seen in 2014 at the latest forecast growth rate and a transportation network comprised of transportation projects that are currently in construction or are funded in the short-range Regional Transportation Improvement Program (RTIP). The No Project Alternative depicts future growth continuing without reference to any of the Regional Blueprint principles or strategies, such as an emphasis on compact development. This scenario can be considered "status quo." It assumes current sub-regional growth trends continue consistent with growth forecast and continuing split of growth between cities, unincorporated communities, and rural areas.
- **Alternative 2: Business as Usual Alternative.** This alternative reflects the Trend Scenario. It is like the No Project Alternative except that it includes transportation investments from the project list for the 2014 RTP/SCS. The 2014 project list was used as it compliments best the growth pattern forecast in the No Project Alternative carrying forth the existing development pattern for comparison without projects identified in the 2018 RTP/SCS or the proposed 2022 RTP/SCS. This alternative can also be considered a "status quo" strategy and provides a baseline compared to the proposed 2022 RTP/SCS as it projects into the future the current land use pattern and road development in the TCAG region without the proposed 2022 RTP/SCS or future projects in the 2018 RTP/SCS.
- **Alternative 3: Blueprint (Old Plan) Alternative.** The Blueprint scenario was adopted as the preferred scenario of the 2018 RTP/SCS. It is based on the application of the development principles adopted as part of the 2009 Tulare County Regional Blueprint (2022 RTP/SCS, Appendix 1-L). Primary among these principles is an objective of a 25 percent higher overall density of new development compared to the Business as Usual Alternative. In general, this means a development footprint similar to the baseline but smaller in extent. The alternative also represents an increased and complementary investment in transit and active transportation, taking advantage of greater density along service corridors as forecast during development of the 2018 RTP/SCS. This alternative therefore includes transportation investments reflected in the 2018 RTP/SCS project list.
- **Alternative 4: Blueprint Plus**. The Blueprint Plus Alternative represents a change in future development patterns more pronounced than that envisioned by the Blueprint (Old Plan) Alternative but at the same density as the proposed 2022 RTP/SCS. Blueprint Plus has an objective of overall density of new development 5 percent higher than the Blueprint, consistent with the proposed 2022 RTP/SCS. This density is reflected in an incremental shift to more compact development types primarily within the cities' spheres of influence where there is infrastructure to support such development, or such infrastructure can be efficiently extended compared to increased development along transit corridors.

  This alternative adds to the Blueprint Plus scenario modeled in the SCS by focusing on implementation of the SCS goals:

  - Promote the improvement of air quality and greenhouse gas reductions through congestion management coordination of land use, housing, and transportation systems; provision of alternative modes of transportation; and provision of incentives that reduce vehicle miles traveled

- Promote public health in the region by providing opportunities for residents to bicycle and walk to destinations such as home, work, school, medical facilities, and commercial and service businesses
- Provide a safe, secure, coordinated, and efficient public transit system that can reasonably meet the needs of residents
- Improve, enhance, and expand the region's bicycle and pedestrian systems and connectivity to those systems, while keeping them safe and convenient.

When compared to the proposed 2022 RTP/SCS, land use density would be similar, but concentrated in different areas. This alternative excludes the cross valley corridor (CVC) project; as such, new development is concentrated more in existing urban areas, rather than along the CVC route.

In terms of transportation investments, the emphasis on these goals would also be implemented by prioritizing proposed 2022 RTP/SCS transportation funding on transit and active transportation modes, as well as by emphasizing fix-it first for streets and highways, and de-emphasizing funding and hence construction of capacity increasing roadway projects. This priority of investment of transportation funding to cities, transit, and active transportation projects anticipated to result in less funding directed toward capacity increasing projects than under the of proposed 2022 RTP/SCS, and therefore less construction of capacity increasing projects on undisturbed lands.

Chapter 6 of the EIR describes these alternatives in further detail and compares their impacts to the proposed project's impacts.

Areas of Known Controversy

The EIR scoping process identified few areas of known controversy for the proposed project. Responses to the Notice of Preparation of a Draft EIR and input received are summarized in Table 1-1 of Chapter 1, *Introduction*. Impacts of the proposed project on disadvantaged communities were an important concern for one commenter.

Issues to be Resolved

Issues to be resolved include the choice among alternatives, and the nature of mitigation measures to be adopted.

Summary of Impacts and Mitigation Measures

Table ES-1 summarizes the direct environmental impacts of the proposed project, proposed mitigation measures, and residual impacts (the impact after application of mitigation, if required). Impacts are categorized as follows:

- **Significant and Unavoidable.** An impact that cannot be reduced to below the threshold level given feasible mitigation measures. Such an impact requires a Statement of Overriding Considerations to be adopted if the proposed project is approved per §15093 of the *State CEQA Guidelines*.

- **Less than Significant with Mitigation Incorporated.** An impact that can be reduced to below the threshold level given feasible mitigation measures.
- **Less than Significant.** An impact that may be adverse but does not exceed the threshold levels and does not require mitigation measures.
- **No Impact:** The proposed project would have no effect on environmental conditions or would reduce existing environmental problems or hazards.

Cumulative impacts of the proposed 2022 RTP/SCS are not summarized Table ES-1. They are evaluated in each resource section of EIR Chapter 4.

Table ES-1 Summary of Environmental Impacts, Mitigation Measures, and Residual Impacts

Impact	Mitigation Measure(s)	Impact
Aesthetic and Visual Resources		
Impact AES-1. The proposed transportation projects and land use projects envisioned under the proposed 2022 RTP/SCS would have a substantial adverse effect on scenic vistas and substantially damage scenic resources within highways identified to have high scenic qualities or designated by the State as eligible scenic highways. Impacts would be significant and unavoidable.	**AES-1(a) Tree Protection and Replacement.** The implementing agency for new roadways, extensions and widenings of existing roadways, trails and facility improvement projects shall, or can and should, avoid the removal of existing mature trees to the extent possible consistent with adopted local City and County policies as applicable. The implementing agency of a particular proposed 2022 RTP/SCS project shall replace any trees lost at a minimum 2:1 basis and incorporate them into the landscaping design for the roadway when feasible, or as required by local or County requirements. The implementing agency also shall ensure the continued vitality of replaced trees through periodic maintenance. **AES-1(b) Discouragement of Architectural Features that Block Scenic Views.** The implementing agency shall, or can and should, design projects to minimize contrasts in scale and massing between the project and surrounding natural forms and development. Setbacks and acoustical design of adjacent structures shall be preferentially used as mitigation for potential noise impacts arising from increased traffic volumes associated with adjacent land development. The use of sound walls, or any other architectural features that could block views from the scenic highways or other view corridors, shall be discouraged to the extent possible. Where use of sound walls is found to be necessary, walls shall incorporate offsets, accents, and landscaping to prevent monotony. In addition, sound walls shall be complementary in color and texture to surrounding natural features.	Significant and Unavoidable
Impact AES-2. The proposed transportation projects and land use patterns envisioned by the proposed 2022 RTP/SCS would in non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site or its surroundings, and in an urbanized area, would conflict with applicable zoning and other regulations governing scenic quality. Impacts would be significant and unavoidable.	**AES-2 Design Measures for Visual Compatibility.** The implementing agency shall, or can and should, require measures that minimize contrasts in scale and massing between the project and surrounding natural forms and developments. Strategies to achieve this include: ▪ Siting or designing projects to minimize their intrusion into important viewsheds; ▪ Avoiding large cuts and fills when the visual environment (natural or urban) would be substantially disrupted; ▪ Ensuring that re-contouring provides a smooth and gradual transition between modified landforms and existing grade; ▪ Developing transportation systems to be compatible with the surrounding environments (e.g., colors and materials of construction material; scale of improvements); ▪ Designing and installing landscaping to add natural elements and visual interest to soften hard edges, as well as to restore natural features along corridors where possible after widening, interchange modifications, re-alignment, or construction of ancillary facilities; and ▪ Designing new structures to be compatible in scale, mass, character, and architecture with existing structures.	Significant and Unavoidable

<table>
<tr><th>Impact</th><th>Mitigation Measure(s)</th><th>Impact</th></tr>
<tr><td>Impact AES-3. Development of proposed transportation improvement projects and land use patterns envisioned under proposed 2022 RTP/SCS would create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area. Impacts are significant and unavoidable.</td><td>AES-3(a) Roadway and Project Lighting. The implementing shall, or can and should, roadway lighting to the extent possible, consistent with safety and security objectives, and shall not exceed the minimum height requirements of the local jurisdiction in which the project is proposed. This may be accomplished through the use of back shields, hoods, low intensity lighting, and using as few lights as necessary to achieve the goals of the project.

As part of planning, design, and engineering for transportation and land use projects, implementing agencies shall, or can and should, ensure that projects proposed near light-sensitive uses avoid substantial spillover lighting. Potential design measures include, but are not limited to, the following:
▪ Lighting shall consist of cutoff-type fixtures that cast low-angle illumination to minimize incidental spillover of light into adjacent properties and undeveloped open space. Fixtures that project light upward or horizontally shall not be used.
▪ Lighting shall be directed away from habitat and open space areas adjacent to the project site.
▪ Light mountings shall be downcast, and the height of the poles minimized to reduce potential for backscatter into the nighttime sky and incidental spillover of light onto adjacent private properties and undeveloped open space. Light poles will be 20 feet high or shorter. Luminary mountings shall have non-glare finishes.
▪ Exterior lighting features shall be directed downward and shielded in order to confine light to the boundaries of the subject project. Where more intense lighting is necessary for safety purposes, the design shall include landscaping to block light from sensitive land uses, such as residences.

AES-3(b) Glare Reduction Measures. Implementing agencies shall, or can and should, minimize and control glare from transportation and land use projects near glare-sensitive uses through the adoption of project design features such as:
▪ Planting trees along transportation corridors to reduce glare from the sun;
▪ Creating tree wells in existing sidewalks;
▪ Adding trees in new curb extensions and traffic circles;
▪ Adding trees to public parks and greenways;
▪ Landscaping off-street parking areas, loading areas, and service areas;
▪ Limiting the use of reflective materials, such as metal;
▪ Using non-reflective material, such as paint, vegetative screening, matte finish coatings, and masonry;
▪ Screening parking areas by using vegetation or trees;
▪ Using low-reflective glass;
▪ Complying with applicable general plan policies, municipal code regulations, city or local controls related to glare; and
▪ Tree species planted to comply with this measure shall provide substantial shade cover when mature. Utilities shall be installed underground along these routes wherever feasible to allow trees to grow and provide shade without need for severe pruning.</td><td>Significant and Unavoidable</td></tr>
</table>

Impact	Mitigation Measure(s)	Impact
Agricultural & Forestry Resources		
Impact AG-1. Proposed transportation projects and land use projects envisioned by the proposed 2022 RTP/SCS would result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use, and/or conflict with existing zoning for agriculture or a Williamson Act contract. This would be a significant and unavoidable impact.	**AG-1 Agricultural Land Impact Avoidance and Minimization.** Implementing agencies shall implement measures, where feasible based on project-and site-specific considerations that include, but are not limited to those identified below. ▪ Require project relocation or corridor realignment, where feasible, to avoid Important Farmland, agriculturally zoned land and/or land under Williamson Act contract; ▪ Manage project construction to minimize the introduction of invasive species or weeds that may affect agricultural production on agricultural land adjacent to project sites. Managing project construction may include washing construction equipment before bringing equipment on-site, using certified weed-free straw bales for construction Best Management Practices (BMPs), and other similar measures. ▪ Provide buffers, berms, setbacks, fencing, or other project design measures to protect surrounding agriculture, and to reduce conflict with farming that could result from implementation of transportation improvements and/or development included as a part of the RTP/SCS.	Significant and Unavoidable
Impact AG-2. The proposed transportation projects and land use projects envisioned by the proposed 2022 RTP/SCS would not conflict with existing zoning for forest land, timberland, or timberland production, nor convert forest land to non-forest uses. Impacts would be less than significant.	None required.	Less than Significant
Air Quality		
Impact AQ-1. The proposed 2022 RTP/SCS would not conflict with or obstruct implementation of the applicable air quality plan. Impacts would be less than significant.	None required.	Less than Significant

Impact	Mitigation Measure(s)	Impact
Impact AQ-2. Construction activities associated with transportation improvements and land use projects envisioned by the proposed 2022 RTP/SCS would result in a cumulatively considerable net increase in criteria pollutants for which the project region is non-attainment under an applicable federal or state ambient air quality standard. This impact would be significant and unavoidable.	**AQ-2(a) Application of SJVAPCD Feasible Mitigation Measures.** For all projects, the implementing agency shall incorporate the most recent SJVAPCD feasible construction mitigation measures and/or technologies for reducing inhalable particles based on analysis of individual sites and project circumstances. Additional and/or modified measures may be adopted by SJVAPCD prior to implementation of individual projects under the proposed 2022 RTP/SCS; therefore, the most current list of feasible mitigation measures at the time of project implementation shall be used. The current SJVAPCD feasible mitigation measures include the following (SJVAPCD 2015b): ▪ All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover. ▪ All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking. ▪ When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained. ▪ Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant. ▪ An owner/operator of any site with 150 or more vehicle trips per day, or 20 or more vehicle trips per day by vehicles with three or more axles shall implement measures to prevent carryout and trackout. ▪ Limit the hours of operation of heavy-duty equipment and/or the amount of equipment in use. **AQ-2(b) Diesel Equipment Emissions Standards.** The implementing agency shall ensure, to the maximum extent feasible, that diesel construction equipment meeting CARB Tier 4 emission standards for off-road heavy-duty diesel engines is used. If use of Tier 4 equipment is not feasible, diesel construction equipment meeting Tier 3 (or if infeasible, Tier 2) emission standards shall be used. These measures shall be noted on all construction plans, and the implementing agency shall perform periodic site inspections. **AQ-2(c) Electric Construction Equipment.** The implementing agency shall ensure that to the extent feasible, construction equipment utilizes electricity from power poles rather than temporary diesel power generators and/or gasoline power generators.	Significant and Unavoidable
Impact AQ-3. Operation of the proposed transportation improvements and land use projects envisioned by the proposed 2022 RTP/SCS would result in a cumulatively considerable net increase of a criteria pollutant for which the project region is non-	**AQ-3 Long-term Regional Operational Emissions.** Implementing agencies can and should implement long-term operational emissions reduction measures. Such reduction measures include the following: ▪ Require that all interior and exterior architectural coatings for all developments utilize coatings following SJVAPCD Rule 4601, *Architectural Coatings*. ▪ Increase building envelope energy efficiency standards in excess of applicable building standards and encourage new development to achieve zero net energy use. ▪ Install energy-efficient appliances, interior lighting, and building mechanical systems. Encourage installation of solar panels for new residential and commercial development.	Significant and Unavoidable

Impact	Mitigation Measure(s)	Impact
attainment under an applicable federal or state ambient air quality standard. Impacts would be significant and unavoidable.	▪ Locate sensitive receptors more than 500 feet of a freeway, 500 feet of urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day. ▪ Locate sensitive receptors more than 1,000 feet of a major diesel rail service or railyards. Where adequate buffer cannot be implemented, implement the following: ▫ Install air filtration (as part of mechanical ventilation systems or stand-alone air cleaners) to indoor reduce pollution exposure for residents and other sensitive populations in buildings that are close to transportation network improvement projects. ▫ Use air filtration devices rated MERV-13 or higher. ▪ Plant trees and/or vegetation suited to trapping roadway air pollution and/or sound walls between sensitive receptors and the pollution source. The vegetation buffer should be thick, with full coverage from the ground to the top of the canopy Install higher efficacy public street and exterior lighting. ▪ Use daylight as an integral part of lighting systems in buildings. ▪ Use passive solar designs to take advantage of solar heating and natural cooling. ▪ Install light colored “cool” roofs, cool pavements. ▪ Install solar and tankless hot water heaters. ▪ Exclude wood-burning fireplaces and stoves. ▪ Incorporate design measures and infrastructure that promotes safe and efficient use of alternative modes of transportation (e.g., neighborhood electric vehicles, bicycles) pedestrian access, and public transportation use. Such measures may include incorporation of electric vehicle charging stations, bike lanes, bicycle-friendly intersections, and bicycle parking and storage facilities. ▪ Incorporate design measures that promote ride sharing programs (e.g., by designating a certain percentage of parking spaces for ride sharing vehicles, designating adequate passenger loading and unloading and waiting areas for ride sharing vehicles, and providing a web site or message board for coordinating rides).	
Impact AQ-4. The proposed transportation improvements and land use projects envisioned by the proposed 2022 RTP/SCS would expose sensitive receptors to substantial particulate matter pollutant concentrations. However, because the proposed 2022 RTP/SCS would reduce exposure in comparison to the baseline,	None required.	Less than Significant

Impact	Mitigation Measure(s)	Impact
Impacts would be less than significant.		
Impact AQ-5. The transportation improvements and land use projects envisioned by the proposed 2022 RTP/SCS would expose sensitive receptors to substantial TAC concentrations. Impacts would be significant and unavoidable.	**AQ-4 Health Risk Reduction Measures.** Transportation project sponsor agencies shall implement the following measures: ▪ During project-specific design and CEQA review, the potential localized particulate (PM_{10} and $PM_{2.5}$) impacts and their health risks shall be evaluated for individual projects. Localized particulate matter concentrations shall be estimated using procedures and guidelines consistent with U.S. EPA 2015's *Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas*. If required based on the project-level hotspot analysis, project-specific mitigation shall be added to the project design concept or scope to ensure that local particulate (PM_{10} and $PM_{2.5}$) emissions would not reach a concentration at any location that would cause estimated cancer risk to exceed the SJVAPCD threshold of 20 in one million. Per the U.S. EPA guidance (2015), potential mitigation measures to be considered may include but shall not be limited to: providing a retrofit program for older higher emitting vehicles, anti-idling requirements or policies, controlling fugitive dust, routing traffic away from populated zones and replacing older buses with cleaner buses. These measures can and should be implemented to reduce localized particulate impacts as needed. ▪ Retain a qualified air quality consultant to prepare a health risk assessment (HRA) in accordance with CARB and OEHHA requirements to determine the exposure of nearby residents to TAC concentrations. ▪ If impacts result in increased risks to sensitive receptors above significance thresholds, plant trees and/or vegetation suited to trapping TACs and/or sound walls between sensitive receptors and the pollution source. In addition, consistent with the general guidance contained in CARB's *Air Quality and Land Use Handbook* (2005) and Technical Advisory *on Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways* (2017), appropriate and feasible measures shall be incorporated into project building design for land use projects including residential, school and other sensitive uses located within 500 feet (or other appropriate distance as determined by the lead agency) of freeways, heavily travelled arterials, railways and other sources of diesel particulate matter, including roadways experiencing significant vehicle delays. The appropriate measures shall include one or more of the following methods, as appliable and as determined by a qualified professional. The implementing agency shall incorporate health risk reduction measures based on an analysis of individual sites and project circumstances. These measures may include: ▪ Avoid siting new sensitive land uses within 500 feet of a freeway or railway. ▪ Require development projects for new sensitive land uses to be designed to minimize exposure to roadway-related pollutants to the maximum extent feasible through inclusion of design components including air filtration and physical barriers. ▪ Do not locate sensitive receptors near the entry and exit points of a distribution center. ▪ Locate structures and outdoor living areas for sensitive uses as far as possible from the source of emissions. As feasible, locate doors, outdoor living areas and air intake vents primarily on the side of the building away from	Significant and Unavoidable

Impact	Mitigation Measure(s)	Impact
	nearby high volume roadways or other pollution source. As feasible, incorporate dense, tiered vegetation that regains foliage year-round and has a long life span between the pollution source and the project. ▪ Maintain a 50-foot buffer from a typical gas dispensing facility (under 3.6 million gallons of gas per year). ▪ Install, operate and maintain in good working order a central heating and ventilation (HV) system or other air take system in the building, or in each individual residential unit, that meets the efficiency standard of the MERV 13. The HV system should include the following features: ▫ Installation of a high efficiency filter and/or carbon filter-to-filter particulates and other chemical matter from entering the building. ▫ Use of either HEPA filters or ASHRAE 85 percent supply filters. ▫ Completion of ongoing maintenance. ▪ Retain a qualified HV consultant or Home Energy Rating Systems rater during the design phase of the project to locate the HV system based on exposure modeling from the mobile and/or stationary pollutant sources. ▪ Maintain positive pressure within the building. ▪ Achieve a performance standard of at least one air exchange per hour of fresh outside filtered air. ▪ Achieve a performance standard of at least four air exchanges per hour of recirculation. Achieve a performance standard of 0.25 air exchanges per hour of unfiltered infiltration if the building is not positively pressurized. ▪ Require project owners to provide a disclosure statement to occupants and buyers summarizing technical studies that reflect health concerns about exposure to highway/freeway exhaust emissions.	
Impact AQ-6. Construction of the proposed transportation improvements and land use projects envisioned by the proposed 2022 RTP/SCS would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. Impacts would be less than significant.	None required.	Less than Significant
Biological Resources		
Impact BIO-1. Implementation of transportation projects and the land use scenario envisioned by the proposed 2022 RTP/SCS would have a	**BIO-1(a) Biological Resources Screening and Assessment.** The implementing agencies shall, or can and should, implement the following measures during CEQA review of projects implementing the proposed 2022 RTP/SCS. On a project-by-project basis, a preliminary biological resource screening shall be performed to determine whether the project has any potential to impact biological resources. If it is determined that the project has no potential to impact biological resources, no further action is required. If the project would have the potential to impact biological	Significant and Unavoidable

Impact	Mitigation Measure(s)	Impact
substantial adverse effect, either directly or through habitat modifications, on 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 Wildlife or U.S. Fish and Wildlife Service. Impacts would be significant and unavoidable.	resources, prior to construction, a qualified biologist shall conduct a biological resources assessment (BRA) or similar type of study to document the existing biological resources within the project footprint plus an appropriate buffer determined by a qualified biologist and to determine the potential impacts to those resources. The BRA shall evaluate the potential for impacts to all sensitive biological resources including, but not limited to special-status species, nesting birds, wildlife movement, sensitive plant communities/critical habitat and other resources judged to be sensitive by local, state, and/or federal agencies. Pending the results of the BRA, design alterations, further technical studies (i.e., protocol surveys) and/or consultations with the USFWS, CDFW and/or other local, state, and federal agencies may be required. The following Mitigation Measures [BIO-1(b) through BIO-1(i)] shall be incorporated, only as applicable, into the BRA and/or the project CEQA document for projects where specific resources are present, or may be present, and may be impacted by the project. Note that specific surveys described in the mitigation measures below may be completed as part of the BRA where suitable habitat is present. **BIO-1(b) Special-Status Plant Species Surveys.** If completion of the project-specific BRA determines that special-status plant species have potential to occur on-site, the implementing agency shall contract a qualified biologist to complete surveys for special-status plants prior to any vegetation removal, grubbing, or other construction activity of each project (including staging and mobilization). The surveys shall be floristic in nature and shall be seasonally timed to coincide with the target species identified in the project-specific BRA. Whenever practicable, surveys shall be conducted in accordance with the most current protocols established by the CDFW, USFWS, and the local jurisdictions if said protocols exist. A report of the survey results shall be submitted to the implementing agency for review. If special-status plant species are identified, mitigation measure BIO-1(c) shall apply. **BIO-1(c) Special-Status Plant Species Avoidance, Minimization, and Mitigation.** If state or federally listed and/or CRPR 1 and 2 species are found during special-status plant surveys [pursuant to mitigation measure BIO-1(b)], then the implementing agency shall redesign the project to avoid impacting these plant species to the maximum extent feasible. Occurrences of these species that are not within the immediate disturbance footprint but are located within 50 feet of disturbance limits shall have bright orange protective fencing installed at least 30 feet beyond their extent, or other distance as approved by a qualified biologist, to protect them from harm. If CRPR 3 and 4 species are found, the qualified biologist contracted to conduct the plant surveys [pursuant to mitigation measure BIO-1(b)] shall evaluate to determine if they meet criteria to be considered special-status, and if so, the same process as identified for CRPR 1 and 2 species shall apply. If special-status plants species cannot be avoided and would be impacted by a project implemented under the proposed 2022 RTP/SCS, the implementing agency shall require all impacts shall be mitigated at an appropriate ratio to fully offset project impacts, as determined by a qualified biologist for each species as a component of habitat restoration. A restoration plan shall be prepared and submitted to the implementing agency. **BIO-1(d) Endangered/Threatened Animal Species Habitat Assessment and Protocol Surveys.** If the results of the BRA determine that suitable habitat may be present for federally and/or state endangered or threatened animal species, the implementing agency shall require habitat assessments/surveys. Whenever practicable the surveys shall be completed in accordance with CDFW and/or USFWS/NMFS protocols prior to issuance of any construction permits/project approvals.	

Impact	Mitigation Measure(s)	Impact
	Alternatively, in lieu of conducting protocol surveys, the implementing agency may choose to assume presence within the project footprint and proceed with development of appropriate avoidance measures, consultation, and permitting, as applicable. If the target species is detected during protocol surveys, or protocol surveys are not conducted and presence assumed based on suitable habitat, mitigation measure BIO-1(e) shall apply. **BIO-1(e) Endangered/Threatened Animal Species Avoidance and Compensatory Mitigation.** If habitat is occupied or presumed occupied by federal and/or state listed species and would be impacted by the project, the implementing agency shall redesign the project in coordination with a qualified biologist to avoid impacting occupied/presumed occupied habitat to the extent feasible. If occupied or presumed occupied habitat cannot be avoided, the implementing agency shall estimate the total acreages for habitat that would be impacted prior to the issuance of construction permits/approvals. Compensatory mitigation shall be achieved through purchase of credits at a USFWS, NMFS and/or CDFW approved conservation bank if available for the affected species, and/or through providing compensatory mitigation to offset impacts to federal and/or state listed species habitat. Compensatory mitigation shall be provided at an appropriate ratio to fully offset project impacts, as determined by a qualified biologist for permanent impacts. Compensatory mitigation may be combined/nested with special-status plant species and sensitive community restoration where applicable. Temporary impact areas shall be restored to pre-project conditions. If on and/or off-site compensatory mitigation sites are identified, the implementing agency shall retain a qualified biologist to prepare a Habitat Mitigation and Monitoring Plan (HMMP) to ensure the success of compensatory mitigation sites that are to be conserved for compensation of permanent impacts to federal and/or state listed species. The HMMP shall identify long term site management needs, routine monitoring techniques, techniques, and success criteria, and shall determine if the conservation site has restoration needs to function as a suitable mitigation site. If restoration is required on the conservation site, the HMMP shall contain the restoration components outlined under the Restoration Plan listed in measure BIO-1(c). The HMMP shall be submitted to the implementing agency. **BIO-1(f) Endangered/Threatened Species Avoidance and Minimization During Construction.** The implementing agency shall apply the following measures to aquatic and terrestrial species, where appropriate. Implementing agencies shall select from these measures as appropriate depending on site conditions, the species with potential for occurrence and the results of the biological resources screening and assessment (Measure BIO-1[a]). ▪ Preconstruction surveys for federal and/or state listed species with potential to occur shall be conducted where suitable habitat is present by a qualified biologist not more than 48 hours prior to the start of construction activities. The survey area shall include the proposed disturbance area and all proposed ingress/egress routes, plus a 100-foot buffer. If any life stage of federal and/or state listed species is found within the survey area, the qualified biologist shall recommend an appropriate course of action, which may include consultation with USFWS, NMFS and/or CDFW. The results of the pre-construction surveys shall be submitted to the implementing agency for review and approval prior to start of construction.	

Impact	Mitigation Measure(s)	Impact
	▪ Ground disturbance shall be limited to the minimum necessary to complete the project. The project limits of disturbance shall be flagged. Areas of special biological concern shall have highly visible orange construction fencing. ▪ All projects occurring within/adjacent to aquatic habitats (including riparian habitats and wetlands) shall be completed between April 1 and October 31, to avoid impacts to sensitive aquatic species. ▪ All projects occurring within or adjacent to sensitive habitats that may support federally and/or state endangered/threatened species shall have a qualified biologist present during all initial ground disturbing/vegetation clearing activities. Once initial ground disturbing/vegetation clearing activities have been completed, said biologist shall conduct daily pre-activity clearance surveys for endangered/threatened species. Alternatively, and upon approval of the CDFW and/or USFWS/NMFS or as outlined in project permits, said biologist may conduct site inspections at a minimum of once per week to ensure all prescribed avoidance and minimization measures are begin fully implemented. ▪ No endangered/threatened species shall be captured and relocated without authorization from the CDFW and/or USFWS. ▪ If pumps are used for dewatering activities, all intakes shall be completely screened with wire mesh not larger than five millimeters to prevent animals from entering the pump system. ▪ If at any time during construction of the project an endangered/threatened species enters the construction site or otherwise may be impacted by the project, all project activities shall cease. At that point, a qualified biologist shall recommend an appropriate course of action, which may include consultation with USFWS, NMFS and/or CDFW. ▪ All vehicle maintenance/fueling/staging shall occur not less than 100 feet from any riparian habitat or water body. Suitable containment procedures shall be implemented to prevent spills. ▪ No equipment shall be permitted to enter wetted portions of any affected drainage channel. ▪ All equipment operating within streambeds (restricted to conditions in which water is not present) shall be in good conditions and free of leaks. Spill containment shall be installed under all equipment staged within stream areas and extra spill containment and clean up materials shall be located in close proximity for easy access. ▪ At the end of each workday, excavations shall be secured with cover or a ramp shall be provided to prevent wildlife entrapment. ▪ All trenches, pipes, culverts, or similar structures shall be inspected for animals prior to burying, capping, moving, or filling. **BIO-1(g) Non-Listed Special-status Animal Species Avoidance and Minimization.** Depending on the species identified in the BRA, the implementing agency shall select from among the following to reduce the potential for impacts to non-listed special-status animal species: ▪ Preconstruction clearance surveys shall be conducted within 14 days prior to the start of construction (including staging and mobilization). The surveys shall cover the entire disturbance footprint plus a minimum 100-foot buffer and shall identify all special-status animal species that may occur on-site. All non-listed special-status species shall be relocated from the site either through direct capture or through passive exclusion. A report of the	

Impact	Mitigation Measure(s)	Impact
	preconstruction survey shall be submitted to the implementing agency for their review and approval prior to the start of construction. ▪ A qualified biologist shall be present during all initial ground disturbing activities, including vegetation removal, to recover special-status animal species unearthed by construction activities. ▪ Upon completion of the project, a qualified biologist shall prepare a final compliance report documenting all compliance activities implemented for the project, including the preconstruction survey results. ▪ If special-status bat species may be present and impacted by the project, within 30 days of the start of construction a qualified biologist shall conduct presence/absence surveys for special-status bats, in consultation with the CDFW, where suitable roosting habitat is present. Surveys shall be conducted using acoustic detectors and by searching tree cavities, crevices, and other areas where bats may roost. If active bat roosts or colonies are present, the biologist shall evaluate the type of roost to determine the next step. ▫ If a maternity colony is present, all construction activities shall be postponed within a 250-foot buffer around the maternity colony until it is determined by a qualified biologist that the young have dispersed or as recommended by CDFW through consultation. Once it has been determined that the roost is clear of bats, the roost shall be removed immediately. ▫ If a roost is determined by a qualified biologist to be used by a large number of bats (large hibernaculum), alternative roosts, such as bat boxes if appropriate for the species, shall be designed and installed near the project site. The number and size of alternative roosts installed will depend on the size of the hibernaculum and shall be determined through consultations with the CDFW. ▫ If other active roosts are located, exclusion devices such as valves, sheeting or flap-style one-way devices that allow bats to exit but not re-enter roosts discourage bats from occupying the site. **BIO-1(h) Preconstruction Surveys for Nesting Birds.** The implementing agencies shall, or can and should, implement the following measures during CEQA review of projects implementing the proposed 2022 RTP/SCS. For construction activities occurring during the nesting season (generally February 1 to September 15), surveys for nesting birds covered by the CFGC, the MBTA, and Bald and Golden Eagle Protection Act shall be conducted by a qualified biologist no more than 10 days prior to vegetation removal activities. A qualified biologist shall conduct preconstruction surveys for raptors. The survey for the presence of bald and golden eagles shall cover all areas within of the disturbance footprint plus a one-mile buffer where access can be secured. The survey area for all other nesting bird and raptor species shall include the disturbance footprint plus a 300-foot and 500-foot buffer, respectively. If active nests (nests with eggs or chicks) are located, the qualified biologist shall establish an appropriate avoidance buffer based on the species biology and the current and anticipated disturbance levels occurring in vicinity of the nest. All buffers shall be marked using high visibility flagging or fencing, and, unless approved by the qualified biologist, no construction activities shall be allowed within the buffers until the qualified biologist has verified that young have fledged from the nest, or the nest fails.	

Impact	Mitigation Measure(s)	Impact
	For bald or golden eagle nests identified during the preconstruction surveys, an avoidance buffer of up to one mile shall be established on a case-by-case basis in consultation with the USFWS and CDFW. The size of the buffer may be influenced by the existing conditions and disturbance regime, relevant landscape characteristics, and the nature, timing, and duration of the expected disturbance. The buffer shall be established between February 1 and September 15; however, buffers may be relaxed earlier than September 15 if a qualified ornithologist determines that a given nest has failed or that all surviving chicks have fledged, and the nest is no longer in use. A report of these preconstruction nesting bird surveys and nest monitoring (if applicable) shall be submitted to the implementing agency for review and approval prior to the start of construction. **BIO-1(i) Worker Environmental Awareness Program (WEAP).** The implementing agencies shall, or can and should, implement the following measures during CEQA review of projects implementing the proposed 2022 RTP/SCS. Prior to initiation of construction activities (including staging and mobilization), all personnel associated with project construction shall attend WEAP training, conducted by a qualified biologist retained by the implementing agency, to aid workers in recognizing special-status resources and review of the limits of construction and mitigation measures required. A fact sheet conveying this information shall also be prepared for distribution to all contractors, their employers, and other personnel involved with construction of the project. All employees shall sign a form documenting that they have attended the WEAP and understand the information presented to them.	
Impact BIO-2. Implementation of transportation projects and the land use scenario envisioned by the proposed 2022 RTP/SCS would result in substantial adverse impacts on sensitive habitats, including sensitive natural communities, and state and federally protected wetlands. This impact would be significant and unavoidable.	**BIO-2(a) Aquatic Resources Jurisdictional Delineation and Impact Avoidance.** The implementing agencies shall, or can and should, implement the following measures during CEQA review of projects implementing the proposed 2022 RTP/SCS. If the results of measure BIO-1(a) indicates projects implemented under the proposed 2022 RTP/SCS occur within or adjacent to wetland, drainages, riparian habitats, or other areas that may fall under the jurisdiction of the CDFW, USACE, and/or RWQCB, a qualified biologist shall complete an aquatic resources delineation in accordance with the requirement set forth by each agency. The result shall be submitted to the implementing agency, USACE, RWQCB, and/or CDFW, as appropriate, for review and approval, and the project shall be designed to avoid and minimize impacts to jurisdictional areas to the extent feasible. The delineation shall serve as the basis to identify potentially jurisdictional areas to be protected during construction, through implementation of the avoidance and minimization identified in measure BIO-2(f). **BIO-2(b) Wetland, Drainages, and Riparian Habitat Restoration**. The implementing agencies shall, or can and should, implement the following measures during CEQA review of projects implementing the proposed 2022 RTP/SCS. Unavoidable impacts to jurisdictional wetlands, drainages, and riparian habitat shall be mitigated at an appropriate ratio to fully offset project impacts, as determined by a qualified biologist retained by the implementing agency and shall occur on-site or as close to the impacted habitat as possible. A mitigation and monitoring plan consistent with regulatory agency requirements shall be developed by a qualified biologist and submittal to the regulatory agency overseeing the project for approval. Alternatively, mitigation shall be accomplished through purchase of credits from an approved wetlands mitigation bank. **BIO-2(c) Landscaping Plan.** If landscaping is proposed for a specific project, a qualified biologist/landscape architect retained by the implementing agency shall prepare a landscape plan. Drought tolerant, locally native plant species shall be used. Noxious, invasive and/or non-native plant species that are recognized on the Federal Noxious Weed List,	Significant and Unavoidable

Impact	Mitigation Measure(s)	Impact
	California Noxious Weeds List and/or California Invasive Plant Council Inventory shall not be permitted. Species selected for planting shall be regionally appropriate native species that are known to occur in the adjacent native habitat types. **BIO-2(d) Sensitive Natural Community Avoidance and Mitigation.** If the results of measure BIO-1(a) indicates projects implemented under the proposed 2022 RTP/SCS would impact sensitive natural communities, the implementing agency shall avoid impacts to sensitive natural communities through final project design modifications if feasible. If the implementing agency determines that sensitive natural communities cannot be avoided, impacts shall be mitigated on-site or offsite at an appropriate ratio to fully offset project impacts, as determined by a qualified biologist based on any applicable resource agency guidelines. Temporarily impacted areas shall be restored to pre-project conditions. A Restoration Plan shall be developed by a qualified biologist and submitted to the implementing agency. **BIO-2(e) Invasive Weed Prevention and Management Program.** Prior to start of construction for each project that occurs within or adjacent to native habitats, an Invasive Weed Prevention and Management Program shall be developed by a qualified biologist retained by the implementing agency to prevent invasion of native habitat by non-native plant species. The plan shall be submitted to the implementing agency for review and approval. A list of target species shall be included, along with measures for early detection and eradication. The plan, which shall be implemented by the implementing agency, shall also include, but not be limited to, the following measures to prevent the introduction of invasive weed species: ▪ During construction, limit the use of imported soils for fill. If the use of imported fill material is necessary, the imported material must be obtained from a source that is known to be free of invasive plant species. ▪ To minimize colonization of disturbed areas and the spread of invasive species, the contractor shall stockpile topsoil and redeposit the stockpiled soil after construction or transport the topsoil to a permitted landfill for disposal. ▪ All erosion control materials, including straw bales, straw wattles, or mulch used on-site must be free of invasive species seed. ▪ Exotic and invasive plant species shall be excluded from any erosion control seed mixes and/or landscaping plant palettes associated with the proposed project. ▪ All disturbed areas shall be hydroseeded with a mix of locally native species upon completion of work in those areas. **BIO-2(f) Wetlands, Drainages, and Riparian Habitat Best Management Practices During Construction**. The following best management practices shall be required by the implementing agency for development within or adjacent to wetlands, drainages, or riparian habitat: ▪ Access routes, staging and construction areas shall be limited to the minimum area necessary to achieve the project goal and minimize impacts to other waters including locating access routes and ancillary construction areas outside of jurisdictional areas.	

Impact	Mitigation Measure(s)	Impact
	▪ To control sedimentation during and after project implementation, appropriate erosion control materials shall be deployed to minimize adverse effects on jurisdictional areas in the vicinity of the project. ▪ Project activities within the jurisdictional areas should occur during the dry season (typically between June 1 and November 1) in any given year, or as otherwise directed by the regulatory agencies. ▪ During construction, no litter or construction debris shall be placed within jurisdictional areas. All such debris and waste shall be picked up daily and properly disposed of at an appropriate site. ▪ Raw cement, concrete, or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances which could be hazardous to aquatic species resulting from project related activities, shall be prevented from contaminating the soil and/or entering wetlands, drainages, or riparian habitat. ▪ All refueling, maintenance and staging of equipment and vehicles shall occur at least 100 feet from bodies of water and in a location where a potential spill would not drain directly toward aquatic habitat (e.g., on a slope that drains away from the water source). Prior to the onset of work activities, a plan must be in place for prompt and effective response to any accidental spills.	
Impact BIO-3. Implementation of transportation projects and the land use scenario envisioned by the proposed 2022 RTP/SCS would 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. This impact would be Significant and Unavoidable.	**BIO-3(a) Project Design for Wildlife Connectivity.** The implementing agency shall implement the following measures. All projects including long segments of fencing and lighting shall be designed to minimize impacts to wildlife. Where fencing or other project components is required for public safety concerns, these project components shall be designed to permit wildlife movement by incorporating design features such as: ▪ A minimum 16 inches between the ground and the bottom of the fence to provide clearance for small animals; ▪ A minimum 12 inches between the top two wires, or top the fence with a wooden rail, mesh, or chain link instead of wire to prevent animals from becoming entangled; ▪ If privacy fencing is required near open space areas, openings at the bottom of the fence measure at least 16 inches in diameter shall be installed at reasonable intervals to allow wildlife movement, or the fence may be installed with the bottom at least 16 inches above the ground level; ▪ If fencing or other project components must be designed in such a manner that wildlife passage would not be permitted, wildlife crossing structures shall be incorporated into the project design as appropriate; and ▪ Lighting installed as part of any project shall be designed to be minimally disruptive to wildlife (see mitigation measure AES-3(a) Roadway Lighting for lighting requirements). **BIO-3(b) Maintain Connectivity in Drainages.** The implementing agency shall implement the following measures. Permanent structures shall be avoided to the extent feasible within any drainage or river that serves as a wildlife migration corridor that would impede wildlife movement. In addition, upon completion of construction within any drainage, areas of stream channel and banks that are temporarily impacted shall be returned to pre-construction contours and in a condition that allows for unimpeded passage through the area once the work has been complete.	Significant and Unavoidable

Impact	Mitigation Measure(s)	Impact
	If water is to be diverted around work sites, a diversion plan shall be submitted to the implementing agency for review and approval prior to issuance of project construction permits/approvals. The diversion shall be designed in a way as to not impede movement while the diversion is in place. **BIO-3 (c) Construction Best Management Practices to Minimize Disruption to Wildlife.** The following construction best management practices shall be incorporated by the implementing agency into all grading and construction plans to minimize temporary disruption of wildlife, which could hinder wildlife movement: ▪ Designation of a 20 mile per hour speed limit in all construction areas. ▪ Daily construction work schedules shall be limited to daylight hours only. ▪ Mufflers shall be used on all construction equipment and vehicles shall be in good operating condition. ▪ All trash shall be placed in sealed containers and shall be removed from the project site a minimum of once per week. ▪ No pets are permitted on project site during construction.	
Impact BIO-4. Implementation of transportation projects and the land use scenario envisioned by the proposed 2022 RTP/SCS would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. This impact would be less than significant.	None required.	Less than Significant
Impact BIO-5. Implementation of transportation projects and the land use scenario envisioned by the proposed 2022 RTP/SCS would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Impacts would be less than significant.	None required.	Less than Significant

Impact	Mitigation Measure(s)	Impact
Cultural Resources		
Impact CR-1. Transportation improvement projects and the land use scenario envisioned by the proposed 2022 RTP/SCS would cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5. This impact would be significant and unavoidable.	**CR-1 Built Environment Historical Resources.** Prior to individual project permit issuance, the implementing agency of a 2022 RTP/SCS project involving earth disturbance or construction of permanent above ground structures or roadways shall prepare a map defining the project area. This map shall indicate the areas of primary and secondary disturbance associated with construction and operation of the facility and will help in determining whether known and potential historical resources are located within the project area. If a structure greater than 45 years in age is within the identified impact zone, a survey and evaluation of the structure(s) to determine their eligibility for recognition under State, federal, or local historic preservation criteria shall be conducted. The evaluation shall be prepared by an architectural historian or historical architect meeting the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation, Professional Qualification Standards (PQS) as defined in 36 CFR Part 61. All buildings and structures 45 years of age or older within the project area shall be evaluated in their historic context and documented in a report meeting the State Office of Historic Preservation guidelines. All evaluated properties shall be documented on Department of Parks and Recreation Series 523 Forms. The report shall be submitted to the implementing agency for review and concurrence. If historical resources are identified within the project area of a proposed project, efforts shall be made to the extent feasible to ensure that impacts are mitigated. Application of mitigation shall generally be overseen by a qualified architectural historian or historic architect meeting the PQS, unless unnecessary in the circumstances (e.g., preservation in place). In conjunction with any development application that may affect the historical resource, a report identifying and specifying the treatment of character-defining features and construction activities shall be provided to the implementing agency for review. To the greatest extent possible the relocation, rehabilitation, or alteration of the resource shall be consistent with the *Secretary of the Interior's Standards for the Treatments of Historic Properties* (Standards). In accordance with CEQA, a project that has been determined to conform with the Standards generally would not cause a significant adverse direct or indirect impact to historical resources (14 CCR § 15126.4(b)(1)). Application of the Standards shall be overseen by a qualified architectural historian or historic architect meeting the PQS. In conjunction with any development application that may affect the historical resource, a report identifying and specifying the treatment of character-defining features and construction activities shall be provided to the implementing agency for review and concurrence. If significant historical resources are identified on a development site and compliance with the Standards and or avoidance is not possible, appropriate site-specific mitigation measures shall be established and undertaken. Mitigation measures may include documentation of the historical resource in the form of a Historic American Building Survey-Like report. The report shall comply with the Secretary of the Interior's Standards for Architectural and Engineering Documentation and shall generally follow the HABS Level III requirements, including digital photographic recordation, detailed historic narrative report, and compilation of historic research. The documentation shall be completed by a qualified architectural historian or historian who meets the PQS and submitted to the implementing agency prior to issuance of any permits for demolition or alteration of the historical resource.	Significant and Unavoidable

Impact	Mitigation Measure(s)	Impact
Impact CR-2. Construction activity associated with transportation improvement projects and the land use scenario envisioned by the proposed 2022 RTP/SCS may cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5. Potential impacts to archaeological resources would be significant and unavoidable.	**CR-2(a) Archaeological Resources Impact Minimization.** Before construction activities, implementing agencies shall, or can and should, retain a qualified archaeologist to conduct a record search at the Northwest Information Center to determine whether the project area has been previously surveyed and whether resources were identified. When recommended by the Information Center, implementing agencies shall, or can and should, retain a qualified archaeologist to conduct archaeological surveys before construction activities. Implementing agencies shall, or can and should, follow recommendations identified in the survey, which may include, but would not be limited to subsurface testing, designing and implementing a Worker Environmental Awareness Program (WEAP), construction monitoring by a qualified archaeologist, avoidance of sites and preservation in place, and/or data recovery if avoidance is not feasible. Recommended mitigation measures shall be consistent with *State CEQA Guidelines* Section 15126.4(b)(3) recommendations and may include but not be limited to preservation in place and/or data recovery. All cultural resources work shall follow accepted professional standards in recording any find including submittal of standard DPR Primary Record forms (Form DPR 523) and location information to the appropriate California Historical Resources Information System office for the project area. **CR-2(b) Unanticipated Discoveries During Construction.** During construction activities, implementing agencies shall, or can and should, implement the following measures. If evidence of any prehistoric or historic-era subsurface archaeological features, deposits or tribal cultural resources are discovered during construction-related earthmoving activities (e.g., ceramic shard, trash scatters, lithic scatters), all ground-disturbing activity proximate to the discovery shall be halted until a qualified archaeologist (36 CFR Section 61) can assess the significance of the find. If the find is a prehistoric archaeological site, the appropriate Native American group shall be notified. If the archaeologist determines that the find does not meet the CRHR standards of significance for cultural resources, construction may proceed. If the archaeologist determines that further information is needed to evaluate significance, a testing plan shall be prepared and implemented. If the find is determined to be significant by the qualified archaeologist (i.e., because the find is determined to constitute either an historical resource or a unique archaeological resource), the archaeologist shall work with the implementing agency to avoid disturbance to the resources, and if complete avoidance is not feasible in light of project design, economics, logistics and other factors, shall recommend additional measures such as the preparation and implementation of a data recovery plan. All cultural resources work shall follow accepted professional standards in recording any find including submittal of standard DPR Primary Record forms (Form DPR 523) and location information to the appropriate California Historical Resources Information System office for the project area. If the find is a prehistoric archaeological site, the culturally affiliated California Native American tribe shall be notified and afforded the opportunity to monitor mitigative treatment. During evaluation or mitigative treatment, ground disturbance and construction work could continue in other parts of the project area that are distant enough from the find not to impact it, as determined by the qualified archaeologist.	Significant and Unavoidable
Impact CR-3. Construction activity associated with transportation improvement projects and the land use scenario envisioned by the 2022 RTP/SCS could result in	None required.	Less than Significant

Impact	Mitigation Measure(s)	Impact
disturbances to human remains including those interred outside of formal cemeteries. Potential impacts to human remains would be less than significant.		
Energy		
Impact E-1. Future transportation improvement projects and implementation of the land use scenario envisioned by the proposed 2022 RTP/SCS would not result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources. This impact would be less than significant.	None required.	Less than Significant
Impact E-2. The proposed 2022 RTP/SCS would not increase reliance on fossil fuels or decrease reliance on renewable energy sources. This impact would be less than significant.	None required.	Less than Significant
Impact E-3. The proposed 2022 RTP/SCS would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. This impact would be less than significant.	None required.	Less than Significant

Impact	Mitigation Measure(s)	Impact
Geology and Soils and Mineral Resources		
Impact GEO-1. The transportation improvements and land use projects envisioned by the proposed 2022 RTP/SCS would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides. Impacts would be less than significant.	None required.	Less than Significant
Impact GEO-2. The proposed transportation improvements and land use projects envisioned by the proposed 2022 RTP/SCS would not result in substantial soil erosion or the loss of topsoil. Impacts would be less than significant.	None required.	Less than Significant
Impact GEO-3. Implementation of transportation improvements and future projects included in the land use scenario envisioned in the proposed 2022 RTP/SCS could be located on potentially unstable soils, in areas of lateral spreading, subsidence, or high liquefaction potential, or areas	None required.	Less than Significant

Impact	Mitigation Measure(s)	Impact
of expansive soil. Impacts would be Less than significant.		
Impact GEO-4. The transportation improvements and land use projects envisioned by the proposed 2022 RTP/SCS in rural areas may have soils incapable of adequately supporting septic tanks or alternative wastewater disposal systems. Impacts would be less than significant.	None required.	Less than Significant
Impact GEO-5. Implementation of proposed transportation improvements and the land use scenario envisioned by the proposed 2022 RTP/SCS would directly or indirectly destroy a unique paleontological resource or site or unique geological feature. Impacts would be significant and unavoidable.	**GEO-5 Paleontological Resources Mitigation and Monitoring Program.** The implementing agency of a proposed 2022 RTP/SCS project involving ground disturbing activities (including grading, trenching, foundation work and other excavations) shall, or can and should, retain a qualified paleontologist, defined as a paleontologist who meets the Society of Vertebrate Paleontology (SVP) standards for Qualified Professional Paleontologist (SVP 2010), to conduct a Paleontological Resources Assessment (PRA). The PRA shall determine the age and paleontological sensitivity of geologic formations underlying the proposed disturbance area, consistent with SVP Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources (SVP 2010) guidelines for categorizing paleontological sensitivity of geologic units within a project area. If underlying formations are found to have a high potential (sensitivity) for paleontological resources and/or could be considered a unique geologic feature, the following measures shall apply: ▪ **Avoidance.** Avoid routes and project designs that would permanently alter unique paleontological and unique geological features. If avoidance practices cannot be implemented, the following measures shall apply. ▪ **Retention of a Qualified Paleontologist.** A Qualified Paleontologist shall be retained to create a Paleontological Resources Monitoring and Mitigation Program (PRMMP) to direct all mitigation measures related to paleontological resources. The Qualified Paleontologist shall meet the qualifications for a Qualified Professional Paleontologist, which is defined by the SVP as an individual, preferably with an M.S. or Ph.D. in paleontology or geology, who is experienced with paleontological procedures and techniques, who is knowledgeable in the geology of California, and who has worked as a paleontological mitigation project supervisor for a least two years (SVP 2010). ▪ **Paleontological Worker Environmental Awareness Program (WEAP).** Prior to the start of ground disturbance activity, construction personnel shall be informed on the appearance of fossils and the procedures for notifying paleontological staff should fossils be discovered by construction staff. ▪ **Paleontological Monitoring.** Paleontological monitoring shall be conducted by a qualified paleontological monitor, who is defined as an individual who has experience with collection and salvage of paleontological resources and	Significant and Unavoidable

Impact	Mitigation Measure(s)	Impact
	meets the minimum standards of the SVP (2010) for a Paleontological Resources Monitor. The duration and timing of the monitoring will be determined by the Qualified Paleontologist based on the observation of the geologic setting from initial ground disturbance. If the Qualified Paleontologist determines that full-time monitoring is no longer warranted, based on the specific geologic conditions once the full depth of excavations has been reached, they may recommend that monitoring be reduced to periodic spot-checking or ceased entirely. Monitoring shall be reinstated if any new ground disturbances are required, and reduction or suspension shall be reconsidered by the Qualified Paleontologist at that time. In the event of a fossil discovery by the paleontological monitor or construction personnel, all work in the immediate vicinity of the find shall cease. A Qualified Paleontologist shall evaluate the find before restarting construction activity in the area. If it is determined that the fossil(s) is (are) scientifically significant, the Qualified Paleontologist shall complete the following measures to mitigate impacts to significant fossil resources: ▫ **Fossil Salvage**. If significant fossils are discovered, the implementing agency shall be notified immediately, and the qualified paleontologist (or paleontological monitor) shall recover them. Typically, fossils can be safely salvaged quickly by a single paleontologist and not disrupt construction activity. In some cases, larger fossils (such as complete skeletons or large mammal fossils) require more extensive excavation and longer salvage periods. In this case, the paleontologist shall have the authority to temporarily direct, divert or halt construction activity to ensure that the fossil(s) can be removed in a safe and timely manner. ▫ **Preparation and Curation of Recovered Fossils**. Once salvaged, fossils shall be identified to the lowest possible taxonomic level, prepared to a curation-ready condition, and curated in a scientific institution with a permanent paleontological collection, such as the Natural History Museum of Los Angeles County, along with all pertinent field notes, photos, data, and maps. ▪ **Final Paleontological Resources Mitigation and Monitoring Report**. Upon completion of ground disturbing activity (and curation of fossils, if necessary) the Qualified Paleontologist shall prepare a final mitigation and monitoring report outlining the results of the PRMMP. The report shall include discussion of the location, duration and methods of the monitoring, stratigraphic sections, any recovered fossils, and the scientific significance of those fossils, and where fossils were curated. The report shall be submitted to the implementing agency. If the monitoring efforts recovered fossils, then a copy of the report shall also be submitted to the designated museum repository, such as the Natural History Museum of Los Angeles County.	
Impact GEO-6. Implementation of transportation improvements and future projects included in the land use scenario envisioned in the proposed 2022 RTP/SCS would not result in the loss of availability of known mineral resources of value or locally important	None required.	Less than Significant

Impact	Mitigation Measure(s)	Impact
resource recovery sites. This impact would be less than significant.		
Greenhouse Gas Emissions and Climate Change		
Impact GHG-1. Construction of the transportation improvements and land use projects envisioned by the proposed 2022 RTP/SCS would generate GHG emissions that may have a significant impact on the environment. Impacts would be significant and unavoidable.	**GHG-1 Construction GHG Reduction Measures.** The project sponsor shall incorporate the most recent GHG emission reduction measures for off-road construction vehicles during construction. The measures shall be noted on all construction plans, and the implementing agency shall perform periodic site inspections. Current GHG-reducing measures include the following: ▪ Use of diesel construction equipment meeting CARB's Tier 4 certified engines wherever feasible for off-road heavy-duty diesel engines and comply with the State Off-Road Regulation. Where the use of Tier 4 engines is not feasible, Tier 3 certified engines shall be used; where the use of Tier 3 engines are not feasible, Tier 2 certified engines shall be used; ▪ Use of on-road heavy-duty trucks that meet CARB's 2007 or cleaner certification standard for on-road heavy-duty diesel engines, and comply with the State On-Road Regulation; ▪ Minimizing idling time (e.g., five-minute maximum). Signs shall be posted in the designated queuing areas and or job sites to remind drivers and operators of the five-minute idling limit; ▪ Use of electric-powered equipment in place of diesel-powered equipment when feasible; ▪ Use of alternatively fueled or catalyst-equipped diesel construction equipment when feasible, to the extent electric powered equipment is not feasible; ▪ Substitute gasoline-powered in place of diesel-powered equipment, when neither electric-powered equipment or alternatively fueled or catalyst-equipped diesel equipment is feasible; and ▪ Project proponents shall incentivize that construction workers carpool, and/or use electric vehicles to commute to and from the project site.	Significant and Unavoidable
Impact GHG-2. Proposed transportation improvements and land use projects envisioned by the proposed 2022 RTP/SCS would result in a net increase in GHG emissions by 2046 compared to the existing baseline conditions and would therefore have a significant impact on the environment. Impacts would be significant and unavoidable.	**GHG-2 Land Use Project Energy Consumption and Water Use Reduction Measures.** For land use projects under their jurisdiction, cities and the County can and should implement measures to reduce energy consumption, water use, solid waste generation, and VMT, all of which contribute to GHG emissions. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions. These measures include, but are not limited to: ▪ Require new residential and commercial construction to install solar energy systems or be solar-ready ▪ Require new residential and commercial development to install low flow water fixtures ▪ Require new residential and commercial development to install water-efficient drought-tolerant landscaping, including the use of compost and mulch ▪ Require new development to exceed the applicable Title 24 energy-efficiency requirements ▪ Require new development to be fully electric	Significant and unavoidable

Impact	Mitigation Measure(s)	Impact
	▪ Require new residential and commercial development to offer information on recycling, composting, and disposal of household hazardous waste and e-waste ▪ Require new development to implement circulation design elements in parking lots for no-residential uses to reduce vehicle queuing and improve the pedestrian environment	
Impact GHG-3. The transportation improvements and land use projects envisioned by the proposed 2022 RTP/SCS would not conflict with regional SB 375 per capita passenger vehicle CO_2 emission reduction targets of 16 percent by 2035 from 2005 levels. Impacts would be less than significant.	None required.	Less than Significant
Impact GHG-4. Implementation of the proposed 2022 RTP/SCS would conflict with the State's ability to achieve SB 32, EOs S-3-05 and B-55-18, and applicable local GHG reduction plan targets and goals. Impacts would be significant and unavoidable.	**GHG-4(a) Transportation-Related GHG Reduction Measures**. The implementing agency shall incorporate the most recent GHG emission reduction measures and/or technologies for reducing VMT and associated transportation related GHG emissions. Current GHG-reducing measures include the following: ▪ Installation of electric vehicle charging stations beyond those required by State and local codes ▪ Utilization of electric vehicles and/or alternatively fueled vehicles in company fleet ▪ Provision of dedicated parking for carpools, vanpool, and clean air vehicles ▪ Provision of vanpool and/or shuttle service for employees ▪ Implementation of reduced parking minimum requirements ▪ Implementation of maximum parking limits ▪ Provision of bicycle parking facilities beyond those required by State and local codes ▪ Provision of a bicycle-share program ▪ Expansion of bicycle routes/lanes along the project site frontage ▪ Provision of new or improved transit amenities (e.g., covered turnouts, bicycle racks, covered benches, signage, lighting) if project site is located along an existing transit route ▪ Expansion of existing transit routes ▪ Provision of transit subsidies ▪ Expansion of sidewalk infrastructure along the project site frontage ▪ Provision of safe, pedestrian-friendly, and interconnected sidewalks and streetscapes ▪ Provision of employee lockers and showers	Significant and Unavoidable

Impact	Mitigation Measure(s)	Impact
	▪ Provision of on-site services that reduce the need for off-site travel (e.g., childcare facilities, automatic teller machines, postal machines, food services) ▪ Provision of alternative work schedule options, such as telework or reduced schedule (e.g., 9/80 or 10/40 schedules), for employees ▪ Implementation of transportation demand management programs to educate and incentivize residents and/or employees to use transit, smart commute, and alternative transportation options	
Hazards and Hazardous Materials		
Impact HAZ-1. transportation improvement projects and the land use scenario envisioned by the proposed 2022 RTP/SCS may facilitate the routine transport, use, or disposal of hazardous material, and may result in reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Impacts would be less than significant.	None required.	Less than Significant
Impact HAZ-2. Transportation improvement projects and land use projects envisioned in the proposed 2022 RTP/SCS would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school. Impacts would be less than significant.	None required.	Less than Significant
Impact HAZ-3. The proposed 2022 RTP/SCS includes transportation improvement projects and land use scenario projects that could be located on sites on the list of	**HAZ-3 Site Remediation.** If an individual project included in the proposed 2022 RTP/SCS is located on or near a hazardous materials and/or waste site compiled by Government Code Section 65962.5, the implementing agency shall prepare a Phase I ESA in accordance with the American Society for Testing and Materials' E-1527-05 standard. For work requiring any demolition or renovation, the Phase I ESA shall make recommendations for any hazardous building materials survey work that shall be done. All recommendations included in a Phase I ESA prepared for a site shall be implemented. If a Phase I ESA indicates the presence or likely presence of contamination, the implementing agency	Significant and Unavoidable

Impact	Mitigation Measure(s)	Impact
hazardous material sites compiled by Government Code Section 65962.5, and therefore create a significant hazard to the public or environment. This impact would be significant and unavoidable.	shall require a Phase II ESA, and recommendations of the Phase II ESA shall be fully implemented. Examples of typical recommendations provided in Phase I/II ESAs include removal of contaminated soil in accordance with a soil management plan approved by the local environmental health department; covering stockpiles of contaminated soil to prevent fugitive dust emissions; capturing groundwater encountered during construction in a holding tank for additional testing and characterization and disposal based on its characterization; and development of a health and safety plan for construction workers.	
Impact HAZ-4. Transportation improvement projects and the land use scenario envisioned in the proposed 2022 RTP/SCS located within an airport land use plan or within two miles of a public or public use airport would not result in a safety hazard for people residing or working in the project area. Impacts would be less than significant.	None required.	Less than Significant
Hydrology and Water Quality		
Impact HYD-1. Implementation of proposed transportation projects and future projects included in the land use scenario envisioned in the proposed 2022 RTP/SCS would not violate water quality standards or waste discharge requirements, or otherwise substantially degrade surface or ground water quality. Impacts would be less than significant.	None required.	Less than Significant
Impact HYD-2. Transportation and land use projects implementing the proposed 2022 RTP/SCS would	**HYD-2(a) Construction Dust Suppression Water Supply**. For all proposed 2022 RTP/SCS projects, where feasible, reclaimed and/or recycled water shall be used for dust suppression during construction activities. This includes use of such reclaimed water in water trucks utilized for project construction occurring outside developed areas and away	Significant and Unavoidable

Impact	Mitigation Measure(s)	Impact
substantially decrease groundwater supplies and interfere with groundwater recharge such that it may impede sustainable groundwater management of the basin. Impacts would be significant and unavoidable.	from water infrastructure which would otherwise provide such reclaimed water. This measure shall be noted on construction plans and shall be spot checked by the local jurisdiction. **HYD-2(b) Landscape Watering.** In jurisdictions that do not already have an appropriate local regulatory program related to landscape watering, proposed 2022 RTP/SCS projects that include landscaping shall be designed with drought tolerant plants and drip irrigation. When feasible, native plant species shall be used. In addition, landscaping associated with proposed improvements shall be maintained using reclaimed water when feasible. If reclaimed water could feasibly be utilized for project landscape watering due to proximity of reclaimed water sources but is unavailable due to lack of connecting infrastructure, local agencies or transportation sponsors shall conduct an analysis of the upgrades needed to provide such infrastructure, which will include the potential for new connections to existing reclaimed water systems to provide reclaimed water to other nearby sources besides the proposed project in the analysis, and shall perform such steps as necessary to utilize available reclaimed water if feasible.	
Impact HYD-3. Transportation and future land use projects implementing the proposed 2022 RTP/SCS would not substantially alter the existing drainage pattern of a site or area through alteration of the course of a stream or river or through the addition of impervious surfaces in a manner where drainage changes would result in flooding on- or off-site, redirect or impede flood flows, exceed the capacity of stormwater systems, or provide additional polluted runoff. Impacts would be less than significant.	None required.	Less than Significant
Impact HYD-4. transportation and land use projects implementing the proposed 2022 RTP/SCS would not risk release of pollutants due to project inundation in flood hazard, tsunami, or seiche	None required.	Less than significant

Impact	Mitigation Measure(s)	Impact
zones. Impacts would be less than significant.		
Impact HYD-5. Transportation and land use projects implementing the proposed 2022 RTP/SCS could conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plans. Impacts would be significant and unavoidable.	**HYD-2(a) Construction Dust Suppression Water Supply**. For all proposed 2022 RTP/SCS projects, where feasible, reclaimed and/or recycled water shall be used for dust suppression during construction activities. This includes use of such reclaimed water in water trucks utilized for project construction occurring outside developed areas and away from water infrastructure which would otherwise provide such reclaimed water. This measure shall be noted on construction plans and shall be spot checked by the local jurisdiction. **HYD-2(b) Landscape Watering.** In jurisdictions that do not already have an appropriate local regulatory program related to landscape watering, proposed 2022 RTP/SCS projects that include landscaping shall be designed with drought tolerant plants and drip irrigation. When feasible, native plant species shall be used. In addition, landscaping associated with proposed improvements shall be maintained using reclaimed water when feasible. If reclaimed water could feasibly be utilized for project landscape watering due to proximity of reclaimed water sources but is unavailable due to lack of connecting infrastructure, local agencies or transportation sponsors shall conduct an analysis of the upgrades needed to provide such infrastructure, which will include the potential for new connections to existing reclaimed water systems to provide reclaimed water to other nearby sources besides the proposed project in the analysis, and shall perform such steps as necessary to utilize available reclaimed water if feasible.	Significant and Unavoidable
Land Use & Planning		
Impact LU-1. Implementation of proposed transportation improvements and the land use scenario envisioned by the proposed 2022 RTP/SCS would not physically divide an established community. This impact would be less than significant.	None required.	Less than Significant
Impact LU-2. The proposed 2022 RTP/SCS project implementation would not cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation (including, but not limited to, the General Plan or Zoning Ordinance) and result in a physical change to the environment not already	Mitigation measures are provided for applicable resources throughout their respective environmental issue area sections of the EIR to reduce impacts.	Less than Significant

<table>
<tr><th>Impact</th><th>Mitigation Measure(s)</th><th>Impact</th></tr>
<tr><td>addressed in the other resource chapters of this EIR. This impact would be less than significant.</td><td></td><td></td></tr>
<tr><td colspan="3">Noise</td></tr>
<tr><td>Impact N-1 Construction activity associated with transportation improvements and land use projects envisioned by the proposed 2022 RTP/SCS would generate a substantial temporary increase in ambient noise levels in excess of standards established in local general plans or noise ordinances and would generate a substantial absolute noise increase over existing noise levels. This impact would be significant and unavoidable.</td><td>N-1 Construction Noise Reduction. To reduce construction noise levels to achieve applicable standards, implementing agencies for transportation and land use projects shall implement the measures identified below where feasible and necessary.
a. Compliance with local Construction Noise Regulations. Implementing agencies shall ensure that, where residences or other noise sensitive uses are located within 800 feet of construction sites without pile driving, appropriate measures shall be implemented to ensure consistency with local noise ordinance requirements relating to construction. Specific techniques may include, but are not limited to, restrictions on construction timing, use of sound blankets on construction equipment, and the use of temporary walls and noise barriers to block and deflect noise.
b. Noise Complaint and Enforcement Manager. Designate an on-site construction complaint and enforcement manager for projects within 800 feet of sensitive receivers. Implementing agencies shall post phone numbers for the on-site enforcement manager at construction sites along with complaint procedures and who to notify in the event of a problem.
c. Pile Driving. For any project within 3,200 feet of sensitive receptors that requires pilings, the implementing agency shall require caisson drilling or sonic pile driving as opposed to pile driving, where feasible. This shall be accomplished through the placement of conditions on the project during its individual environmental review.
d. Construction Equipment Noise Control. Implementing agencies shall ensure that equipment and trucks used for project construction utilize the best available noise control techniques (including mufflers, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds).
e. Impact Equipment Noise Control. Implementing agencies shall ensure that impact equipment (e.g., jack hammers, pavement breakers, and rock drills) used for project construction be hydraulically or electrically powered wherever feasible to avoid noise associated with compressed air exhaust from pneumatically powered tools. Where use of pneumatically powered tools is unavoidable, use of an exhaust muffler on the compressed air exhaust can lower noise levels from the exhaust by up to about 10 dBA. When feasible, external jackets on the impact equipment can achieve a reduction of 5 dBA. Whenever feasible, use quieter procedures, such as drilling rather than impact equipment operation.
f. Construction Activity Timing Restrictions. The following timing restrictions shall apply to proposed 2022 RTP/SCS activates creating noise levels at or above 65 dBA at a nearby dwelling unit, except where timing restrictions are already established in local codes or policies. Construction activities shall be limited to:
▪ Monday through Friday: 7 a.m. to 6 p.m.
▪ Saturday: 9 a.m. to 5 p.m.</td><td>Significant and Unavoidable</td></tr>
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Impact	Mitigation Measure(s)	Impact
	g. Placement of Stationary Noise Sources. Locate stationary noise sources as far from noise-sensitive receptors as possible. Stationary noise sources that must be located near existing receptors will be equipped with the best available mufflers.	
Impact N-2. Transportation improvements envisioned by the proposed 2022 RTP/SCS would generate a substantial permanent increase in ambient noise levels in excess of standards or over existing noise levels and generate a substantial absolute noise increase over existing noise levels. This impact would be significant and unavoidable.	**N-2 Noise Assessment and Control for Mobile and Point Source Reduction.** Implementing agencies for 2022 RTP/SCS projects shall complete detailed noise assessments using applicable guidelines (e.g., Caltrans Traffic Noise Analysis Protocol) for roadway projects that may impact noise sensitive receptors. The implementing agency shall ensure that a noise survey is conducted that, at minimum: ▪ Determines existing and projected noise levels ▪ Determines the amount of attenuation needed to reduce potential noise impacts to applicable State and local standards ▪ Identifies potential alternate alignments that allow greater distance from, or greater buffering of, noise-sensitive areas ▪ If warranted, recommends methods for mitigating noise impacts, including: ▪ Appropriate setbacks ▪ Sound attenuating building design, including retrofit of existing structures with sound attenuating building materials ▪ Use of sound barriers (earthen berms, sound walls, or some combination of the two) ▪ Locate transit-related passenger stations, central maintenance facilities, decentralized maintenance facilities, and electric substations away from sensitive receptors to the maximum extent feasible. Where new or expanded roadway projects are found to expose receptors to noise exceeding normally acceptable levels, the individual project lead agency shall implement techniques as recommended in the project-specific noise assessments. The preferred methods for mitigating noise impacts shall include the use of appropriate setbacks and sound attenuating building design, including retrofit of existing structures with sound attenuating building materials where feasible. In instances where use of these techniques is not feasible, the use of sound barriers (earthen berms, sound walls, or some combination of the two) shall be considered. Whenever possible, a combination of elements shall be used, including open grade paving, solid fences, walls, and landscaped berms. Other techniques such as rubberized asphalt or "quiet pavement" shall be used where feasible to reduce road noise for new roadway segments or modifications requiring repaving. The effectiveness of noise reduction measures shall be monitored by taking noise measurements and installing adaptive mitigation measures to achieve applicable standards.	Significant and Unavoidable
Impact N-3. Construction activities associated with transportation projects under the proposed 2022 RTP/SCS would generate excessive groundborne vibration levels. New truck, bus, and train	**N-3(a) Vibration Mitigation for Construction of Transportation Projects.** Where local vibration and groundborne noise standards do not apply, implementing agencies of proposed 2022 RTP/SCS projects utilizing heavy construction equipment shall estimate vibration levels generated by construction activities and use the Caltrans vibration damage potential threshold criteria to screen for and screen out projects as to their potential to damage buildings on site or near a project. **Caltrans Vibration Damage Potential Threshold Criteria**	Significant and Unavoidable

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<tr><th>Impact</th><th>Mitigation Measure(s)</th><th>Impact</th></tr>
<tr>
<td>traffic resulting from the proposed 2022 RTP/SCS would generate excessive vibration levels. These impacts would be significant and unavoidable.</td>
<td>
<table>
<tr><th></th><th colspan="2">Maximum PPV (in/sec)</th></tr>
<tr><th>Structure and Condition</th><th>Transient Sources</th><th>Continuous/
Frequent Intermittent Sources</th></tr>
<tr><td>Extremely fragile historic buildings</td><td>0.12</td><td>0.08</td></tr>
<tr><td>Fragile buildings</td><td>0.20</td><td>0.10</td></tr>
<tr><td>Historic and some old buildings</td><td>0.50</td><td>0.25</td></tr>
<tr><td>Older Residential structures</td><td>0.50</td><td>0.30</td></tr>
<tr><td>New residential structures</td><td>1.00</td><td>0.50</td></tr>
<tr><td>Modern industrial structures</td><td>2.00</td><td>0.50</td></tr>
<tr><td colspan="3">Source: Transportation and Construction Vibration Guidance Manual (2020b)</td></tr>
</table>
If construction equipment would generate vibration levels exceeding acceptable levels as established by Caltrans, implementing agencies of the proposed 2022 RTP/SCS shall, or can and should, complete the following tasks:

Prior to construction, survey the project site for vulnerable buildings, and complete geotechnical testing (preconstruction assessment of the existing subsurface conditions and structural integrity), for any older or historic buildings within 50 feet of pile driving. The testing shall be completed by a qualified geotechnical engineer and qualified historic preservation professional and/or structural engineer.
Prepare and submit a report to the lead agency that contains the results of the geological testing. If recommended by the preconstruction report implementing agencies shall require ground vibration monitoring of nearby historic structures. Methods and technologies shall be based on the specific conditions at the construction site. The preconstruction assessment shall include a monitoring program to detect ground settlement or lateral movement of structures in the vicinity of pile-driving activities and identify corrective measures to be taken should monitored vibration levels indicate the potential for building damage. In the event of unacceptable ground movement with the potential to cause structural damage, all impact work shall cease, and corrective measures shall be implemented to minimize the risk to the subject, or adjacent, historic structure.
To minimize disturbance withing 550 feet of pile-driving activities, implement “quiet” pile-driving technology, such as predrilling of piles and the use of more than one pile driver to shorten the duration of pile driving), where feasible, in consideration of geotechnical and structural requirements and conditions as defined as part of the geotechnical testing, if testing was feasible.
Use cushion blocks to dampen noise from pile driving.
Phase operations of construction equipment to avoid simultaneous vibration sources

N-3(b) Vibration Mitigation for Operation of Transportation Projects. Where local vibration and groundborne noise standards do not apply, implementing agencies of proposed 2022 RTP/SCS projects shall comply with all applicable local vibration and groundborne noise standards, or in the absence of such local standards, comply with guidance provided by the FTA in Transit Noise and Vibration Impact Assessment (FTA 2018) to assess impacts to buildings and
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Impact	Mitigation Measure(s)	Impact
	sensitive receptors and reduce vibration and groundborne noise. FTA recommended thresholds shall be used except in areas where local standards for groundborne noise and vibration have been established. Methods that can be implemented to reduce vibration and groundborne noise impacts include, but are not limited to: ▪ Bus and Truck Traffic ▫ Constructing of noise barriers ▫ Use noise reducing tires and wheel construction on bus wheels ▫ Use vehicle skirts (i.e., a partial enclosure around each wheel with absorptive treatment) on freight vehicle wheels	
Impact N-4. Land use projects envisioned by the proposed 2022 RTP/SCS may place sensitive receptors in areas with noise levels in excess of standards established in the local general plan or noise ordinance. This impact would be significant and unavoidable.	**N-4 Noise Mitigation for Land Uses.** If a land use project is located in an area with exterior ambient noise levels above local noise standards, the implementing agency shall ensure that a noise study is conducted to determine the existing exterior noise levels in the vicinity of the project. If the project would be impacted by ambient noise levels, feasible attenuation measures shall be used to reduce operational noise to meet acceptable standards. In addition, noise insulation techniques shall be utilized to reduce indoor noise levels to thresholds set in applicable State and/or local standards. Such measures may include but are not limited to dual-paned windows, solid core exterior doors with perimeter weather stripping, air conditioning system so that windows and doors may remain closed, and situating exterior doors away from roads. The noise study and determination of appropriate mitigation measures shall be completed during the project's individual environmental review.	Significant and Unavoidable
Impact N-5. Transportation improvements and land use projects envisioned by the proposed 2022 RTP/SCS would be located in close proximity to existing airports such that applicable exterior and interior noise thresholds would be exceeded. Impacts would be significant and unavoidable.	**N-5 Noise Mitigation Near Airports.** Implementing agencies for all new development proposed to be located within an existing airport influence zone, as defined by the locally adopted ALUCP or local general plan, or within two miles of a private use airport, shall require a site-specific noise compatibility study. The study shall consider and evaluate existing aircraft noise, based on specific aircraft activity data for the airport in question, and shall include recommendations for site design and building construction. Such measures may include but are not limited to dual-paned windows, solid core exterior doors with perimeter weather stripping, air conditioning system so that windows and doors may remain closed, and situating exterior doors away from roads, such as dual paned windows. The noise study and determination of appropriate mitigation measures shall be completed during the project's individual environmental review.	Significant and Unavoidable
Population and Housing		
Impact POP-1. Transportation and land use projects implementing the proposed 2022 RTP/SCS would not induce substantial unplanned population growth, either directly or indirectly. This	None required.	Less than Significant

Impact	Mitigation Measure(s)	Impact
impact would be less than significant.		
Impact POP-2. transportation and land use projects implementing the proposed 2022 RTP/SCS would temporarily displace existing housing and people but would not necessitate the construction of replacement housing elsewhere. Impacts would be less than significant.	None required.	Less than Significant
Public Services and Recreation		
Impact PS-1. Transportation and land use projects implementing the proposed 2022 RTP/SCS would result in new or expanded governmental facilities, the implementation of which would result in substantial physical impacts. This impact would be significant and unavoidable.	**PS-1 Increased Public Service Demand.** During the CEQA review process for individual public services facilities, the implementing agency with responsibility for construction of new public service facilities or the expansion of existing facilities, including those of fire and police services, parks, and other public facilities, can and should apply necessary mitigation measures to avoid or reduce significant environmental impacts associated with the construction or expansion of such facilities. Cities and the County can and should recognize the need for these measures in CEQA reviews of land use projects. The environmental impacts associated with such construction or expansion of public services facilities should be avoided or reduced through the imposition of conditions required to be followed by those directly involved in the construction or expansion activities. Such conditions should include those necessary to avoid or reduce significant impacts associated with air quality, noise, transportation, biological resources, cultural resources, greenhouse gas emissions, hydrology and water quality, and others that apply to specific construction or expansion of new public or expanded public service facilities.	Significant and Unavoidable
Impact PS-2. Land use projects implementing the proposed 2022 RTP/SCS would require the provision of new schools, the construction of which would result in substantial physical impacts. Impacts would be less than significant.	None required.	Less than Significant
Impact PS-3. Transportation and land use projects implementing the proposed 2022 RTP/SCS would increase the use of existing parks and	**REC-1 Impact Reduction from New Recreational Facilities.** During project specific design and CEQA review, the County and cities, and other agencies with responsibility for the construction of new or expanded recreation facilities, can and should apply necessary mitigation measures to avoid or reduce significant environmental impacts associated with the construction of such facilities. The environmental impacts associated with such construction should be avoided or reduced through the imposition of conditions required to be followed by those directly involved in the	Significant and Unavoidable

Impact	Mitigation Measure(s)	Impact
recreational facilities, resulting in substantial physical deterioration, and would include recreational facilities that would have an adverse physical effect on the environment. This impact would be significant and unavoidable.	construction or expansion activities. Such conditions should include those necessary to avoid or reduce significant impacts associated with air quality, noise, transportation, biological resources, cultural resources, greenhouse gas emissions, hydrology and water quality, and others that apply to specific construction of new or expanded recreation facilities, including recreational trails.	
Transportation		
Impact T-1. transportation projects and land use projects envisioned by the proposed 2022 RTP/SCS would not conflict with any program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities. This impact would be less than significant.	None required.	Less than Significant
Impact T-2. The proposed 2022 RTP/SCS would result in an overall increase in regional VMT above baseline (2021) conditions. The proposed 2022 RTP/SCS would result in a small decrease in VMT per capita below baseline (2021) conditions. Regional VMT and VMT per capita impacts from implementation of the proposed 2022 RTP/SCS would be significant and unavoidable. The induced travel impact at	**T-2(a) Regional VMT Reduction Programs.** Implementing agencies shall require implementation of VMT reduction strategies through TDM programs, impact fee programs, mitigation banks or exchange programs, in-lieu fee programs, and other land use project conditions that reduce VMT. Programs shall be designed to reduce VMT from existing land uses, where feasible, and from new discretionary residential or employment land use projects. The design of programs and project specific mitigation shall focus on VMT reduction strategies that increase travel choices and improve the comfort and convenience of sharing rides in private vehicles, using public transit, biking, or walking. Modifications may include but are not limited to: ▪ Provide car-sharing, vanpool, bike sharing, and ride-sharing programs ▪ Implement or provide access to commute reduction programs ▪ Provide a bus rapid transit system ▪ Improve pedestrian or bicycle networks, or transit service ▪ Provide transit passes ▪ Encourage telecommute programs ▪ Incorporate affordable housing into the project	Significant and Unavoidable

Impact	Mitigation Measure(s)	Impact
the regional level would be less than significant.	▪ Increase density ▪ Increase mixed uses within the project area ▪ Incorporate improved pedestrian connections within the project/neighborhood ▪ Incentivize development in low VMT communities ▪ Incentivize housing near commercial and offices ▪ Increase access to goods and services, such as groceries, schools, and daycare ▪ Incorporate neighborhood electric vehicle network ▪ Orient the project toward transit, bicycle, and pedestrian facilities ▪ Provide traffic calming ▪ Provide bicycle parking ▪ Limit parking ▪ Separate out parking costs ▪ Provide parking cash-out programs **T-2(b) Project Level VMT Analysis and Reduction.** Transportation project sponsor agencies shall evaluate transportation projects that involve increasing roadway capacity for their potential to increase VMT. Where project-level increases are found to be potentially significant, implementing agencies shall, or can and should, identify and implement measures that reduce VMT. Examples of measures that can reduce the VMT associated with increases in roadway capacity include tolling new lanes to encourage carpools and fund transit improvements; converting existing general-purpose lanes to high occupancy vehicle lanes; VMT banks; and implementing or funding offsite travel demand management. Implementing agencies shall evaluate VMT as part of project specific CEQA review and discretionary approval decisions for land use projects. Where project level significant impacts are identified, implementing agencies shall identify and implement measures that reduce VMT. Examples of measures that reduce VMT include infill development, mixed use and transit-oriented development, TDM strategies, complete streets, reduced parking requirements, and providing alternative transportation facilities, such as bike lanes and transit stops.	
Impact T-3. Proposed transportation and land use projects implementing the proposed 2022 RTP/SCS would not substantially increase hazards due to geometric design features or incompatible uses. This impact would be less than significant.	None required.	Less than Significant

Impact	Mitigation Measure(s)	Impact
Impact T-4. Proposed transportation and land use projects implementing the proposed 2022 RTP/SCS would not result in inadequate emergency vehicle access or interfere with an adopted emergency response plan or emergency evacuation plan. This impact would be less than significant.	None required.	Less than Significant
Tribal Cultural Resources		
Impact TCR-1. Transportation projects and the land use scenario envisioned in the proposed 2022 RTP/SCS would cause a substantial adverse change in the significance of a tribal cultural resource. This impact would be significant and unavoidable.	**TCR-1 Tribal Cultural Resources Impact Minimization.** Implementing agencies shall, or can and should, comply with AB 52, which may require formal tribal consultation. If the implementing agency determines that a project may cause a substantial adverse change to a tribal cultural resource, they shall implement mitigation measures identified in the consultation process required under PRC Section 21080.3.2, or shall implement the following measures where feasible to avoid or minimize the project-specific significant adverse impacts: ▪ Avoidance and preservation of the resources in place, including, but not limited to: designing and building the project to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space to incorporate the resources with culturally appropriate protection and management criteria. ▪ Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following: ▫ Protecting the cultural character and integrity of the resource ▫ Protecting the traditional use of the resource ▫ Protecting the confidentiality of the resource ▪ Establishment of permanent conservation easements or other culturally appropriate property management criteria for the purposes of preserving or utilizing the resources or places. ▪ Native American monitoring by the appropriate tribe during soil disturbance for all projects in areas identified as sensitive for potential tribal cultural resources and/or in the vicinity (within 100 feet) of known tribal cultural resources.	Significant and Unavoidable
Utilities and Service Systems		
Impact UTIL-1. Proposed transportation projects and future land use scenario of the proposed 2022 RTP/SCS would	**UTIL-1(a) Water and Wastewater Facilities.** During the CEQA review process for individual facilities, TCAG and transportation project sponsor agencies, and cities in the TCAG region, Tulare County, and other utility providers with responsibility for the construction of new water or wastewater treatment and collection facilities or the expansion of existing facilities shall, or can and should, apply necessary mitigation measures to reduce significant environmental	Significant and Unavoidable

Impact	Mitigation Measure(s)	Impact
require or result in the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction of which would cause significant environmental effects. This impact would be significant and unavoidable.	impacts associated with the construction or expansion of such facilities. The environmental impacts associated with such construction or expansion shall be avoided or reduced through the imposition of conditions required to be followed by those directly involved in the construction or expansion activities. Such conditions shall include those necessary to avoid or reduce impacts associated with air quality, noise, traffic, biological resources, cultural resources, greenhouse gas emissions, hydrology and water quality and others that apply to specific construction or expansion of water or wastewater treatment and collection facilities projects. **UTIL-1(b) Stormwater Facilities**. During the CEQA review process for individual facilities, TCAG and transportation project sponsor agencies, and cities in the TCAG region, Tulare County, and other special districts with responsibility for the construction of new stormwater drainage facilities or the expansion of existing facilities to adequately meet projected capacity needs shall, or can and should, apply necessary mitigation measures to avoid or reduce significant environmental impacts associated with the construction or expansion of such facilities. The environmental impacts associated with such construction or expansion shall be avoided or reduced through the imposition of conditions required to be followed by those directly involved in the construction or expansion activities. Such conditions shall include those necessary to avoid or reduce impacts associated with air quality, noise, traffic, biological resources, cultural resources, greenhouse gas emissions, hydrology and water quality, and others that apply to specific construction or expansion of storm water drainage facilities projects. **UTIL-1(c) Stormwater Control Methods.** During the CEQA review process for individual projects, TCAG and transportation project sponsor agencies, and cities in the TCAG region and Tulare County shall, or can and should, implement the following measures where feasible: ▪ For transportation projects, incorporate stormwater control, retention, and infiltration features, such as detention basins, bioswales, vegetated median strips, and permeable paving, early into the design process to ensure such features are analyzed during environmental review. Implement mitigation measures identified for such features on a project specific basis, where feasible and necessary based on project and site-specific considerations. ▪ For land use projects, incorporate stormwater control, retention, and infiltration features, such as use of permeable paving materials, dry wells, bioswales, or green roofs, early into the design process to ensure such features are analyzed during environmental review. Implement mitigation measures identified for such features on a project specific basis, where feasible and necessary based on project and site-specific conditions. **UTIL-1(d) Electric Power, Natural Gas, or Telecommunications Facilities.** During the CEQA review process, cities, Tulare County, and TCAG region energy and telecommunications providers and other agencies with responsibility for the construction or approval of new electric power, natural gas, or telecommunications facilities or the expansion of existing facilities to adequately meet projected capacity needs shall, or can and should, apply necessary mitigation measures to avoid or reduce significant environmental impacts associated with the construction or expansion of such facilities. The environmental impacts associated with such construction or expansion shall be avoided or reduced through the imposition of conditions required to be followed by those directly involved in the construction or expansion activities. Such conditions shall include those necessary to avoid or reduce impacts associated with air quality, noise, traffic, biological resources, cultural resources, greenhouse gas emissions, hydrology and water quality, and others that apply to specific construction or expansion of natural gas and electric facilities projects.	

Impact	Mitigation Measure(s)	Impact
Impact UTIL-2. Transportation projects and land use projects implementing the proposed 2022 RTP/SCS would generate solid waste in excess of the capacity of local infrastructure or otherwise impair the attainment of solid waste reduction goals. This impact would be significant and unavoidable.	**UTIL-2 Solid Waste Generation and Disposal.** During the CEQA review process for individual facilities, TCAG and transportation project sponsor agencies, cities in the TCAG region, and Tulare County shall, or can and should, implement the following measures where feasible: ▪ Provide an easily accessible area that is dedicated to the collection and storage of non-hazardous recycling materials. ▪ Maintain or reuse existing building structures and materials during building renovations and redevelopment. ▪ Use salvaged, refurbished, or reused materials to help divert such items from landfills. ▪ Divert construction waste from landfills, where feasible, through means such as: ▫ Submitting and implementing a construction waste management plan that identifies materials to be diverted from disposal; ▫ Establishing diversion targets, possibly with different targets for different types and scales of development; ▫ Helping project sponsors and implementing agencies share information on available materials with one another, to aid in the transfer and use of salvaged materials.	Significant and Unavoidable
Impact UTIL-3. transportation projects and the future land use scenario of the proposed 2022 RTP/SCS would be required to comply with all relevant statues and regulations related to solid waste. This impact would be less than significant.	None required.	Less than Significant
Impact UTIL-4. Implementation of proposed transportation projects and future land use scenario in the proposed 2022 RTP/SCS would increase water demand in the TCAG region, resulting in insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years. Impacts would be significant and unavoidable.	**UTIL-4. General Conservation Measures.** During the CEQA review process for individual projects, TCAG and transportation project sponsor agencies, and cities in the TCAG region and Tulare shall, or can and should, implement water conservation measures to reduce water demand. They shall, or can and should, coordinate with relevant water services to ensure demand can be accommodated and identify a water consumption budget. Any water conservation measures that reduce demand for potable water, such as reducing water use for landscape irrigation for transportation projects or use of water-conserving fixtures in envisioned land use projects, shall be employed. Reclaimed water shall be used when possible. Specific conservation measures that shall be implemented may include, but would not be limited to: ▪ Limiting planting to native and non-native plants appropriate for the project microclimate so no water beyond natural rainfall is required for healthy plant survival after the plant establishment period ▪ Limiting supplemental water provided by irrigation to non-potable, unless not practicable ▪ Submitting written documentation of water availability prior to issuance of grading permits.	Significant and Unavoidable

Impact	Mitigation Measure(s)	Impact
Wildfire		
Impact WF-1. Proposed transportation improvements and land use projects envisioned by the proposed 2022 RTP/SCS would be located in or near an SRA or very high fire hazard severity zone, and significant risks of loss, injury, or death from wildfires or downstream flooding or landslides would occur. Impacts would be significant and unavoidable.	**WF-1(a) Wildfire Risk Reduction.** If an individual transportation or land use project included in proposed 2022 RTP/SCS is located within or less than two miles from an SRA or very high fire hazard severity zones, the implementing agency shall require appropriate mitigation to reduce the risk. Examples of mitigation to reduce risk of loss, injury or death from wildlife include, but are not limited to: ▪ Require the use of fire-resistant vegetation native to Tulare County and/or the local microclimate of the project site and discourage the use of fire-prone species especially nonnative, invasive species. ▪ Enforce defensible space regulations to keep overgrown and unmanaged vegetation, accumulations of trash and other flammable material away from structures. ▪ Provide public education about wildfire risk, fire prevention measures, and safety procedures and practices to allow for safe evacuation and/or options to shelter-in-place. ▪ Require adherence to the local hazard mitigation plan, as well as the local general plan policies and programs aimed at reducing the risk of wildfires through land use compatibility, training, sustainable development, brush management, public outreach, and service standards for fire departments. ▪ Ensure sufficient emergency water supply. ▪ Encourage the use of fire-resistant vegetation native to Tulare County and/or the local microclimate of the project site and discourage the use of fire-prone species especially non-native, invasive species. ▪ Require a fire safety plan be submitted to and approved by the local fire protection agency. The fire safety plan shall include all of the fire safety features incorporated into the project and the schedule for implementation of the features. The local fire protection agency may require changes to the plan or may reject the plan if it does not adequately address fire hazards associated with the project as a whole or the individual phase of the project. ▪ Prohibit certain project construction activities with potential to ignite wildfires during red-flag warnings issued by the National Weather Service for the project site location. Example activities that should be prohibited during red-flag warnings include welding and grinding outside of enclosed buildings. ▪ Require fire extinguishers to be onsite during construction of projects. Fire extinguishers shall be maintained to function according to manufacturer specifications. Construction personnel shall receive training on the proper methods of using a fire extinguisher. ▪ Smoking and open fires shall be prohibited at individual transportation or land use projects sites included in proposed 2022 RTP/SCS during construction and operations. A copy of the notification to all contractors regarding prohibiting smoking and burning shall be provided to the County. **WF-1(b) Fire Protection Plan.** Implementing agencies for individual transportation or land use projects included in proposed 2022 RTP/SCS located within or less than two miles from an SRA or very high fire hazard severity zone shall prepare a Fire Protection Plan that meets TCFD requirements. The plan shall contain (but not be limited to) the following provisions: ▪ All construction equipment shall be equipped with appropriate spark arrestors and carry fire extinguishers.	Significant and Unavoidable

Impact	Mitigation Measure(s)	Impact
	▪ A fire watch with appropriate firefighting equipment shall be available at the Project site at all times when welding activities are taking place. Welding shall not occur when sustained winds exceed that set forth by the TCFD unless a TCFD-approved windshield is on site. ▪ A vegetation management plan shall be prepared to address vegetation clearance around all WTGs and a regularly scheduled brush clearance of vegetation on and adjacent to all access roads, power lines, and other facilities. ▪ Operational fire water tanks shall be installed prior to construction. ▪ Provisions for fire/emergency services access if roadway blockage occurs due to large loads during construction and operation ▪ Cleared, maintained parking areas shall be designated; no parking shall be allowed in non-designated areas. ▪ The need for and/or use of dedicated repeaters for emergency services. ▪ Appropriate Hot Work permits (such as cutting and welding permits) shall be obtained from the jurisdictional fire agency. ▪ Individual transportation or land use projects included in proposed 2022 RTP/SCS shall participate in the Red Flag Warning program with local fire agencies and the National Weather Service. The Applicant shall stop work during Red Flag conditions to reduce the risk of wildlife ignition. ▪ Compliance with California PRC sections 4291, 4442, and 4443.	

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1 Introduction

1.1 Statement of Purpose

This document is a Program Environmental Impact Report (EIR) that describes environmental impacts associated with the 2022 Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS) proposed by the Tulare County Association of Governments (TCAG). The proposed 2022 RTP/SCS (which is also referred to as the “proposed project” in this EIR) is an update of the 2018 RTP/SCS, which was adopted in 2018 following certification of a Program EIR.

Section 21000 et seq. of the California Public Resources Code (PRC), commonly referred to as the California Environmental Quality Act of 1970 (CEQA), requires the evaluation of environmental impacts associated with proposed projects such as the proposed 2022 RTP/SCS. As such, this EIR is an informational document for use by TCAG in its consideration and evaluation of the environmental consequences of implementing the proposed 2022 RTP/SCS.

This section of the EIR describes the following aspects of the proposed 2022 RTP/SCS and the EIR: Project background; EIR purpose and legal authority; EIR background; agencies involved in the Project and EIR; EIR scope, content, and format; and the environmental review process under CEQA.

1.2 Project Background

As the metropolitan planning organization (MPO) for the Tulare County region, TCAG is charged with developing the proposed 2022 RTP/SCS in compliance with SB 375 (Chapter 728, Statutes of 2008). The RTP/SCS must be updated every four years.

The most recent comprehensive update to the RTP/SCS occurred in 2018, which updated the 2014 RTP/SCS. A comprehensive Program EIR was prepared for the 2018 RTP/SCS. The 2018 RTP/SCS programmed available transportation funding through the year 2042 and included lists of programmed and planned transportation projects to improve the transportation system during the 2018-2042 planning period.[1] Among these listed projects were highway and congestion management projects, road and street projects, complete streets/pedestrian projects, rail projects, and active transportation/transit projects. As discussed in the 2018 RTP/SCS, some of projects since 2018 have been completed or have begun construction; therefore, those transportation projects yet to be completed have been incorporated into the proposed 2022 RTP/SCS, along with a few additional new projects.

1.3 Purpose and Legal Authority

This EIR has been prepared in compliance with the CEQA Statutes and Guidelines. In general, the purpose of an EIR is to (see *State CEQA Guidelines* Section 15121(a)):

a. Analyze the environmental effects of the adoption and implementation of the Project;
b. Inform decision-makers, responsible and trustee agencies and members of the public as to the range of the environmental impacts of the Project;

[1] The 2018 RTP/SCS prepared by TCAG is available on TCAG’s website: https://tularecog.org/tcag/planning/rtp/rtp-20181/

c. Recommend a set of measures to mitigate significant adverse impacts; and
d. Analyze a range of reasonable alternatives to the proposed Project.

As the Lead Agency for preparing this EIR, TCAG will rely on the EIR analysis of environmental effects in its review and consideration of the proposed 2022 RTP/SCS prior to approval. Responsible Agencies will rely on the EIR analysis prior to approval of their respective projects under their jurisdiction.

As discussed in further detail below in Section 1.4.1, *CEQA Streamlining Opportunities*, SB 375 provides streamlining benefits for certain transit-oriented projects consistent with an adopted SCS. Pursuant to these provisions of SB 375, this EIR has also been prepared to allow qualifying projects to streamline their environmental review.

1.4 Implementation Issues and Future Environmental Review

The proposed 2022 RTP/SCS contains transportation projects that will be implemented over time. Implementation of the proposed 2022 RTP/SCS will follow a schedule based on the funding and demand for individual transportation projects and improvements. Implementation of the SCS component of the proposed 2022 RTP/SCS will require cooperation of the TCAG member agencies and municipalities in the TCAG region.

Implementation of the projects addressed in the proposed 2022 RTP/SCS must individually demonstrate compliance with the requirements of CEQA and/or NEPA (for projects requiring federal funding or approvals). As appropriate, individual projects may be required to prepare a project-level analysis to fulfill CEQA and/or NEPA requirements. The Lead Agency responsible for reviewing these projects would determine the level of review needed, and the scope of that analysis would depend on the specifics of the particular project. These project environmental documents may, however, use the discussion of impacts in this Program EIR to streamline project-specific reviews, for example as a basis of their assessment of these regional or cumulative impacts. These projects may also be eligible for CEQA streamlining under SB 375, as explained further below.

This Program EIR is a first-tier document that addresses the environmental impacts that may affect the TCAG region from adoption and implementation of the proposed 2022 RTP/SCS. “Tiering” generally refers to using the analysis of a broader environmental document that covers the general impacts of a program or larger-scale project so that subsequent environmental documents for a related individual project can be narrow and focused on unique or unanalyzed issues. CEQA encourages the use of tiering to reduce the time and excessive paperwork involved in the review process by eliminating repetitive analyses of issues that were addressed in the Program EIR (CEQA Guidelines Section 15168).

SB 375 enables certain qualifying projects consistent with an SCS (Government Code 65080 (b)(2)(H)) to tier from a Program EIR prepared for an RTP/SCS. Tiered documents may consist of initial studies or focused EIRs that may incorporate by reference portions of the Program EIR from which they are tiered. If the environmental effects of subsequent actions are consistent with and adequately addressed by a certified Program EIR, additional environmental analysis may be unnecessary.

1.4.1 Streamlining Under SB 375

SB 375 provides streamlining benefits for Transit Priority Projects (TPP) and certain mixed-use projects. (See PRC Sections 21155 et seq.) For details, see the Governor's Office of Planning and Research's flow charts on SB 375 streamlining (Governor's Office of Planning and Research 2011). A TPP is a project that meets all of the criteria summarized below. For the purposes of this EIR, geographic areas that meet the TPP requirements are referred to as Transit Priority Areas (TPAs).

- Consistent with the general land use designation, density, building intensity and applicable policies specified for the project area in the SCS;
- Located within half a mile of a major transit stop or high-quality transit corridor;
- Comprised of at least 50 percent residential use based on total building square footage, or as little as 26 percent residential use if the project has a floor area ratio of not less than 0.75; and
- Built out with a minimum of 20 dwelling units per acre (PRC § 21155).

For the purposes of this EIR, geographic areas that meet the TPP requirements are referred to as TPAs. One of three potential streamlining benefits may apply to a TPP pursuant to SB 375, as described below.

First, TPPs that meet a detailed list of criteria set forth in PRC Section 21155.1 are termed Sustainable Communities Projects and are statutorily exempt from CEQA. Due to the extensive list of criteria that must be met to achieve this exemption, the exemption may only be available in limited circumstances.

Second, a TPP that does not qualify for the statutory exemption may be eligible to comply with CEQA using a Sustainable Communities Environmental Assessment (SCEA). An SCEA is similar to a streamlined negative declaration or mitigated negative declaration that requires a 30-day public review period (rather than the otherwise available 20-day public review period). In addition, unlike a negative declaration or mitigated negative declaration, a Lead Agency's decision to approve a TPP based on an SCEA is reviewed, if challenged, by a court under the substantial evidence standard (PRC Section 21155.2(b)(7)).

Third, a TPP that will result in one or more significant impacts after mitigation may be reviewed using a tiered TPP EIR as established by PRC Section 21155.2(c). A tiered TPP EIR is only required to address the significant or potentially significant effects of the TPP on the environment and is not required to include a discussion of (1) growth inducing impacts, (2) any project specific or cumulative impacts from cars and light duty truck trips generated by the project on global warming or the regional transportation network, (3) cumulative effects that have been adequately addressed and mitigated in prior applicable certified EIRs, (4) off-site alternatives, or (5) a reduced density alternative to address effects of car and light truck trips generated by the TPP (PRC Sections 21155.2 (c), 21159.28(a) and (b)).

In addition to the benefits provided for TPPs, SB 375 provides streamlining benefits for residential or mixed-use residential projects, as defined in PRC Section 21159.28(d), that are consistent with the use designation, density, building intensity and applicable policies specified for the project area in the SCS but do not meet the criteria for TPPs. Projects eligible for streamlining must incorporate mitigation measures required by an applicable prior environmental document, such as this EIR after it is certified by TCAG.

Projects that qualify to use the SB 375 CEQA streamlining benefits would still need to obtain discretionary permits or other approvals from the Lead Agency and the local jurisdiction, in accordance with local codes and procedures, including any agreements related to zoning, design review, use permits and other local code requirements. The streamlining only applies to the CEQA processing of a project.

1.4.2 Streamlining Under SB 226

In 2011, the legislature enacted SB 226 to establish additional streamlining benefits applicable to infill projects consistent with an SCS that are consistent with the requirements set forth in *State CEQA Guidelines* section 15183.3 (PRC Sections 21094.5 (c), 21094.5.5). Unlike the CEQA streamlining benefits established by SB 375, the benefits created by SB 226 may apply to non-residential projects including qualifying commercial, retail, transit station, school, or public office building projects (*State CEQA Guidelines*, Section 15183.3 (f)(1)).

1.4.3 Streamlining Under SB 743

SB 743 (2013) (PRC Section 21099 and 21555.4) created an exemption from CEQA for certain residential, employment center and mixed-use development projects that are consistent with a Specific Plan (see Public Resources Code Section 21155.4.) (A Specific Plan implements a General Plan within a smaller geographic area, such as a downtown core or along a transit corridor; see Government Code Section 65450 et seq.). The exemption applies if a project meets all of the following criteria:

a. It a residential, employment, or mixed-use project and is located within a transit priority area;
b. The project is consistent with a specific plan for which an environmental impact report was certified; and
c. It is consistent with an adopted SCS or alternative planning strategy.

The exemption cannot be applied if circumstances requiring preparation of a Subsequent or Supplemental EIR occur, for example if the project would cause new or worse significant environmental impacts compared to what was analyzed in the environmental impact report for the specific plan.

SB 743 also specifies that aesthetic and parking impacts of residential, mixed use residential, or employment center uses on infill sites within a TPA shall not be considered significant effects on the environment (see Public Resources Code Section 21099(d).)

1.4.4 Other Tiering Opportunities

Finally, for all other types of projects proposed to be carried out or approved by a Lead Agency within the region, the Lead Agency may utilize this EIR for the purposes of other allowed CEQA tiering (PRC Sections 21068.5, 21093-21094, *State CEQA Guidelines* 15152, 15385). Tiering is the process by which general matters and environmental effects in an EIR prepared for a policy, plan, program or ordinance are relied upon by a narrower second-tier or site specific EIR (PRC Section 21068.5). Moreover, by tiering from this EIR (if certified by TCAG), a later tiered EIR would not be required to examine effects that (1) were mitigated or avoided in this EIR, (2) were examined at a sufficient level of detail in this EIR to enable those effects to be mitigated or avoided by site specific revisions, the imposition of conditions, or by other means in connection with the approval of the later project (PRC Section 21094).

1.5 Environmental Impact Report Background

In compliance with the *CEQA Guidelines* (Section 15063), TCAG, as the Lead Agency responsible for the proposed 2022 RTP/SCS, solicited preliminary public agency comments on the Project through distribution of a Notice of Preparation (NOP) and receipt of public comments during a scoping meeting held virtually on Wednesday, March 17, 2021, from 12:00 p.m. to 1:00 p.m.

The NOP was distributed to affected agencies and the public for the required 30-day period from March 8, 2021, to April 7, 2021. Table 1-1 summarizes the issues relevant to the EIR that were identified in the NOP comments received) and the EIR sections where the issues are addressed. The NOP and NOP comment letters received are included in Appendix A of this EIR.

Table 1-1 NOP Comments and EIR Response

Comment/Request	How and Where it was Addressed
California Department of Transportation	
Caltrans states they look forward to the opportunity provide comments and recommendations on the Draft EIR for TCAG's 2022 RTP/SCS when completed and routed for Caltrans review.	As a Responsible Agency for the proposed project, the EIR will be sent to Caltrans during public review for comments and recommendations.
Leadership Counsel for Justice and Accountability	
The commenter requests that the EIR collect the most updated and relevant information concerning disadvantaged communities and their transportation needs and priorities.	Please refer to the environmental justice chapter in the Regional Transportation Plan and the Environmental Justice Report in Appendix 2-U and Health Impact Assessment, provided in Appendix 2-S of the proposed 2022 RTP/SCS, for further input on disadvantaged communities and identified transportation needs and priorities.
The commenter requests that the EIR pay special attention to how disadvantaged communities and communities of color are impacted by the impact categories identified for review, especially the following categories: air quality, energy, greenhouse gas emissions (GHGs), land use and planning, transportation, population and housing, hydrology and water quality, and public services and utilities. In addition, the commenter requests that the EIR analyze all relevant projects and investments, from active transportation and freeway expansions, which will impact disadvantaged communities. The commenter states that strong policies and proposed investments should benefit disadvantaged communities and that EIR should analyze how projects for disadvantaged communities will be prioritized for needed transportation projects such as sidewalks, road repaving, proper stormwater drainage and street lighting.	The EIR discusses the environmental impacts of the proposed Project throughout Section 4.0 of the EIR. CEQA directs analyses to assess impacts from the physical improvements being proposed by the Project, this would include impacts to disadvantaged communities as well as the general population. The issue areas listed are all assessed in Section 4 of this EIR.
The commenter requests that the EIR considers groundwater and groundwater sustainability in the hydrology and water quality analysis.	Impacts related to groundwater and groundwater sustainability are discussed in Section 4.9, *Hydrology and Water Quality*.
The commenter requests that the EIR includes an analysis of health impacts as well as health benefits associated with different alternatives.	Negative impacts to human health, as they pertain to an environmental analysis under CEQA, include but are not limited to the following: exposure to air quality pollutants and contaminants, excessive noise, geologic hazards, exposure to hazardous materials, hydrologic

Comment/Request	How and Where it was Addressed
	hazards, and transportation hazards. Please refer to Section 4.3, *Air Quality*, 4.7, *Geology and Soils*, 4.9, *Hydrology and Water Quality*, 4.11, Noise, 4.14, *Transportation*, and Section 4.16, *Wildfire*. Project alternatives impacts on these resources are discussed in Section 6.0, *Alternatives*.
The commenter states if dairy biogas and compressed natural gas (CNG) projects will be identified as project alternatives in the RTP/SCS, the EIR must conduct an analysis for any air quality, water, GHGs, energy, public utilities, etc. impacts to disadvantaged communities.	Neither the proposed 2022 RTP/SCS, nor the proposed 2022 RTP/SCS alternatives discussed in the EIR, including dairy gas or CNG projects.
The commenter recommends that TCAG approaches SB 375 requirements as a floor to be met rather than a ceiling when approaching development projects to be streamlined.	The proposed 2022 RTP/SCS has been prepared with specific focus towards meeting SB 375 requirements. A discussion of SB 375 requirements is provided in Section 2.0, *Project Description*.
Native American Heritage Commission	
The commenter provides a summary of legislation that requires consultation with Native American tribes associated with the geographic area of the Project and recommends beginning consultation as early as possible.	Information regarding the Native American tribal consultation process and potential proposed project impacts related to tribal cultural resources are discussed in Section 4.16, *Tribal Cultural Resources.*

1.6 Lead, Responsible, and Trustee Agencies

The *CEQA Guidelines* require the identification of “lead,” “responsible,” and “trustee” agencies. TCAG is the “Lead Agency” for the proposed Project because it has the principal responsibility for approving the Project.

A “responsible agency” is a public agency other than the “Lead Agency” that has discretionary approval authority over certain components of a project (the *State CEQA Guidelines* define a public agency as a State or local agency, but specifically exclude federal agencies from the definition). A “trustee agency” refers to a State agency having jurisdiction by law over natural resources affected by a project which are held in trust for the people of the State of California (for example, the California Department of Fish and Wildlife). While no responsible agencies or trustee agencies are responsible for approvals associated with adoption of the proposed 2022 RTP/SCS, implementation of projects identified in the proposed 2022 RTP/SCS will require permits and approvals from lead, trustee, and responsible agencies, which may include the following:

- Tulare County
- City of Dinuba
- City of Exeter
- City of Farmersville
- City of Lindsay
- City of Porterville
- City of Tulare
- City of Visalia
- California Transportation Commission
- California Department of Transportation
- California Department of Fish and Wildlife
- California Department of Conservation
- Central Valley Regional Water Quality Control Board
- San Joaquin Valley Air Pollution Control District

- City of Woodlake
- Tulare County Regional Transit Agency
- Visalia Transit

1.7 EIR Scope, Content, and Format

This EIR has been organized into seven sections, which include:

1. **Introduction.** Provides the statement of purpose, Project background, and information about the EIR content and format.
2. **Project Description.** Discusses the Project objectives, Project locations and specific Project characteristics.
3. **Environmental Setting.** Provides a description of the existing physical setting of the TCAG region, a description of the regional transportation system, and the EIR baseline and approach to direct and cumulative analyses.
4. **Analysis of Environmental Issues.** Describes existing conditions found in the Project area and assesses environmental impacts that may be generated by implementing the proposed Project and cumulative development in and near Tulare County. These Project impacts are compared to “thresholds of significance” in order to determine the nature and severity of the direct and indirect impacts. Mitigation measures, intended to reduce adverse, significant impacts below threshold levels, are proposed where feasible. Impacts that cannot be avoided or mitigated to less-than-significant levels are also identified. Identified significant and unavoidable impacts in this EIR are: aesthetics/visual resources, agriculture resources, air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology, noise, population and housing, public services, recreation, transportation, tribal cultural resources, utilities, and wildfire.
5. **Other CEQA-Required Discussions.** Analyzes the spatial, economic, or population growth-inducing impacts that may result from implementation of the proposed Project, as well as long-term effects of the Project and significant irreversible environmental changes.
6. **Alternatives.** Presents and assesses the environmental impacts of four alternatives (including future baseline and no project) in addition to implementation of the proposed 2022 RTP/SCS.
7. **References/Preparers.** Lists all published materials, federal, State, and local agencies, and other organizations and individuals consulted during the preparation of this EIR. It also lists the EIR preparers.

The EIR also includes several technical appendices with supporting technical information.

- Appendix A: Air Quality Emissions Calculations
- Appendix B: Special Status Species
- Appendix C:TCAG 2022 RTP/SCS Performance Metric Data
- Appendix D: Greenhouse Gas Emissions Calculations
- Appendix E: TCAG Regional Travel Demand Model

1.8 Environmental Review Process

The environmental impact review process, as required under CEQA, is summarized below and similarly illustrated in Figure 1-1. The steps are presented in sequential order.

1. **Notice of Preparation (NOP)**. After deciding that an EIR is required, the Lead Agency (TCAG) must file a NOP soliciting input on the EIR scope to the State Clearinghouse, other concerned agencies, and parties previously requesting notice in writing (*CEQA Guidelines* Section 15082; Public Resources Code Section 21092.2). The NOP must be posted in the County Clerk's office for 30 days. TCAG filed the NOP with the County Clerk's office on March 8, 2021.
2. **Draft EIR Prepared.** The Draft EIR must contain: a) table of contents or index; b) summary; c) Project description; d) environmental setting; e) discussion of significant impacts (direct, indirect, cumulative, growth-inducing and unavoidable impacts); f) a discussion of alternatives; g) mitigation measures; and h) discussion of irreversible changes.
3. **Notice of Availability (NOA).** A public notice of Draft EIR availability must be given through at least one of the following procedures: a) publication in a newspaper of general circulation; b) posting on and off the Project site; and c) direct mailing to owners and occupants of contiguous properties. The Lead Agency must solicit input from other agencies and the public and respond in writing to all comments received (Public Resources Code Sections 21104 and 21253).
4. **Final EIR.** A Final EIR must include: a) the Draft EIR; b) copies of comments received during public review; c) list of persons and entities commenting; and d) responses to comments.
5. **Certification of Final EIR.** Prior to making a decision on a proposed project, the Lead Agency must certify that: a) the Final EIR has been completed in compliance with CEQA; b) the Final EIR was presented to the decision-making body of the Lead Agency; and c) the decision-making body reviewed and considered the information in the Final EIR prior to approving a project (*CEQA Guidelines* Section 15090).
6. **Lead Agency Project Decision.** The Lead Agency may a) disapprove the Project because of its significant environmental effects; b) require changes to the Project to reduce or avoid significant environmental effects; or c) approve the Project despite its significant environmental effects, if the proper findings and statement of overriding considerations are adopted (*CEQA Guidelines* Sections 15042 and 15043).
7. **Findings/Statement of Overriding Considerations**. For each significant impact of the Project identified in the EIR, the Lead Agency must find, based on substantial evidence, that either: a) the Project has been changed to avoid or substantially reduce the magnitude of the impact; b) changes to the Project are within another agency's jurisdiction and such changes have or should be adopted; or c) specific economic, social, or other considerations make the mitigation measures or project alternatives infeasible (*CEQA Guidelines* Section 15091). If an agency approves a project with unavoidable significant environmental effects, it must prepare a written Statement of Overriding Considerations that sets forth the specific social, economic, or other reasons supporting the agency's decision.
8. **Mitigation Monitoring Reporting Program.** When the Lead Agency makes findings on significant effects identified in the EIR, it must adopt a reporting or monitoring program for mitigation measures that were adopted or made conditions of project approval to mitigate significant effects.
9. **Notice of Determination (NOD).** The Lead Agency must file a NOD after deciding to approve a project for which an EIR is prepared (*CEQA Guidelines* Section 15094). A local agency must file

the NOD with the County Clerk. The NOD must be posted for 30 days and sent to anyone previously requesting notice. Posting of the NOD starts a 30-day statute of limitations on CEQA legal challenges (Public Resources Code Section 21167[c]).

For the proposed 2022 RTP/SCS Draft EIR, the public review process began on May 20, 2022, and closes on July 5, 2022. In addition, TCAG will hold a public hearing on the Draft EIR at the following location and time:

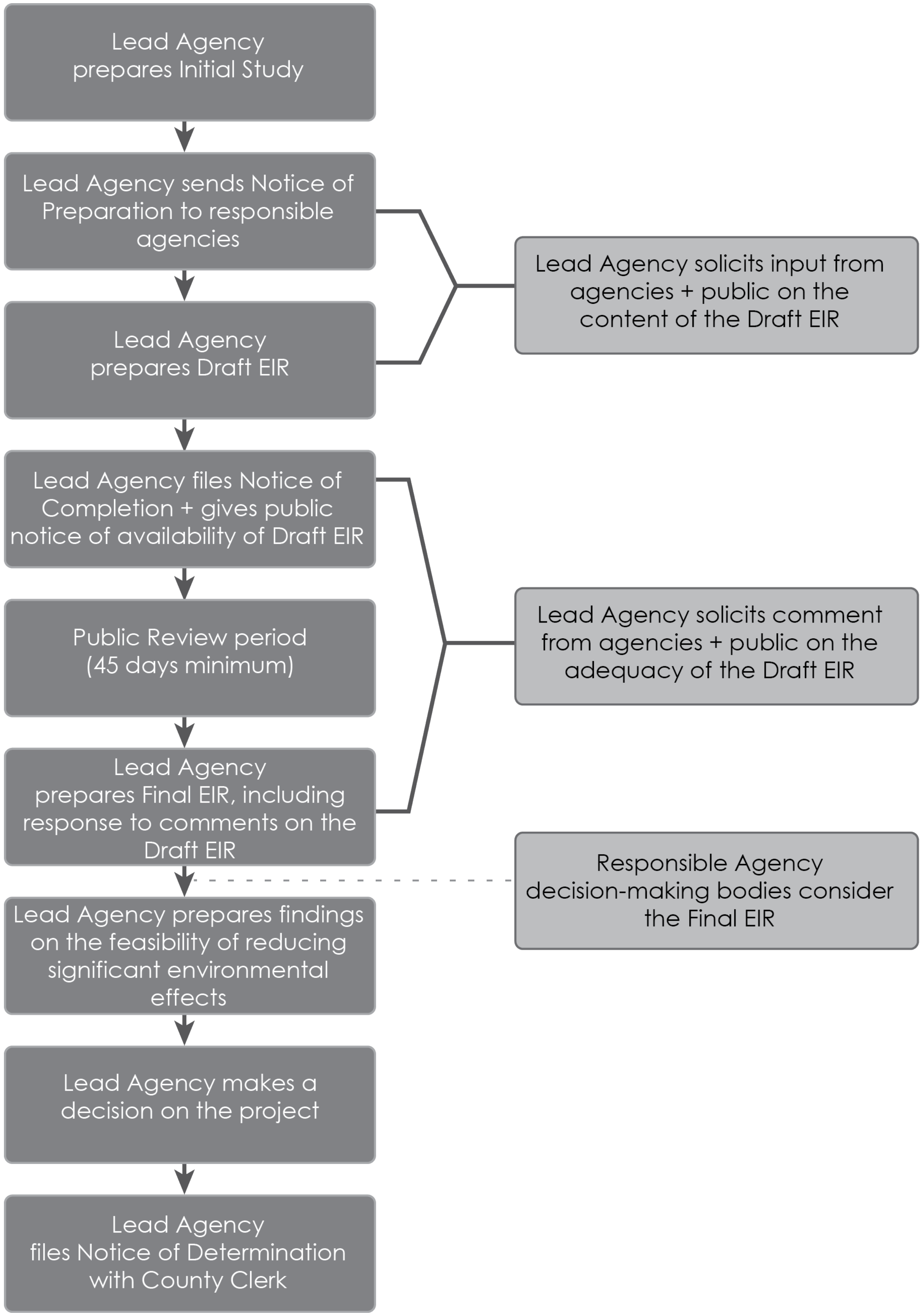
June 27, 2022 at 1:00 P.M. at the Tulare County Human Resources & Development Office, 2500 W. Burrell Avenue, Visalia, CA 93291 or via Zoom at:

Zoom Meeting | Direct Link: https://bit.ly/2Zt4BQY
Toll Free Call in Number: 1(888) 475-4499 | Meeting ID: 744 710 0343
Passcode: 82243742. Call in only instructions: Enter your meeting ID followed by #, Enter # for participant ID, Enter the passcode followed by #.

Written comments on the Draft EIR should be e-mailed to Gabriel Gutierrez at GGutierrez@tularecag.ca.gov using subject line "2022 RTP/SCS Draft EIR" or mailed to:

TCAG
2022 RTP/SCS Draft EIR
Attention: Gabriel Gutierrez
210 North Church Street, Suite B
Visalia, California 93291

Figure 1-1 Environmental Review Process



2 Project Description

This section describes the proposed project (proposed 2022 RTP/SCS), including the project applicant, the project site and surrounding land uses, major project characteristics, project objectives, and discretionary actions needed for approval.

2.1 Background

2.1.1 General Legislative Requirements

The Tulare County Association of Governments (TCAG), as both the federally-designated metropolitan planning organization (MPO) and the State-designated regional transportation planning agency (RTPA) for Tulare County, is required by both federal and State law to prepare a long-range (at least 20-year) transportation planning document known as a Regional Transportation Plan (RTP). The RTP is an action-oriented document used to achieve a coordinated and balanced regional transportation system.

TCAG also has the responsibility to prepare a Sustainable Communities Strategy (SCS) as part of the RTP, pursuant to the requirements of the Stainable Communities and Climate Protection Act (Senate Bill [SB] 375) as adopted in 2008 (discussed further below). The SCS sets forth a forecasted development pattern for the region, which, when integrated with the transportation network and other transportation measures and policies, is intended to reduce greenhouse gas (GHG) emissions from passenger vehicles and light trucks to achieve the regional light-duty vehicle GHG reduction targets set by the California Air Resources Board (CARB).

The California Transportation Commission's (CTC) document *2017 California Regional Transportation Plan Guidelines* serves as the guidance for RTP development (CTC 2017). Under both federal and State law an MPO must update its RTP every four years when in a federally designated air quality non-attainment area.

2.1.2 Sustainable Communities & Climate Protection Act Requirements (SB 375) Requirements

The Sustainable Communities and Climate Protection Act, also known as SB 375 (codified at California Government Code §§ 14522.1, 14522.2, 65080.01, 65080, 65400, 65583, 65584.01, 65584.02, 65584.04, 65587, 65588; Public Resources Code §§2161.3, 21155, 21159.28), is a law passed in 2008 by the California legislature that requires each MPO to demonstrate, through the development of an SCS, how its region will integrate transportation, housing, and land use planning to meet the greenhouse gas (GHG) reduction targets set by the State. In addition to creating requirements for MPOs, it also creates requirements for the CTC and CARB. Some of the requirements include the following:

- The CTC must maintain guidelines for the travel demand models that MPOs develop for use in the preparation of their RTPs;
- CARB must develop regional GHG emission reduction targets for automobiles and light trucks for 2020 and 2035 by September 30, 2010 (completed);
- Each MPO must prepare an SCS as part of its RTP to demonstrate how it will meet the regional GHG targets. If an SCS cannot achieve the regional GHG target, the MPO must prepare an

Alternative Planning Strategy (APS) showing how it would achieve the targets with alternative development patterns, infrastructure, or transportation measures and policies;

- Each MPO must adopt a public participation plan for development of the SCS that includes informational meetings, workshops, public hearings, consultation, and other outreach efforts (completed);
- Each MPO must prepare and circulate a draft SCS at least 55 days before it adopts a final RTP;
- After adoption, each MPO must submit its SCS to CARB for review; and
- CARB must review each SCS to determine whether, if implemented, it would meet the GHG targets. CARB must complete its review within 60 days.

CARB set targets for the TCAG region to maintain or reduce greenhouse gas emissions in 2020 and in 2035. These targets apply to the TCAG region as a whole for all on-road light-duty trucks and passenger vehicles emissions, and not to individual cities or sub-regions. On March 22, 2018, CARB adopted updated regional targets for reducing GHG emissions to 2005 levels by 2020 and 2035. TCAG was assigned targets of a 13 percent reduction in GHG emissions from per capita passenger vehicles by 2020 and a 16 percent reduction in GHG emissions from per capita passenger vehicles by 2035, relative to 2005 emission levels. Emissions modeling for the RTP/SCS incorporates a base year of 2005 for SB 375 GHG emission reduction targets. The RTP includes estimates of CO_2 per capita for 2020 and 2035. As discussed in Section 4.8, *Greenhouse Gas Emissions*, TCAG has modeled GHG emissions for 2020 for illustrative purposes, though no aspect of the proposed 2022 RTP/SCS can influence the achievement or lack of achievement of target year 2020 GHG emissions.

SB 375 specifically states that local governments retain their autonomy to plan local General Plan policies and land uses. The proposed 2022 RTP/SCS provides a regional policy foundation that local governments may build upon, if they so choose. The proposed 2022 RTP/SCS includes and accommodates the quantitative growth projections for the region. SB 375 also requires that the RTP's forecasted development pattern for the region be consistent with the eight-year regional housing needs as allocated to member jurisdictions through the Regional Housing Needs Allocation (RHNA) process under state housing law. RHNA, itself, is statutorily exempt from CEQA.

In addition, this EIR lays the groundwork for the streamlined review of qualifying development projects within Transit Priority Areas.[1] Qualifying projects that meet statutory criteria and are consistent with the proposed 2022 RTP/SCS are eligible for streamlined environmental review pursuant to CEQA under SB 375 and other laws.

2.1.3 Fixing America's Surface Transportation Act (FAST Act)

The most recent federal transportation legislation, Fixing America's Surface Transportation (FAST) Act builds on the changes made by MAP-21, and was enacted in 2015. The Moving Ahead for Progress in the 21st Century Act (MAP-21), enacted in 2012, made a number of reforms to the metropolitan and statewide transportation planning processes, including incorporating performance goals, measures, and targets into the process of identifying needed transportation improvements and project selection. The FAST Act includes provisions to support and enhance these reforms. Public involvement remains a hallmark of the planning process.

The FAST Act continues requirements for a long-range plan and a short-term transportation improvement program (TIP), with the long-range statewide and metropolitan plans now required to

[1] A Transit Priority Area is an area within ½-mile of high-quality transit: a rail stop or a bus corridor that provides or will provide at least 15-minute frequency service during peak hours by the year 2035.

include facilities that support intercity transportation, including intercity buses. The statewide and metropolitan long-range plans must describe the performance measures and targets that states and MPOs use in assessing system performance and progress in achieving the performance targets. Additionally, the FAST Act requires the planning process to consider projects/strategies to improve the resilience and reliability of the transportation system, address stormwater mitigation, and enhance travel and tourism.

Finally, in an effort to engage all sectors and users of the transportation network, the FAST Act requires that the planning process include public ports and private transportation providers, and further encourages MPOs to consult during this process with officials of other types of planning activities, including tourism and natural disaster risk reduction. MAP-21 and the FAST Act also change criteria for MPO officials to provide transit provider representatives with equal authority and allow the representative to also serve as the representative of a local municipality.

Through the RTP development process, the FAST Act encourages TCAG to:

- Consult with officials responsible for other types of planning activities that are affected by transportation in the area (including State and local planned growth, economic development, environmental protection, airport operations, and freight movements) or to coordinate its planning process, to the maximum extent practicable, with such planning activities.[2]

Specifically, the FAST Act requires that the RTP planning process:

Provide for consideration of projects and strategies that will:

a) Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
b) Increase the safety of the transportation system for motorized and non-motorized users;
c) Increase the security of the transportation system for motorized and non-motorized users;
d) Increase the accessibility and mobility of people and for freight;
e) Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
f) Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
g) Promote efficient system management and operation;
h) Emphasize the preservation of the existing transportation system.
i) Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation; and
j) Enhance travel and tourism. [3]

2.1.4 Planning Final Rule – FAST Act

On May 27, 2016, the Statewide and Nonmetropolitan Transportation Planning and Metropolitan Transportation Planning Final Rule was issued, with an effective date of June 27, 2016, for Title 23 CFR Parts 450 and 771 and Title 49 CFR Part 613. This final rule states, “On or after May 27, 2018, an

[2] 23 U.S.C. §134(g)(3)(A).
[3] 23 U.S.C. §134(h)(1).

RTPA may not adopt an RTP that has not been developed according to the provisions of MAP-21/FAST Act as specified in the Planning Final Rule." This rule applies to the proposed 2022 RTP/SCS.

2.1.5 Environmental Justice

TCAG is required to address social equity and environmental justice in the RTP. The legal basis for environmental justice stems from the Civil Rights Act of 1964, along with Executive Order 12898 (February 1994), which states that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." TCAG must evaluate how the proposed 2022 RTP/SCS might impact minority and low-income populations and must ensure that the proposed 2022 RTP/SCS does not have a disproportionate adverse impact on such populations.

In addition, per 23 C.F.R. Section 450.316(a)(1)(vii), the participation plan that TCAG must develop and use must describe explicit procedures, strategies, and desired outcomes for "[s]eeking out and considering the needs of those traditionally underserved by existing transportation systems, such as low-income and minority households, who may face challenges accessing employment and other services."

2.1.6 Regional Transportation Plans

As noted, the procedures for developing RTPs are provided in the CTC's Regional Transportation Plan Guidelines (2017). The guidelines identify the purpose of an RTP to be as follows:

- Providing an assessment of the current modes of transportation and the potential of new travel options within the region;
- Projecting/estimating the future needs for travel and goods movement;
- Identification and documentation of specific actions necessary to address regional mobility and accessibility needs;
- Identification of guidance and documentation of public policy decisions by local, regional, state and federal officials regarding transportation expenditures and financing and future growth patterns;
- Identification of needed transportation improvements, in sufficient detail, to serve as a foundation for the: (a) Development of the Federal Transportation Improvement Program (FTIP), and the State Transportation Improvement Program (STIP), (b) Facilitation of the National Environmental Policy Act (NEPA)/404 integration process, and (c) Identification of project purpose and need;
- Employing performance measures that demonstrate the effectiveness of the system of transportation improvement projects in meeting the intended goals;
- Promotion of consistency between the California Transportation Plan (CTP), the regional transportation plan and other plans developed by cities, counties, districts, California Tribal Governments, and state and federal agencies in responding to statewide and interregional transportation issues and needs;
- Providing a forum for: (1) participation and cooperation and (2) facilitation of partnerships that reconcile transportation issues which transcend regional boundaries; and
- Involving community-based organizations as part of the public, Federal, State and local agencies, California Tribal Governments, as well as local elected officials, early in the transportation

planning process so as to include them in discussions and decisions on the social, economic, air quality and environmental issues related to transportation.

RTPs must include long-term horizons (at least 20 years) that reflect regional needs, identify regional transportation issues/problems, and develop and evaluate solutions that incorporate all modes of travel. RTPs must also recommend a comprehensive approach that provides direction for programming decisions to meet the identified regional transportation needs. RTPs must also be fully consistent with the requirements of the FAST Act and other federal regulations, including conformity with the 1990 Clean Air Act Amendments and consistency with the Federal Transportation Improvement Program (FTIP).

In addition, Government Code §§ 65050, 65400, 65584.01-04, 65587, 65588 and Public Resources Code §21155 were amended in January 2009 when SB 375 became law, requiring coordinated planning between regional land use and transportation plans to increase efficiency and reduce GHG emissions.

2.2 Project Goals and Objectives

The proposed 2022 RTP/SCS establishes planning goals and objectives to guide the development of the plan and establish the guiding principles for decision-making. Regional projects and programs are developed, funded, and implemented based on these goals. TCAG's general objectives for the proposed 2022 RTP/SCS are to ensure that the SCS and the transportation system planned for the TCAG region accomplishes the following:

- Serves regional goals, objectives, policies and plans.
- Responds to community and regional transportation needs.
- Promotes energy efficient, environmentally sound modes of travel and facilities and services.
- Promotes equity and efficiency in the distribution of transportation projects and services

Specific goals of the proposed 2022 RTP/SCS are as follows:

- Environmental Justice: Ensure that transportation investments do not discriminate based on race, color, national origin, sex, age, or disability.
- Air Quality: Promote the improvement of air quality and greenhouse gas reductions through congestion management coordination of land use, housing, and transportation systems; provision of alternative modes of transportation; and provision of incentives that reduce vehicle miles traveled.
- Public Health: Promote public health in the region by providing opportunities for residents to bicycle and walk to destinations such as home, work, school, medical facilities, and commercial and service businesses.
- Comprehensive: Provide an efficient, integrated, multi-modal transportation system for the movement of people and goods that enhances the physical, economic, and social environment in the Tulare County region.
- Reliability and Congestion: Maintain or improve reliability of the transportation network and maintain or reduce congestion; Achieve a safe transportation system for all motorized and non-motorized users on all public roads in Tulare County; and Support more efficient use of the transportation system through the implementation of Intelligent Transportation Systems (ITS) technology.

- Transit: Provide a safe, secure, coordinated, and efficient public transit system that can reasonably meet the needs of residents.
- Active Transportation: Improve, enhance, and expand the region's bicycle and pedestrian systems and connectivity to those systems, while keeping them safe and convenient.
- Goods Movement: Provide a transportation system that efficiently and effectively transports goods to, from, within, and throughout Tulare County; and Improve goods movement within the region to increase economic vitality, meet the growing needs of freight and passenger services, and improve traffic safety, air quality, and overall mobility.
- Rail: Promote safe, economical, convenient rail systems and schedules that meet the needs of passenger and freight services in the region.
- Aviation: Support development of a regional system of airports that meets the air commerce and general aviation needs of the county.
- Emerging Technologies: Support the development and implementation of emerging technologies in the Surface Transportation System.
- SCS: Develop an integrated land use plan that meets CARB targets.

2.3 Project Location

As discussed in detail in Section 3.0, *Environmental Setting*, the proposed 2022 RTP/SCS covers the entire area of Tulare County and includes the cities of Dinuba, Exeter, Farmersville, Lindsay, Porterville, Tulare, Visalia, and Woodlake, as well as unincorporated communities in the county (see Figure 2-1). Capital improvement transportation projects, identified in the proposed 2022 RTP/SCS, are located on State highways, County roads, and locally owned streets, as well as on transit district property and public utility lands.

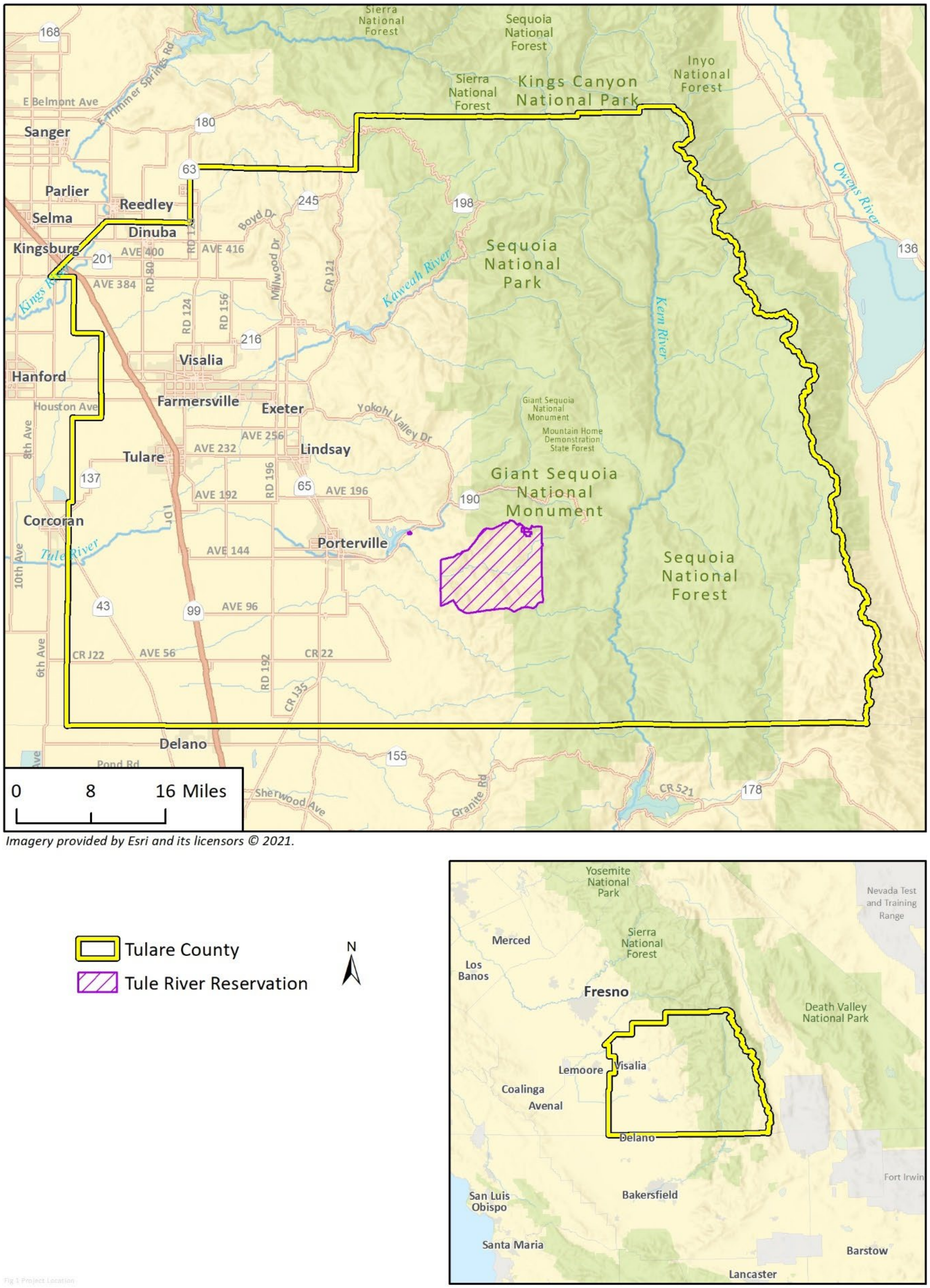
2.4 Project Characteristics

The proposed 2022 RTP/SCS is an update to the current 2018 RTP/SCS that was adopted in August 2018. The proposed 2022 RTP/SCS reflects changes in legislative requirements, local land use policies, and resource constraints that have occurred since adoption of the current 2018 RTP/SCS. The 2022 update to the 2018 RTP/SCS is focused on continued implementation of the 2018 RTP/SCS, with updates to ensure consistency with federal, State, and local planning requirements.

The proposed 2022 RTP/SCS shows how TCAG will meet the transportation needs of the region for the period from 2022 to 2046, considering existing and projected future land use patterns as well as forecasted population and job growth. The proposed 2022 RTP/SCS plans for and programs approximately $7.4 billion in revenues expected to be available to TCAG from all transportation funding sources over the course of the planning period. It identifies and prioritizes expenditures of anticipated funding for transportation projects that involve all transportation modes: highways, streets and roads, transit, rail, bicycle and pedestrian; transportation demand management (TDM); and transportation system management (TSM).

The proposed 2022 RTP/SCS transportation improvements project list is an update the 2018 RTP/SCS project list. As such it removes projects that have been completed since 2018, modifies some projects that continue to be on the list based on new information, and adds new projects to the list. None of the modified projects on the proposed 2022 RTP/SCS list would be substantially different in terms of geographical location, type of project, or the size of the project to those on the

Figure 2-1 TCAG Region



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2018 RTP/SCS list. A list of the transportation improvement projects included in the proposed 2022 RTP/SCS is shown in Table 2-1.

The land use scenario envisioned by the proposed 2022 RTP/SCS is similar to that contained in the 2016 RTP/SCS The principles of the preferred land use scenario, the Cross Valley Corridor Blueprint Plus (CVCBP), guides the allocation of future development sufficient to accommodate the forecasted growth in population, households, and employment through 2046. Most notable of these principles is an increase in average densities county-wide by generally 30% over the status quo densities. This is articulated in a growth pattern that is reflective of the CVCBP's potential for increasing multi-modal travel and transit-oriented development. Reference Section 2.4.2 below for additional information regarding the Sustainable Communities Strategy (SCS) and the CVCBP land use scenario.

2020 RTP/SCS Organization. TCAG adopted the previous 2018 RTP/SCS in August 2018. This proposed 2022 RTP/SCS reflects changes in legislative requirements, local land use policies, and resource constraints and is organized into four chapters:

Policy Element. The Policy Element provides guidance to decision-makers of the implications, impacts, opportunities, and foreclosed options that will result from implementation of the RTP. California statue states that each RTP shall include a Policy Element that: describes the transportation issues in the region, identifies and qualifies regional needs expressed within both short and long-range planning horizons and maintains internal consistency with the Financial Element and fund estimates.

Sustainable Communities Strategy. Demonstrates the ability of TCAG to meet the GHG targets that CARB has set for the TCAG region from on-road light-duty trucks and passenger vehicles. The proposed 2022 RTP/SCS updates the current RTP/SCS, adopted by TCAG in August 2018, and incorporates new strategies to address rapidly changing regional, national, and global context.

Action Element. Consists of short-term and long-term activities that address regional transportation issues and needs for all transportation modes. The Action Element would establish assumptions which form the definition of what is acceptable based upon adopted goals, policies and objectives and are part of the projection equation. Further, the Action Element would be separated into two parts: a discussion of regional issues, mandated transportation services, air quality, forecasting, regionally significant roads, alternatives, social impacts and RTP analysis; and a concluding section discussing each mode of transportation.

Financial Element. Identifies the current and anticipated revenue sources and financing techniques available to fund the planned transportation investments described in the Action Element. The intent of the Financial Element would be to define realistic transportation financial constraints and opportunities with current available data. Discussion would center of three main topics: current funding revenues, transportation expenditures, and potential funding sources for the future

Of these four chapters of the proposed 2022 RTP/SCS, the Sustainable Communities Strategy, Policy Element, and the Action Element are the three that include provisions with the potential to create physical changes to the environment and are the primary focus for analysis in this EIR. These chapters are described in more detail below.

2.4.1 Policy Element

The Policy Element identifies transportation goals, objectives, and policies that will help meet the needs of the region. These goals, objectives, and policies are established to determine specific courses of action to guide Tulare County toward implementation of the proposed 2022 RTP/SCS. The areas covered are quite expansive, from items such as bicycle, goods movement, and regional road system polices, to policies and objectives to achieve public health, public outreach, and environmental justice goals. The eleven policy areas and goals of the proposed 2022 RTP/SCS are identified below. Reference Chapter B (Policy Element) for more detailed descriptions of the transportation goals, objectives, and policies of the proposed 2022 RTP/SCS.

Policy Area 1: Environmental Justice

> **Goal:** Ensure that transportation investments do not discriminate based on race, color, national origin, sex, age, or disability.

Policy Area 2: Air Quality and Greenhouse Gases

> **Goal:** Promote the improvement of air quality and greenhouse gas reductions through congestion management coordination of land use, housing, and transportation systems; provision of alternative modes of transportation; and provision of incentives that reduce vehicle miles traveled.

Policy Area 3: Public Health

> **Goal:** Promote public health in the region by providing opportunities for residents to bicycle and walk to destinations such as home, work, school, medical facilities, and commercial and service businesses.

Policy Area 4: Comprehensive

> **Goal:** Provide an efficient, integrated, multi-modal transportation system for the movement of people and goods that enhances the physical, economic, and social environment in the Tulare County region.

Policy Area 5: Reliability and Congestion

> **Goal:** Maintain or improve reliability of the transportation network and maintain or reduce congestion.

> **Goal:** Achieve a safe transportation system for all motorized and non-motorized users on all public roads in Tulare County

> **Goal:** Support more efficient use of the transportation system through the implementation of Intelligent Transportation Systems (ITS) technology.

Policy Area 6: Transit

> **Goal:** Provide a safe, secure, coordinated, and efficient public transit system that can reasonably meet the needs of residents.

Policy Area 7: Active Transportation

> **Goal:** Improve, enhance, and expand the region's bicycle and pedestrian systems and connectivity to those systems, while keeping them safe and convenient.

Policy Area 8: Goods Movement

> **Goal:** Provide a transportation system that efficiently and effectively transports goods to, from, within, and throughout Tulare County.

Goal: Improve goods movement within the region to increase economic vitality, meet the growing needs of freight and passenger services, and improve traffic safety, air quality, and overall mobility.

Policy Area 9: Rail

Goal: Promote safe, economical, convenient rail systems and schedules that meet the needs of passenger and freight services in the region.

Policy Area 10: Aviation

Goal: Support development of a regional system of airports that meets the air commerce and general aviation needs of the county.

Policy Area 11: Emerging Technologies

Goal: Support the development and implementation of emerging technologies in the Surface Transportation System.

2.4.2 Sustainable Communities Strategy

As required by the Sustainable Communities and Climate Protection Act of 2008 (Senate Bill 375), the 2022 Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS) contains a SCS that considers both land use and transportation together in a single, integrated planning process that accommodates regional housing needs and projected growth. The proposed 2022 RTP/SCS updates the current RTP/SCS, adopted by TCAG in August 2018, and incorporates new strategies to address rapidly changing regional, national, and global context. As have past RTPs, the 2022 plan shows how the region can invest limited transportation funds to maintain, operate and improve an integrated, multi-modal transportation system with the purpose of facilitating the efficient movement of people and goods. The updated plan identifies specific strategies, policies, and actions, including a list of programmed and planned transportation projects feasibly within the region's anticipated transportation funding levels, to meet the current and future needs of the region. The planning horizon of the proposed 2022 RTP/SCS is 2046. Reference Chapter C of the 2022 RTP for a thorough description of the TCAG SCS development process.

The RTP/SCS accounts for the land uses of the eight incorporated cities, the many thriving communities in the unincorporated areas, and the diverse rural regions (see Figure 2-2 for existing land uses). The SCS preferred scenario focuses new development in existing urbanized infill locations avoiding resource areas identified (see Figure 2-3). See Chapter C of the proposed 2022 RTP/SCS for additional discussion regarding existing and future land uses.

A vital input to the SCS development process was an updated forecast of population, housing, and jobs. TCAG developed a new forecast for the proposed 2022 RTP/SCS based on the most comprehensive and up-to-date regional forecasts and projections available. The growth forecast for this RTP/SCS incorporates substantial data available from projections published by the California Department of Finance, Demographic Research Office (DOF) in 2021. The growth forecast, based on the DOF projection, is much more restrained than in previous RTPs. The new growth forecast is summarized in Table 2-1 below:

Table 2-1 Demographic Forecast

Year	Population	Housing Units	Jobs
2021	481,649	154,436	187,137
2025	500,134	163,135	192,262
2030	520,428	172,550	199,678
2035	535,463	181,012	206,681
2040	551,563	187,952	212,582
2046	567,383	195,210	218,846

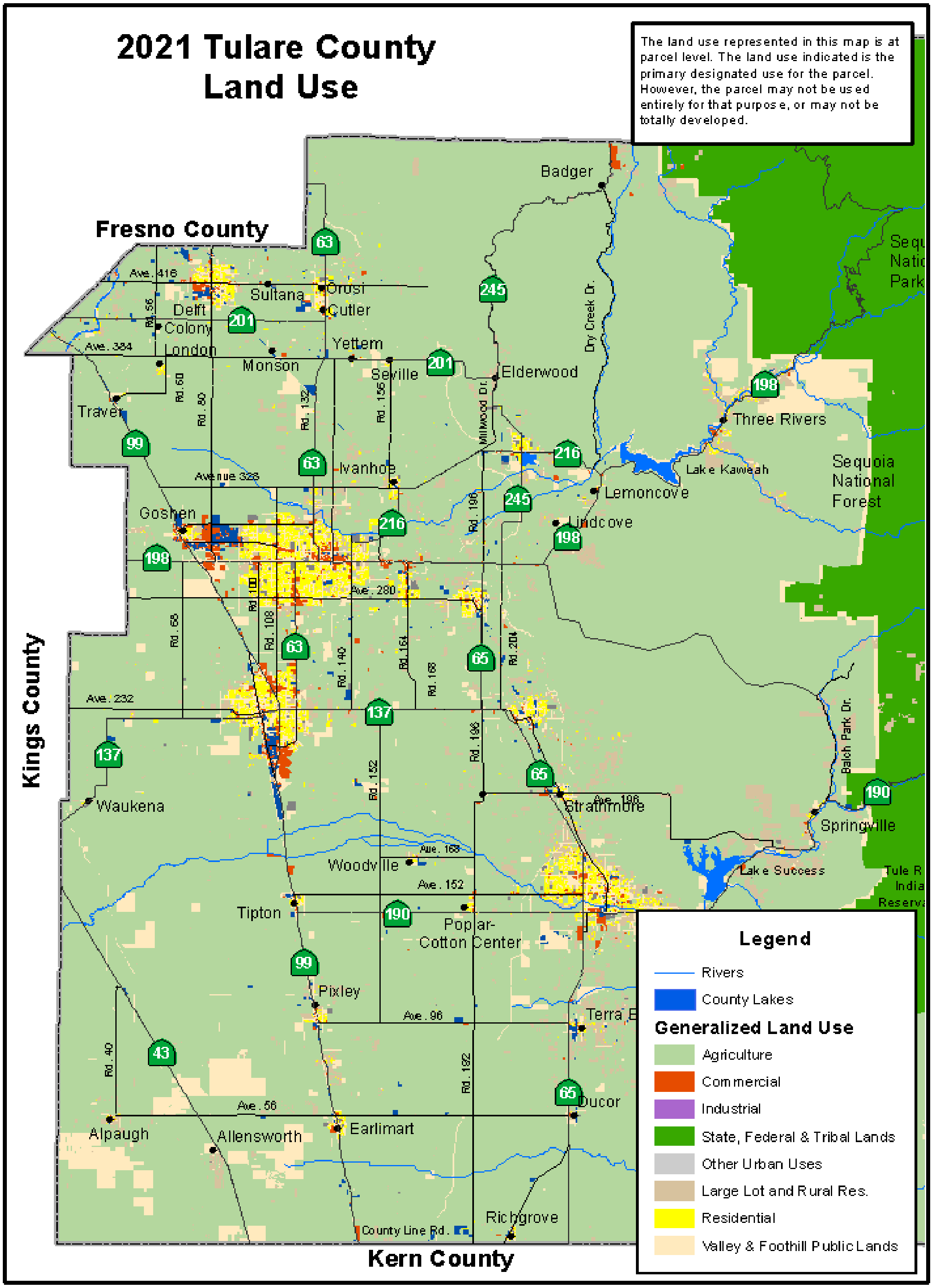
Source: Draft 2022 RTP/SCS. Chapter C, Table SCS-2.1.

SB 375 created a link between housing planning and the RTP. The RTP must be updated every four years, and the Regional Housing Needs Allocation (RHNA) Plan every eight years. Therefore, every other RTP coincides with the RHNA planning process. SB 375 requires the SCS to “identify areas within the region sufficient to house an eight-year projection of the regional housing need for the region pursuant to (Government Code) Section 65584.” The SCS preferred scenario meets this requirement and supplies enough residential housing capacity by jurisdiction to meet the housing need of 33,214 units projected for the 1/1/2023 to 6/30/2031 period for the TCAG region.

Under the federal Clean Air Act, the RTP/SCS must demonstrate that it conforms with the State Implementation Plan, and that it will not cause or contribute to any new violation of any standard, increase the frequency or severity of any existing violation of any standard, or delay timely attainment of any standard or any required interim emission reductions or other milestones in each air basin. TCAG prepares and adopts concurrently with the RTP/SCS an air quality conformity analysis to ensure that the RTP/SCS meets the federal conformity requirements. Under the SCS preferred scenario, TCAG has found that the proposed 2022 RTP/SCS conform to the applicable State Implementation Plan (SIP) and the Environmental Protection Agency’s (EPA) Transportation Conformity Rule. See proposed 2022 RTP/SCS Appendix 1-B for further information on Air Quality Conformity requirements.

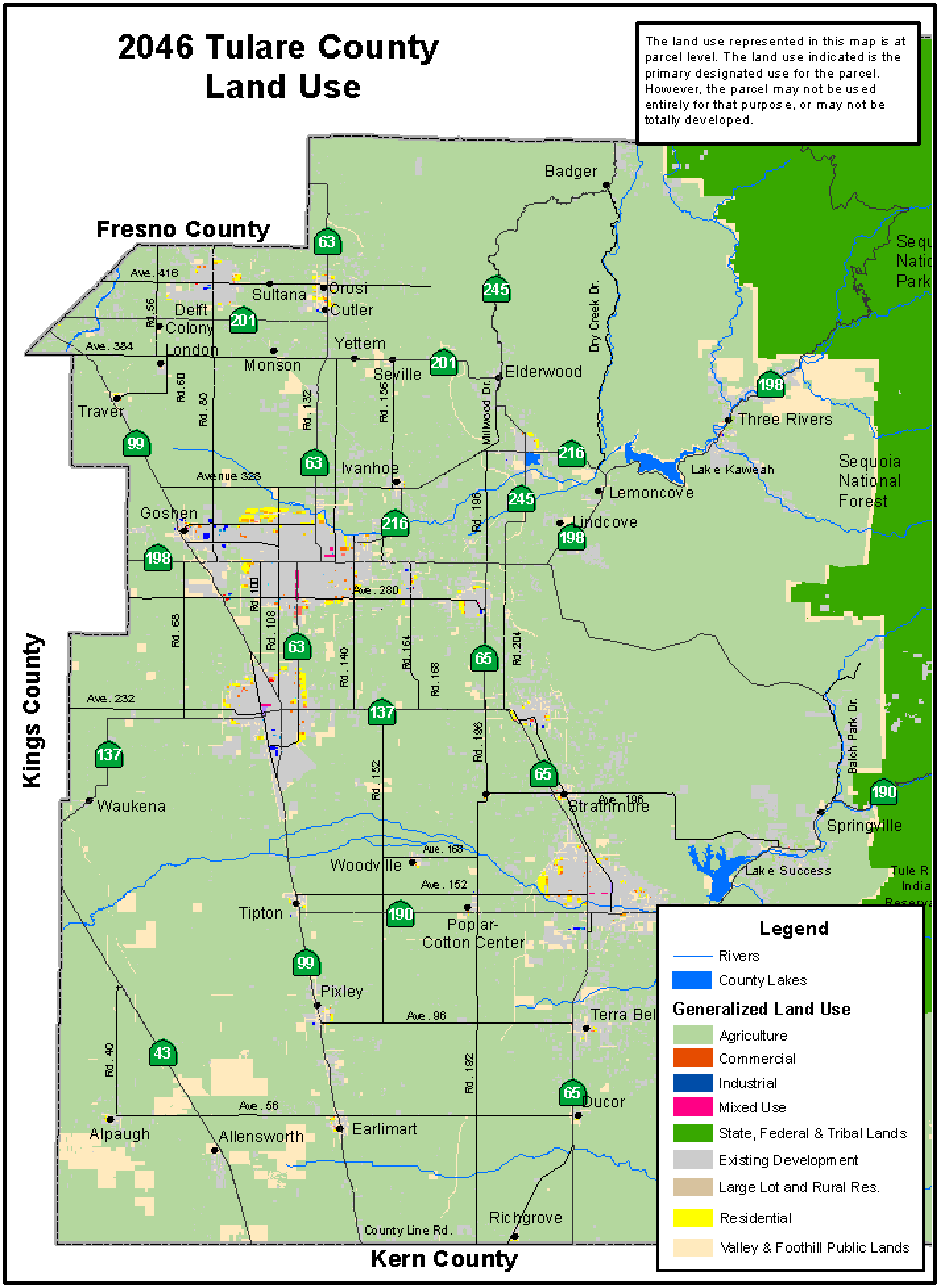
The purpose of SB 375 is to achieve the state’s emissions reduction targets for cars and light-duty trucks. This mandate requires CARB to determine per capita greenhouse gas (GHG) emissions reduction targets for each MPO in the state at two points: 2020 and 2035. For the TCAG region, the current RTP must achieve emissions reductions of 13% per capita in 2020 and 16% per capita in 2035. The SCS preferred scenario meets this requirement by achieving GHG emissions reductions of 13.7% in 2020 and 16.2% in 2035. See proposed 2045 RTP/SCS Chapter C for more information on the proposed 2045 RTP/SCS meets state GHG emissions reduction targets.

Figure 2-2 Existing Land Use



Source: Draft 2022 RTP/SCS. Chapter C, Figure SCS-1.1.

Figure 2-3 2046 Land Use



Source: Draft 2022 RTP/SCS. Chapter C, Figure SCS-5.1.

2.4.3 Action Element

The Action Element of the Regional Transportation Plan (RTP) describes the programs and actions necessary to implement the RTP and assigns implementation responsibilities. The Action Element describes transportation projects that may be completed during the RTP plan horizon (2046) and consider congestion management activities within the region. All transportation modes (highways, local streets and roads, mass transportation, rail, bicycle, pedestrian, and aviation facilities and services) are addressed. The Action Element provides direction about the MPO's and other agencies' roles and responsibilities as RTP/SCS projects and policies are implemented. It consists of short- and long-term activities that address regional transportation issues and needs

The circulation system in Tulare County plays a significant role in the economy by moving goods and people. An intensively agricultural region, Tulare County is dependent on local highways, streets, roads, and railways to meet basic transportation needs. Goods movement is specifically dependent on road conditions and capacity. Tulare County and its cities have implemented programs to reduce congestion and improve the efficiency of our highways, streets, and roads network. Transit and active modes of transportation, such as bicycling and walking, are becoming a larger share of the transportation system. The Action Element provides a summary of existing and future conditions of the Tulare County transportation system. Existing and future circulation issues and land use trends are also addressed. This analysis is intended to support improvements in the transportation system to help meet future travel needs.

2.4.4 The Proposed 2022 RTP/SCS Projects

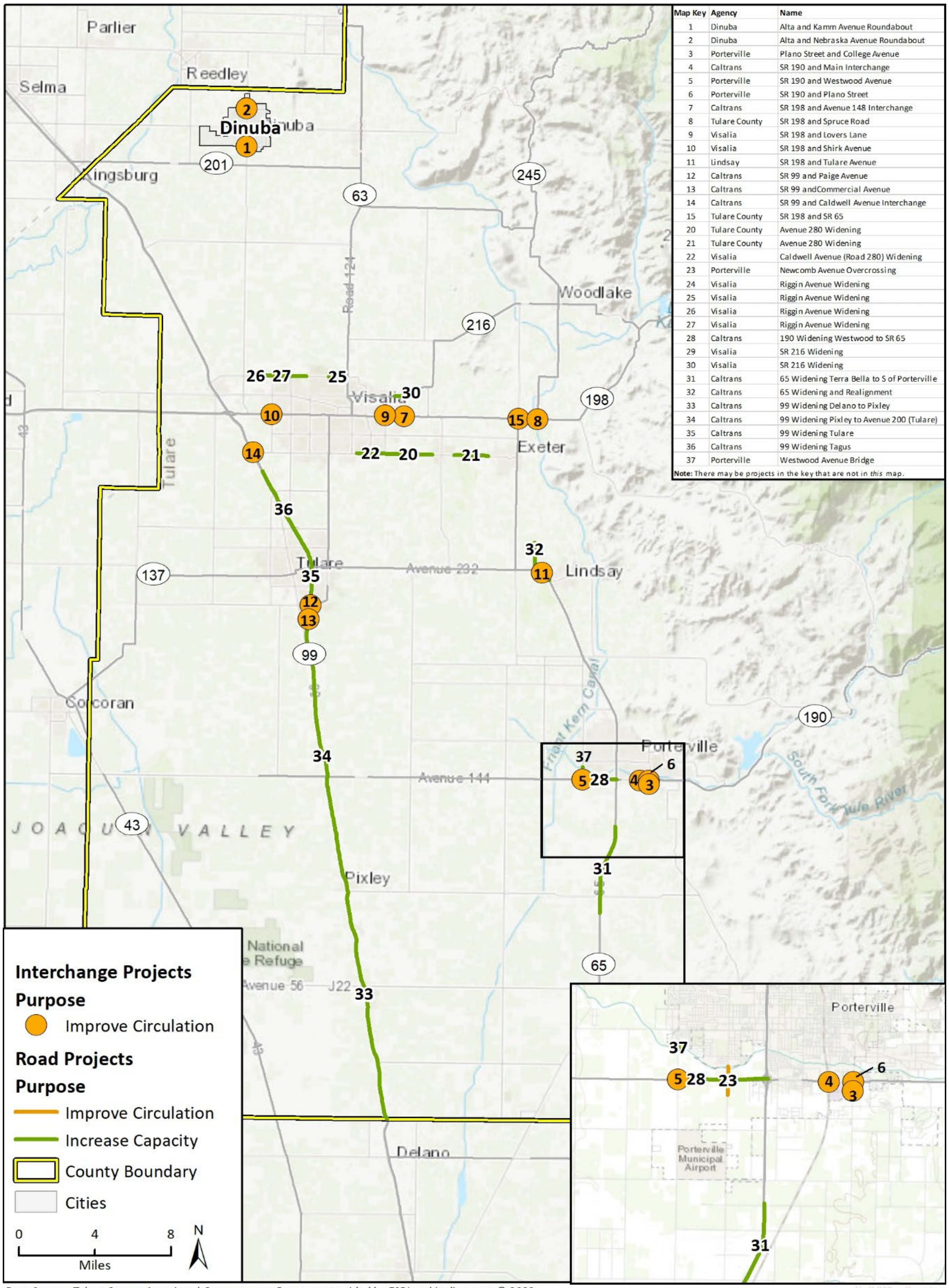
The general locations of all physical projects of the proposed 2022 RTP/SCS are identified in Figure 2-4 through Figure 2-10 and listed in Table 2-2.

The three largest sources of State funding for the TCAG region include the Transportation Development Act, State Transportation Improvement Program, and State Highway Operations and Protection Program. The Transportation Development Act was signed into law in 1971. It provides two major sources of funding for public transportation: the Local Transportation Fund and the State Transit Assistance fund. Funds for the Local Transportation Fund come from ¼ percent of the general State sales tax. The 1997 passage of Senate Bill 45 created the State Transportation Improvement Program (STIP). The STIP is a five-year capital improvement program of transportation projects on and off the State Highway System. Every two years, the CTC adopts a fund estimate which identifies the amount of new funds available for the programming of transportation projects. The State Highway Operations and Protection Program (SHOPP) helps fund collision reduction, bridge preservation, roadway preservation, roadside preservation, and mobility enhancement projects, and preservation of other transportation facilities related to the State Highway System. SHOPP funds also help repair damage caused by natural disasters, civil unrest, or terrorist acts.

The largest source of regional and local funding for the TCAG region is Measure R, which is administered by TCAG, the Local Transportation Authority for Tulare County. In 2006, Measure R established a half-cent sales tax with a 30-year lifespan, estimated to generate slightly more than $652 million during that time. Regional projects have been dedicated to receiving 50 percent of all Measure R funds. This includes funding transportation projects across the county, including the improvement of roads, bike paths, and interchanges.

TCAG has also been successful with competitive grant programs and makes some assumptions regarding continued success. These grant programs include SB 1 programs, the Active Transportation Program, and several cap-and-trade funding programs.

Figure 2-4 General Project Locations – County Overview



Map Key	Agency	Name
1	Dinuba	Alta and Kamm Avenue Roundabout
2	Dinuba	Alta and Nebraska Avenue Roundabout
3	Porterville	Plano Street and College Avenue
4	Caltrans	SR 190 and Main Interchange
5	Porterville	SR 190 and Westwood Avenue
6	Porterville	SR 190 and Plano Street
7	Caltrans	SR 198 and Avenue 148 Interchange
8	Tulare County	SR 198 and Spruce Road
9	Visalia	SR 198 and Lovers Lane
10	Visalia	SR 198 and Shirk Avenue
11	Lindsay	SR 198 and Tulare Avenue
12	Caltrans	SR 99 and Paige Avenue
13	Caltrans	SR 99 andCommercial Avenue
14	Caltrans	SR 99 and Caldwell Avenue Interchange
15	Tulare County	SR 198 and SR 65
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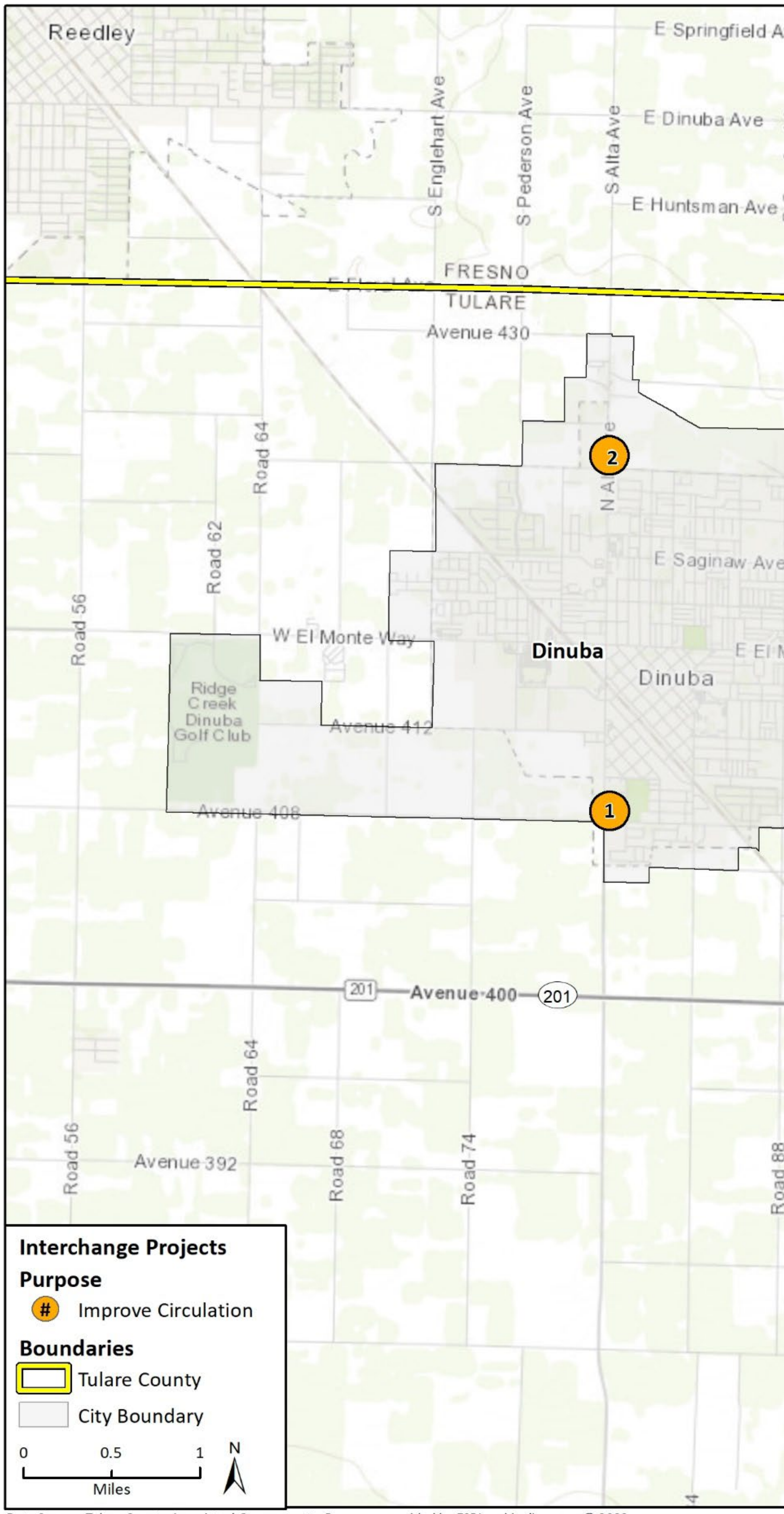
21	Tulare County	Avenue 280 Widening
22	Visalia	Caldwell Avenue (Road 280) Widening
23	Porterville	Newcomb Avenue Overcrossing
24	Visalia	Riggin Avenue Widening
25	Visalia	Riggin Avenue Widening
26	Visalia	Riggin Avenue Widening
27	Visalia	Riggin Avenue Widening
28	Caltrans	190 Widening Westwood to SR 65
29	Visalia	SR 216 Widening
30	Visalia	SR 216 Widening
31	Caltrans	65 Widening Terra Bella to S of Porterville
32	Caltrans	65 Widening and Realignment
33	Caltrans	99 Widening Delano to Pixley
34	Caltrans	99 Widening Pixley to Avenue 200 (Tulare)
35	Caltrans	99 Widening Tulare
36	Caltrans	99 Widening Tagus
37	Porterville	Westwood Avenue Bridge

Note: There may be projects in the key that are not in *this* map.

Data Source: Tulare County Associated Governments. Basemap provided by ESRI and its licensors © 2022.

Figure 2-5 General Project Locations – Dinuba



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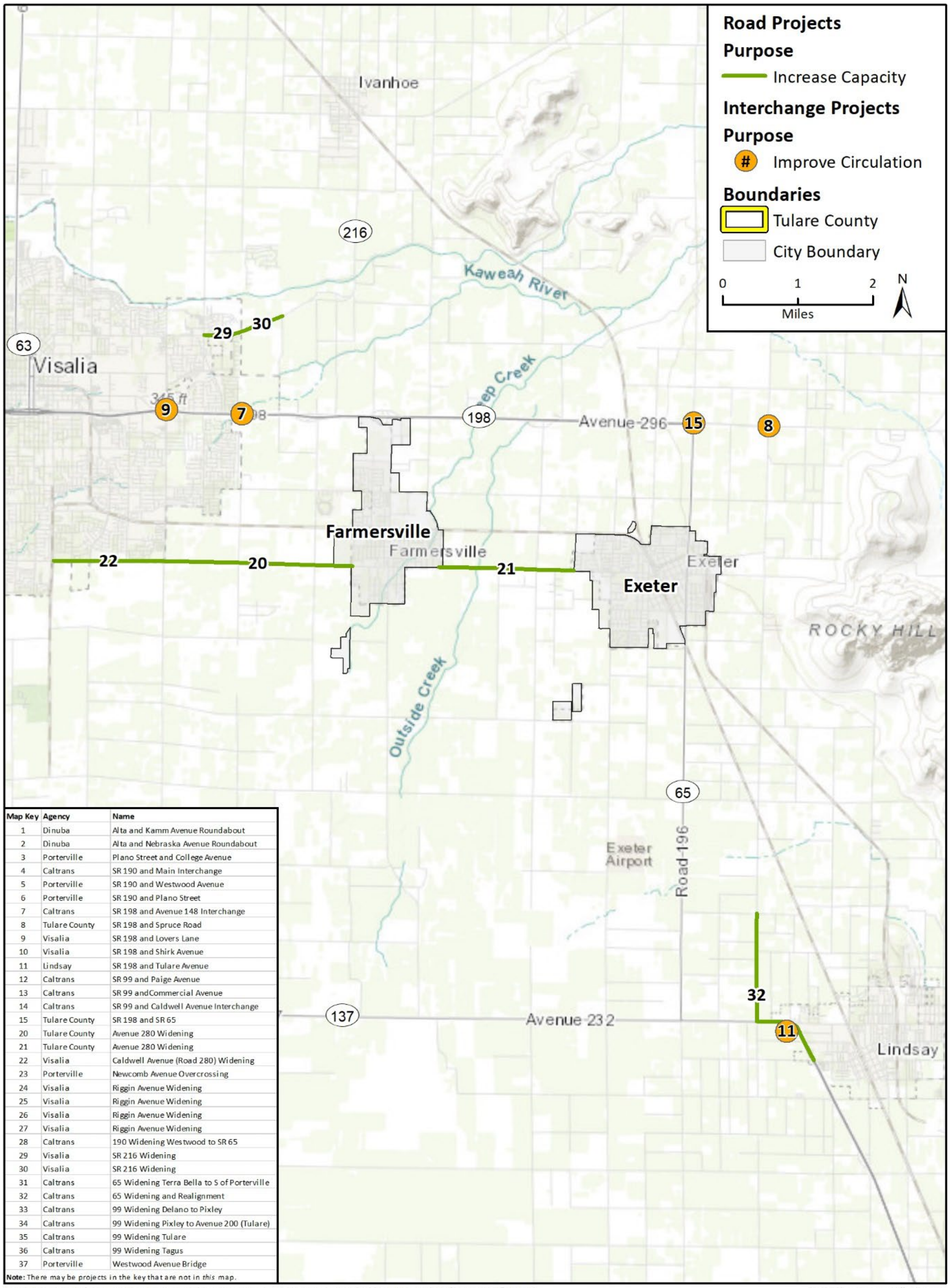
36	Caltrans	99 Widening Tagus
37	Porterville	Westwood Avenue Bridge

Note: There may be projects in the key that are not in *this* map.

Data Source: Tulare County Associated Governments. Basemap provided by ESRI and its licensors © 2022.

Fig X RTPs - Dinuba

Figure 2-6 General Project Locations – Exeter and Farmersville



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34	Caltrans	99 Widening Pixley to Avenue 200 (Tulare)
35	Caltrans	99 Widening Tulare
36	Caltrans	99 Widening Tagus
37	Porterville	Westwood Avenue Bridge

Note: There may be projects in the key that are not in *this* map.

Data Source: Tulare County Associated Governments. Basemap provided by ESRI and its licensors © 2022.

Figure 2-7 General Project Locations - Lindsay

Map Key	Agency	Name
1	Dinuba	Alta and Kamm Avenue Roundabout
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3	Porterville	Plano Street and College Avenue
4	Caltrans	SR 190 and Main Interchange
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27	Visalia	Riggin Avenue Widening
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30	Visalia	SR 216 Widening
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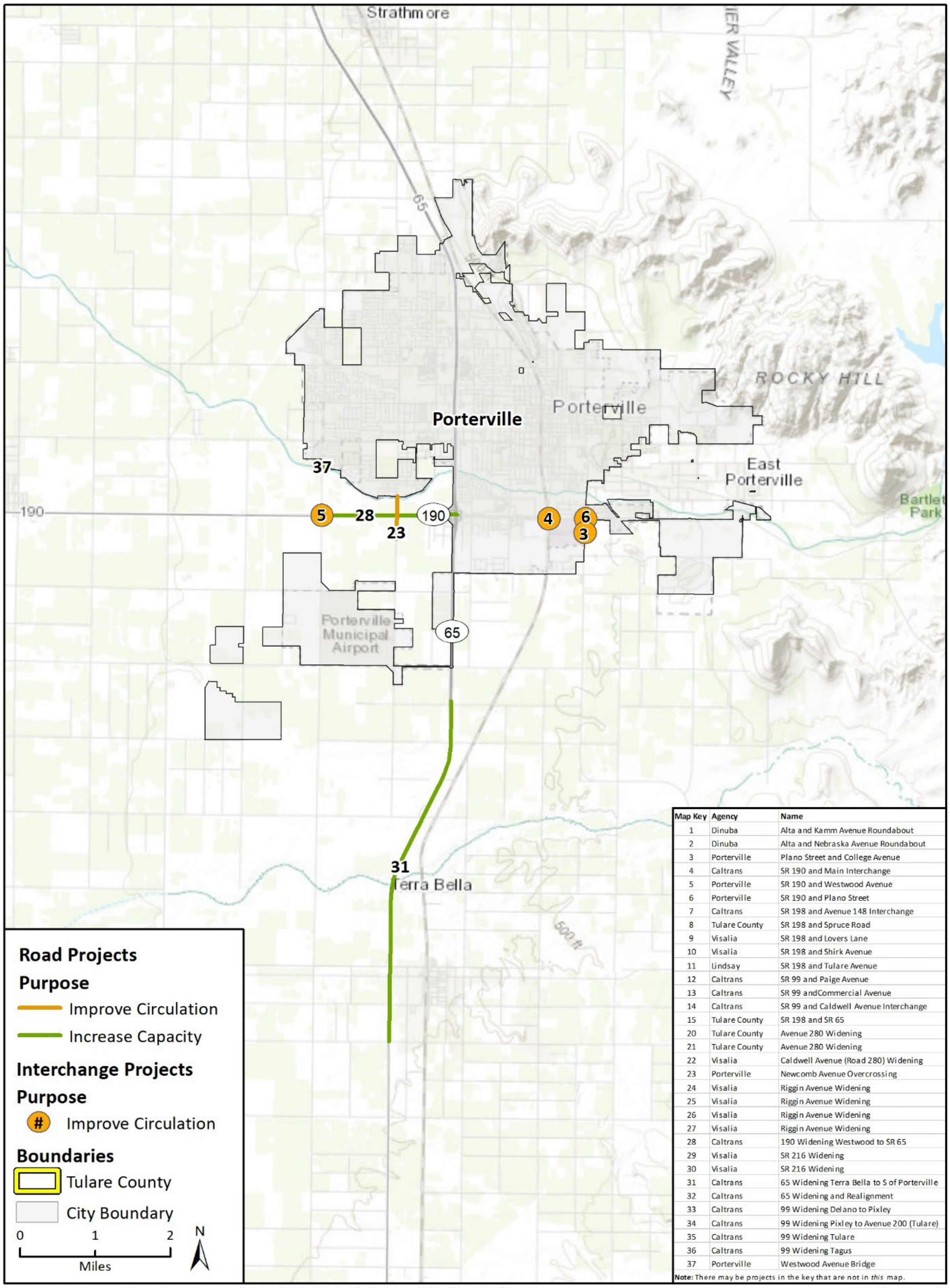
33	Caltrans	99 Widening Delano to Pixley
34	Caltrans	99 Widening Pixley to Avenue 200 (Tulare)
35	Caltrans	99 Widening Tulare
36	Caltrans	99 Widening Tagus
37	Porterville	Westwood Avenue Bridge

Note: There may be projects in the key that are not in *this* map.

Data Source: Tulare County Associated Governments. Basemap provided by ESRI and its licensors © 2022.

Figure 2-8 General Project Locations - Porterville



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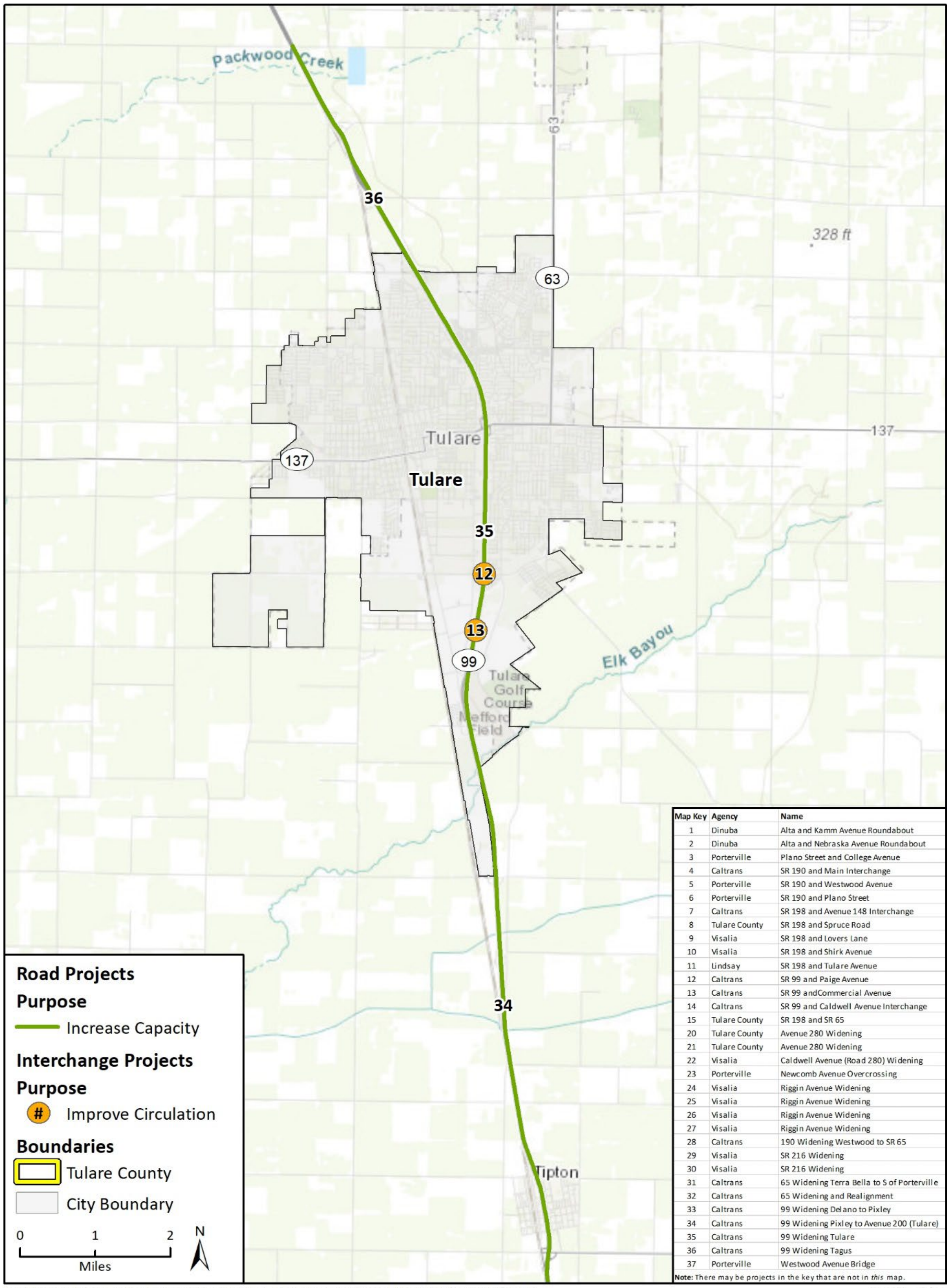
35	Caltrans	99 Widening Tulare
36	Caltrans	99 Widening Tagus
37	Porterville	Westwood Avenue Bridge

Note: There may be projects in the key that are not in *this* map.

Data Source: Tulare County Associated Governments. Basemap provided by ESRI and its licensors © 2022.

Fig X RTPs - Porterville

Figure 2-9 General Project Locations - Tulare



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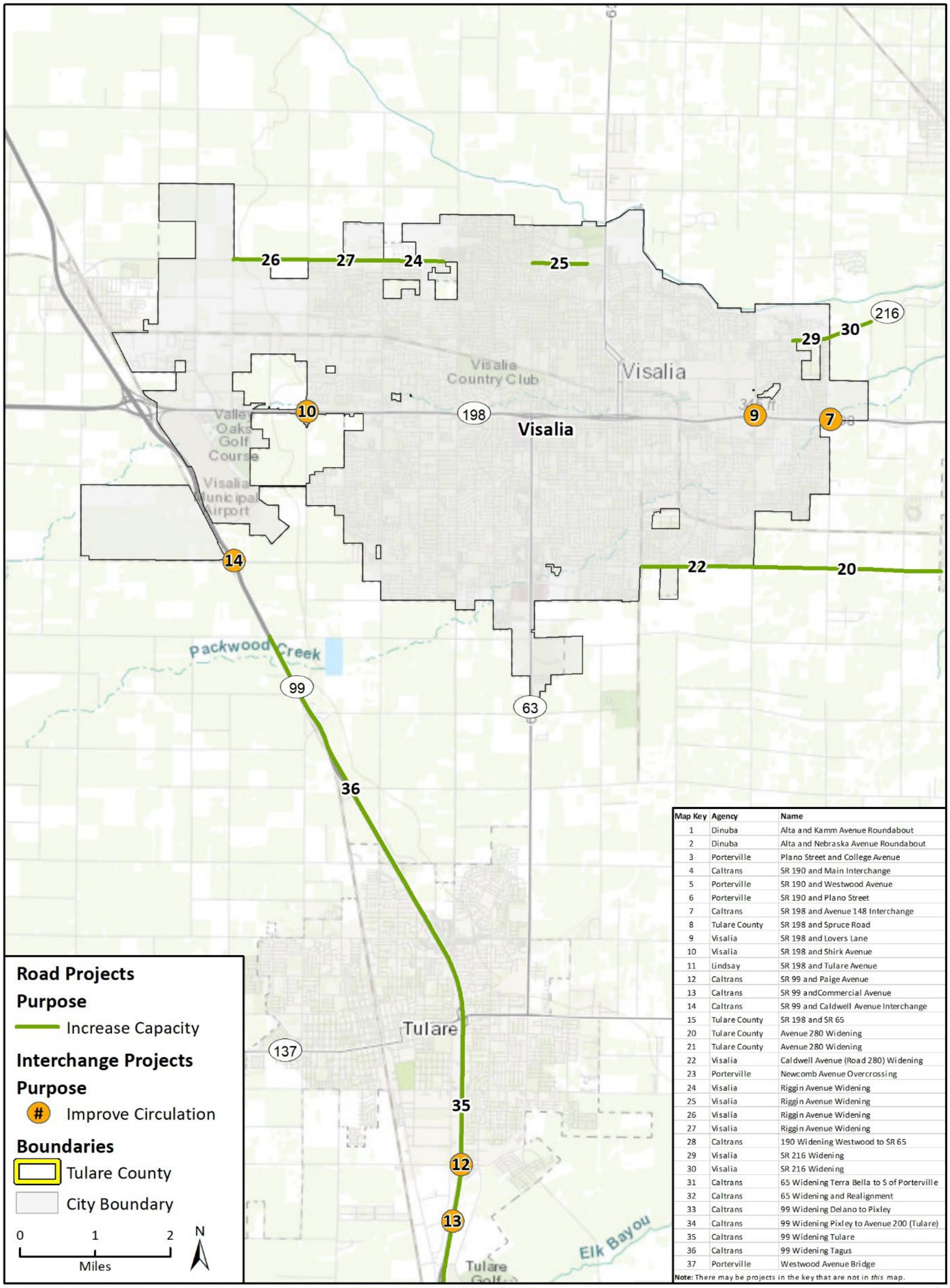
36	Caltrans	99 Widening Tagus
37	Porterville	Westwood Avenue Bridge

Note: There may be projects in the key that are not in *this* map.

Data Source: Tulare County Associated Governments. Basemap provided by ESRI and its licensors © 2022.

Fig X RTPs - Tulare

Figure 2-10 General Project Locations - Visalia



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36	Caltrans	99 Widening Tagus
37	Porterville	Westwood Avenue Bridge

Note: There may be projects in the key that are not in *this* map.

Data Source: Tulare County Associated Governments. Basemap provided by ESRI and its licensors © 2022.

Fig X RTPs - Visalia

Table 2-2 The Proposed 2022 RTP/SCS Planned and Programmed Projects

Project Jurisdiction and Location	Improvement	Purpose and Need
Caltrans		
State Route 99 - 30.6/35.2 Tulare/Tagus - Prosperity Avenue to 1.2m S of Avenue 280	Widen existing roadway from 4 to 6 lanes	Increase Capacity and Relieve Congestion
State Route 99 - 25.4/30.6 Tulare - Avenue 200 to Prosperity Avenue	Widen existing roadway from 4 to 6 lanes	Increase Capacity and Relieve Congestion
State Route 99 - 13.5/25.4 - 0.7 miles north of Court Ave to Avenue 200	Widen existing roadway from 4 to 6 lanes	Increase Capacity and Relieve Congestion
State Route 99 - 0.0/13.5 Near Earlimart, County Line Road to 0.7 miles north of Court Avenue	Widen existing roadway from 4 to 6 lanes	Increase Capacity and Relieve Congestion
State Route 65 - 10.9/15.6 Terra Bella - Avenue 88 to Avenue 124	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
State Route 65 - 29.5/32.3 Near Lindsay-from Hermosa Road to Avenue 244	Realignment and widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
State Route 190 - 13.2/15.0 Porterville - Westwood to State Route 65	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
State Route 99 at Caldwell Avenue	Widen on/off ramps and bridge structure	Improve Circulation and Relieve Congestion
State Route 99 at AgriCenter	Construct new Interchange	Improve Circulation and Relieve Congestion
State Route 99 at Paige Avenue	Widen on/off ramps and bridge structure	Improve Circulation and Relieve Congestion
State Route 198 at Road 148	Construct new interchange	Improve Circulation and Relieve Congestion
State Route 190 at Main Street	Widen bridge structure, new ramps	Improve Circulation and Relieve Congestion
Dinuba		
Nebraska Avenue at Alta Avenue	Roundabout at intersection	Improve Circulation and Safety
Kamm Avenue at Alta Avenue	Roundabout at intersection	Improve Circulation and Safety

Project Jurisdiction and Location	Improvement	Purpose and Need
Lindsay		
State Route 65 - at Tulare Avenue	Roundabout and local street improvements	Improve Circulation and Safety
Porterville		
State Route 190 - at Main Street and SR-65	WB Aux lane and ramp improvements	Improve Circulation and Safety
Westwood Street - South of Orange Avenue to south of Tule River	Widen existing road bridges from 2 to 4 lanes	Increase Capacity and Relieve Congestion
Newcomb Street - North of Tule River to south of Poplar Ditch	New 4 lane overcrossing over SR 190	Improve Circulation and Relieve Congestion
State Route 190 at Westwood	Roundabout and intersection improvements	Improve Circulation and Safety
State Route 190 at Plano Street	Roundabout and intersection improvements	Improve Circulation and Safety
Plano Street at College Avenue	Roundabout at intersection	Improve Circulation and Safety
Visalia		
State Route 198 at Shirk Street	Turn lane, intersection, ramp improvements	Improve Circulation and Safety
State Route 198 downtown corridor interchanges	Turn lane, intersection, ramp improvements	Improve Circulation and Safety
State Route 198 at Lovers Lane	Turn lane, intersection, road rehabilitation improvements	Improve Circulation and Safety
Riggin Avenue - Akers to Demaree	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
Riggin Avenue - Mooney to Conyer	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
Riggin Avenue - Shirk to Akers	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
Riggin Avenue - Kelsey to Shirk	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion

Project Jurisdiction and Location	Improvement	Purpose and Need
Tulare County		
Avenue 280 - Santa Fe (Visalia) to Lovers Ln (Visalia)	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
Avenue 280 - Lovers Ln (Visalia) to Virginia (Farmersville)	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
Avenue 280 - Brundage (Farmersville) to Elberta (Exeter)	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
State Route 99 - South County interchanges	Turn lane, intersection, ramp improvements	Improve Circulation and Safety
State Route 99 at Caldwell Avenue (Avenue 280)	Ramp signalization and intersection improv.	Improve Circulation and Safety
State Route 198 at State Route 65	Turn lanes, intersection improvements	Improve Circulation and Safety
State Route 198 at Spruce Road	Turn lanes, intersection improvements	Improve Circulation and Safety

2.5 Transportation Components Contained within the Proposed 2022 RTP/SCS

The circulation system in Tulare County plays a significant role in the economy by moving goods and people. A rural region, Tulare County is dependent on local highways, streets, roads, and railways to meet basic transportation needs. Goods movement is specifically dependent on road conditions and capacity. Tulare County and its cities have implemented programs to reduce congestion and improve the efficiency of our highways, streets, and roads network. Transit and active modes of transportation, such as bicycling and walking, are becoming a larger share of the transportation system. A summary of the proposed 2022 RTP/SCS major transportation features is described below based on the proposed 2022 RTP/SCS Action Element and a listing of the RTP constrained transportation projects is included in Table 2-1. Reference Chapter D Action Element for more detailed background information on each of transportation components described below.

Active Transportation

Bicycle and Pedestrian Improvements

These projects are focused on improvements designed to benefit pedestrians and bicyclists. This includes construction of Class I through IV bicycle lanes, sidewalk gap closures, ADA accessible ramps and sidewalks, pedestrian bridges, maintenance, installation of traffic calming devices, and new lighting. Within the TCAG region, specific projects include the Butterfield Stage Corridor Project in the City of Porterville, which consists of an approximately 4-mile bike and pedestrian corridor to include solar lighting, water stations, wayfinding, benches, and controlled lighted crossing systems. In the unincorporated community of Ivanhoe, the Road 160 Sidewalk Improvement Project will construct curb, gutter, sidewalk, ADA ramps, and drainage improvements.

The main source of funding for active transportation projects is the State of California's Active Transportation Program. Since the inception of the Active Transportation Program in 2013, agencies in Tulare County have submitted 124 applications for ATP funding. Of those applications, 26 applications have been awarded ATP funds totaling $22,843,000.[4] Tulare County cities have become more aggressive in developing their bicycle facilities by pursing various funding sources. The City of Visalia has a Trails and Waterways committee, and the city aggressively pursues air quality grant funds for bike project implementation. Other cities aggressively pursue bike funds as well and numerous projects are underway and scheduled for the near future. In 2016, TCAG adopted its first Regional Active Transportation Plan (RATP) which identifies the highest-priority pedestrian and bicycle improvements and safe routes to school projects for the County's cities and unincorporated areas. The projects in the RATP are incorporated by reference as the bicycle and pedestrian component of the proposed 2022 RTP/SCS. An update to the RATP was approved by the TCAG Board on April 18, 2022.[5]

In addition to the RATP, the County of Tulare has prepared Complete Streets Plans (see proposed 2022 RTP/SCS Appendices 23 through 27) for several of its unincorporated communities. The aim of Complete Streets Plans is to create a comprehensive and uniform vision for the County with respect to development of a transportation network that supports all modes of travel.

[4] G. Gutierrez, personal communication, March 9, 2022.
[5] 2022 Regional Active Transportation Plan for the Tulare County Region (Final)). https://tularecog.org/sites/tcag/assets/File/TCAG%202022%20RATP%20(Draft)x.pdf

Highways, Streets and Roads

Highway Improvements

These projects are generally focused on State Highways within Tulare County. They include the development of new infrastructure such as new interchanges, new and widened roadway lanes, ramp improvements, new overcrossings, roundabouts, and other modifications designed to improve safety and relieve congestion. Representative projects include: the Delano to Pixley 6-Lane Project which would widen State Route 99 from 4 to 6 lanes from the Kern County line north to the unincorporated community of Pixley (approximately 13 miles); the State Route 198 at Lovers Lanes Operational Improvements project in the City of Visalia which will construct operational improvements to help resolve existing congestion and improve safety for motorists; and the Caldwell Interchange project which will reconstruct the interchange at State Route 99 and Caldwell Avenue and include two new roundabouts.

Highway Operations, Maintenance and Rehabilitation

These projects focus on operational improvements to use existing highway system infrastructure more safely and efficiently. These include resurfacing, restriping, signal modifications and other improvements. Representative actions include projects funded with State Highway Operations and Protection Program (SHOPP) and Highway Safety Improvement Program (HSIP) funds. Examples of projects in the proposed 2022 RTP/SCS include construction of a roundabout at the intersection of State Route 190 and Rockford Road near the City of Porterville; rehabilitation of drainage systems on State Route 198 from the Kings County line to east of Sequoia National Park; and the rehabilitation of pavement, upgrade of Transportation Management Systems (TMS) elements, replacement of signs, and upgrade of facilities to ADA standards on State Route 63 from south of Caldwell Avenue to State Route 198.

Local Street and Road Improvements

These projects are generally focused on county and local streets and roadways. They include the development of new infrastructure such as street widening, realignments, extensions and related improvements designed to improve safety and capacity. Representative improvements include road widening projects along Riggin Avenue and Caldwell Avenue in the City of Visalia and on Avenue 280 in the County of Tulare and near the City of Exeter.

Local Street and Road Operations, Maintenance and Rehabilitation

These projects focus on improvements to existing county and local streets and roadway infrastructure. These include resurfacing, restriping, signal modifications, streetscapes and other improvements designed to maintain and more efficiently and effectively use existing facilities. Specific projects include the K Street Reconstruction Project in the City of Tulare which will reconstruct various segments of roadway located on K Street and Blackstone Avenue; and the Tulare Avenue Rehabilitation Project which will rehabilitate a portion of Tulare Avenue located between Demaree and Roeben Avenues in the City of Visalia.

Transportation Control Measures (TCMs)

Transportation Control Measures (TCMs) are also being used to reduce vehicle trips, improve air quality, and relieve congestion. The SJVAPCD, in compliance with the California Clean Air Act (CCAA) to reduce vehicle trips, is enforcing the TCMs. The Air Quality Conformity document is included as part of the proposed 2022 RTP/SCS as Appendix 1-B. The document and the accompanying air quality findings contain a description of the implemented TCMs in Tulare County. Under the proposed 2022 RTP/SCS, these TCMs will continue to be implemented. There are many sources of funding that can be used to implement TCMs. Some primary sources for TCM implementation are the Congestion Mitigation and Air Quality (CMAQ) Program, Federal Transit Administration (FTA) funding, Active Transportation Program (ATP) funds, and eligible local sales tax funds.

Transportation System Management (TSM)

Transportation System Management (TSM) is designed to identify short-range, low-cost capital projects that improve the operational efficiency of existing infrastructure. An effective TSM program using appropriate techniques can improve circulation and reduce automobile emissions. TSM is an important tool endorsed by the SJVAPCD and state to meet air quality standards and congestion management levels-of-service. TSMs are used in coordination with TDM and TCMs to improve the local and regional environment. Additional population concentrations and accelerated residential, commercial and industrial development will result in more automobiles within urban areas. Additional industrial and commercial development may result in increased emissions at and near such sites. Projects to address TSM in the proposed 2022 RTP/SCS include traffic signal interconnect projects in the City of Visalia on Houston Avenue, Demaree Street, and Ben Maddox Way and a traffic signal and signal interconnection at Burke Street and St. John’s Parkway.

Public Transit

Transit Improvements

These projects include improvements such as the purchase of rolling stock, bus rehabilitation, purchase of communication equipment, bus shelters and ancillary equipment used to rehabilitate/upgrade existing transit stops/stations. Specific improvements include bus purchases for Visalia City Transit and TCRTA as well as transit preventative maintenance activities for Visalia City Transit and TCRTA.

Transit Operations

An environmentally sound alternative to adding additional lanes to highways, streets, and roads is to provide mass transit systems. Mass transportation provides transportation to large numbers of people to designated destinations by bus or train. In Tulare County, buses are the primary mode of public transportation. Fixed Route and Dial-A-Ride services are provided by Visalia Transit and Tulare County Regional Transit Agency (TCRTA). In 2016, Visalia Transit began the V-LINE- bus service between Visalia (from the transit center and Visalia Municipal Airport) to various locations in Fresno County (the Fresno Yosemite International Airport, California State University, Fresno, and Courthouse Park). Intercounty connections are also provided by TCRTA between Dinuba and Reedley and to Delano and Kingsburg. Amtrak, California's only operating interregional passenger rail service, does not directly serve Tulare County. The closest Amtrak stations are in the Cities of Hanford and Corcoran in Kings County. However, Amtrak does coordinate with Visalia Transit to provide a feeder bus linking Visalia from the city’s transit center with the Hanford Station in Kings County. Greyhound and Orange Belt Stages also operate in Tulare County.

Public transportation in Tulare County also takes the form of shared-ride companies, carpools, and vanpools. Fixed route transit is generally used in the more populated urban areas while demand responsive transit and blended paratransit are often used in rural areas and communities.

Several regional programs and services exist in Tulare County. All transit providers participate in the TPass, which provides unlimited monthly fixed route rides, College of Sequoias Student Pass, which provided unlimited fixed route rides for students with their paid student fees, and the Greenline call center.

Mass transportation has the capability to reduce a large number of single vehicle occupancy trips and reduce emissions. All fixed-route providing public transit agencies in Tulare County have fleets of Compressed Natural Gas (CNG) vehicles and CNG fueling stations. Visalia Transit and TCRTA have begun to operate electric buses. Goals for all transit agencies are to integrate transit into the growth and development of their cities and communities. As developments and road designs occur, transit would be integrated when possible. High and medium density neighborhoods, commercial, medical, educational, and employment areas can all benefit from transit. The proposed 2022 RTP/SCS includes projects for general transit operations, preventative maintenance, transit planning, and technology improvements for the Tulare County Regional Transit Agency and Visalia City Transit.

Passenger Rail

In 2003, major improvements were completed to the Cross-Valley Rail. The project was funded with several financial sources including CMAQ funding. CMAQ funding may be used for rail improvements that demonstrate a reduction of pollutants. Other areas related to rail is the preservation of abandoned rail corridors for future improvements or conversion to bike/pedestrian facilities.

The San Joaquin Valley segment of California's High-Speed Rail (HSR) project is currently under construction. As part of the environmental process, the California High Speed Rail Authority selected the rail alignment alternative that runs to the east of Hanford. The Authority has identified a regional HSR station in the Hanford region and TCAG staff is actively involved in the planning process.

Aviation

The Capital Improvement Program (CIP) in the California Aviation System Plan identifies potential airport projects for publicly owned airports in California. Reference Table F-18.1 of Chapter E Fiscal Element to the list of projects for the five publicly owned airports in Tulare County. A total of $35.5 million of airport projects are identified for Porterville, Mefford (Tulare), Sequoia, Visalia, and Woodlake Airports. The CIP is an unconstrained listing of projects. The projects listed are eligible for funding from the State Aeronautics Account, including the State portion of the local the Federal Aviation Administration (FAA) Airport Improvement projects (AIP).

2.6 Required Approvals and Permits

Approval of the proposed 2022 RTP/SCS is at the discretion of TCAG. It should be noted that additional environmental review will have to be conducted by the project sponsor, as the lead agency for the individual projects contained within the proposed 2022 RTP/SCS, prior to project implementation. Depending on the location of the project, future approvals for individual transportation projects identified in the proposed 2022 RTP/SCS would have to be completed by one or more of the following agencies:

- Tulare County Association of Governments
- California Department of Transportation (Caltrans)

- California Public Utilities Commission's Rail Crossings Engineering Section
- Cities of:
  - Dinuba
  - Exeter
  - Farmersville
  - Lindsay
  - Porterville
  - Tulare
  - Visalia
  - Woodlake
- County of Tulare
- Tulare County Regional Transit Agency
- Visalia Transit

The relationship of this EIR to future environmental review of individual transportation projects is further discussed in Section 1.0, *Introduction.*

Individual projects may also require permits from the following State agencies, which may use the EIR in their environmental reviews and consultations:

- California Department of Fish and Wildlife
- Central Valley Regional Water Quality Control Board
- San Joaquin Valley Air Pollution Control District

2.7 Relationship to Other Plans and Programs

The proposed 2022 RTP/SCS provides a sound basis for the allocation of state and federal transportation funds for transportation projects within each California county over the subsequent 20-years. The proposed 2022 RTP/SCS follows guidelines established by the State of California Transportation Commission (CTC 2017) to:

- Describe the transportation issues and needs facing the county;
- Identify goals and policies for how TCAG will meet those needs;
- Identify the amount of money that will be available for identified projects; and
- Include a list of prioritized transportation projects to serve the county's long-term needs consistent with the funds allocated while considering environmental impacts and planning for future land use.

The proposed 2022 RTP/SCS has been evaluated for consistency with the goals, policies and objectives currently being implemented by municipal and county planning agencies within the region. A consistency discussion of the proposed 2022 RTP/SCS and other land use plans is provided in Section 4.10, *Land Use and Planning*. The proposed 2022 RTP/SCS would be implemented with several other existing TCAG programs designed to reduce adverse impacts to transportation resources, air quality, greenhouse gas (GHG) emissions, and energy.

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3 Environmental Setting and Impact Analysis Approach

This section provides a general overview of the environmental setting of the TCAG region. This section also outlines the EIR baseline and approach to both direct and cumulative impact analyses. More detailed descriptions of the environmental setting for each environmental issue area can be found in Section 4.0, *Environmental Impact Analysis*.

3.1 Regional Setting

Generally, the western portion of Tulare County is located within California's Southern San Joaquin Valley and the eastern portion is generally located within the Sierra Nevada. Encompassing 4,839 square miles, the County is situated along State Route (SR)-99 approximately 175 miles north of Los Angeles. The highest point is located at 14,505 feet at the summit of Mount Whitney on the eastern edge of the County. Tulare County is the seventh largest (in terms of area) county in California and is 93 miles in length from the northwestern boundary to the southeastern boundary. There are eight incorporated cities within Tulare County: Dinuba, Exeter, Farmersville, Lindsay, Porterville, Tulare, Visalia, and Woodlake. Tulare County is comprised of two separate regions based on significant variations in terrain, climate, geographic and environmental factors. The Valley Region includes the southern San Joaquin Valley below an elevation of 1,000 feet mean sea level and the Mountain Region includes easternmost and central portion of the County above the 1,000-foot mean sea level in the Sierra Nevada Mountains.

3.2 Regional Transportation System

3.2.1 Highways and Roadways

There are no Interstate or US Highways in Tulare County, however there are 10 State Routes which include: State Routes 43, 63, 65, 99, 137, 190, 198, 201, 216 and 245. State Route 43 is a state highway in the southwest edge of the County, connecting Bakersfield to Selma, intersected by SR 198, a state highway with portions of expressway and freeway which runs east to west, connecting the California Central Coast to the Central Valley, from US 101 to the Sequoia National Park. SR 198 is intersected by SR 99, also known as the Golden State Highway, connecting most major Central Valley cities from Sacramento to the Grapevine in Los Angeles County, through the Tejon Pass in the Tehachapi Mountains and Los Padres National Forest. SR 99 connects to SR 201, SR 190, and SR 137, which run east to west, connecting the cities of Dinuba, Tulare, Lindsay, and Porterville to the State Highway system. SR 190 contains a roundabout and multiple planned roundabouts as well as portions of freeway, running east/west from SR 99 to the Sequoia National Forest. SR 65 is a highway with portions of freeway in Porterville, connecting the eastern cities of Porterville, Lindsay, and Exeter to Visalia and Tulare, with SR 63 connecting the urbanized area of Visalia and Tulare. SR 63 is also known as Mooney Boulevard, with portions from 4-6 lanes, high volume, and high frequency transit in Visalia. SR 245 and SR 216 are state highways east of Visalia connecting to the city of Woodlake, with SR 245 running north/south, near to the entrance of Kings Canyon National Park. Major local roads in the County include Road 80, a north-south roadway that connects SR 198 and SR 180 through Visalia and Dinuba, and Avenue 280, an east-west roadway that connects SR 99 and SR 65 through Visalia, Farmersville, and Exeter.

3.2.2 Transit Services

Tulare County transit services include fixed-route, inter-city, dial-a-ride, and demand response operations. Fixed route services are offered by Visalia Transit, Porterville Transit, TIME (Tulare Intermodal Express), DART (Dinuba Area Rural Transit), and TCAT (Tulare County Area Transit). Cities with Transit Centers include Visalia, Tulare, Porterville, Dinuba, and Woodlake. Other carriers within Tulare County include Amtrak Thruway Bus, Greyhound, Orange Belt Stage Lines, and Kings County Area Transit (KART). Ridesharing services include Uber, Lyft, and others are also available. Statewide rail connectivity may improve in the future with the California High Speed Rail project, connecting Fresno to Kern County. Connectivity to the California High Speed Rail could be enhanced from the Cross Valley Corridor Plan, which hopes to preserve right of way for BRT and light-rail across the county for a future network. Major transit operations in Tulare County and individual cities are discussed below.

3.2.3 Active Transportation/Complete Streets

Active transportation includes human-powered modes of transportation, including but not limited to walking, bicycling, and the use of strollers and other mobility devices. Complete streets, or streets that support a variety of transportation modes including walking and bicycling, facilitate active transportation. The Cities of Farmersville and Visalia in the TCAG region have adopted an active transportation plan, and TCAG adopted its Regional Active Transportation Plan for the Tulare County Region in May 2016. These plans identify areas and roadways in their jurisdictions which could be improved to better support active transportation with the implementation of complete streets. Also included in the RTP by reference is the Tulare County Regional Active Transportation Plan (RATP), known more informally as Walk 'n Bike Tulare County. It was prepared in response to the growing interest among residents in active transportation and its contribution to a more diverse transportation system for the region. Put simply, the objective of the plan is to make active transportation in the region safer and easier. Within this objective, the plan has two main purposes: (1) to provide a foundation for the active transportation component of the RTP and (2) to help position the high-priority projects to compete well for competitive funding. The 2016 RATP was being updated at the time of Draft EIR preparation.

Tulare County

Tulare County Area Transit (TCAT) has provided rural route service between various cities and communities since 1981. TCAT operates nine different fixed routes which includes demand response services and provides a Dial-a-Ride program. TCAT is the most extensive transit system in Tulare County and connects with all other providers.

City of Visalia

Visalia Transit operates both fixed route and Dial-a-Ride services. Visalia Transit began serving Visalia in 1981 and is now serving over 120,000 people. Visalia Transit operates 13 routes with a dial-a-ride service that serves residents seven days a week. Visalia Transit offers frequent transit service on Route 1, which goes from Downtown Visalia down Mooney Boulevard, Tulare County's most diverse shopping area. Additionally, Visalia Transit offers the V-Line which connects Fresno to Visalia, and the Sequoia Shuttle, connecting to Sequoia National Park from May-September. The

Sequoia Shuttle also provides inner-park service, as well as transportation to the park when weather allows during Thanksgiving and the winter Holidays. Visalia Transit offers a smart phone application with live bus locations and Google Maps directions.

City of Tulare

The City of Tulare operates a fixed-route system, Tulare InterModal Express (TIME), and a Dial-a-Ride service within and around the City limits. It began operating in 1980, serving local residents. The fixed-route service began full time operation in 1989 and operates six days per week. In June of 1993, a route was introduced linking TIME with Visalia Transit. Today there are a total of seven fixed-routes that operate seven days a week.

City of Porterville

The Porterville transit system began operating a demand responsive service in 1981. The transportation system serves over 60,000 residents of Porterville and operates seven days per week. Porterville Transit began servicing residents with a fixed route system in July 1997. Porterville Transit offers an electric fleet of buses, smart-phone capable boarding, a smart phone application with live bus locations, and Google Maps directions.

City of Dinuba

Dinuba Area Regional Transit (DART) provides transportation to destinations in and around Dinuba on four fixed routes and Dial-a-Ride. DART connects to Fresno County at the city of Reedley, providing access for residents to jobs, shopping, and Reedley College. DART offers free service on its Jolly Trolley, which connects the western part of the city to the eastern part, to major shopping destinations.

City of Woodlake

The City of Woodlake transit system began service in June of 1999. The City operates a dial-a-ride service to the residents of Woodlake. The dial-a-ride service serves residents within the area of Woodlake.

Aviation/Rail

Tulare County’s airports primarily serve hobbyists, pilots who own aircraft, the agricultural industry, police, and medical services. Visalia Municipal Airport, Tulare County’s largest airport, recently stopped offering commercial flights. Together, the airports provide another mobility option for the County’s residents and businesses, which includes, seven public-use airports. Locations include Mefford Field, Sequoia, Porterville, Visalia Municipal, Eckert, Exeter/Thunderhawk, and Woodlake), and sixteen personal-use or special-use airports.

Amtrak, California's only operating interregional passenger rail service, does not directly serve Tulare County with a rail line. However, “Thruway Buses” from Amtrak are available from Visalia to Hanford, the closest available Amtrak rail line in Kings County. KART’s fixed route also offers service from Visalia to Hanford. Amtrak’s San Joaquin’s route passes through Hanford Station eight times a day, connecting County residents to either the San Francisco Bay Area or Sacramento to the north, and Bakersfield to the south Amtrak also provides bus service or partners with third parties to provide connections to other major cities in the state.

3.3 Mitigation Approach, EIR Baseline, Approach for Direct and Cumulative Analyses

3.3.1 Mitigation Approach

This EIR includes mitigation measures to reduce impacts and identifies agencies for implementation of those mitigation measures. TCAG has Lead Agency status, and therefore has authority to directly enforce mitigation measures for projects for it has have discretionary authority. However, TCAG does not have direct authority to require mitigation measures that would be implemented by other agencies (e.g., Caltrans, cities, transit agencies, etc.). These agencies are "responsible agencies" for this Program EIR but will be lead agencies for future transportation and land use development projects. While TCAG cannot mandate that sponsoring agencies implement the mitigation measures, ongoing interagency consultation during project specific environmental review process would ensure that mitigation contained herein is considered and implemented where applicable. It is the responsibility of the lead agency implementing specific proposed 2022 RTP/SCS projects to conduct environmental review consistent with CEQA, and where applicable, incorporate mitigation measures provided herein and developed specifically for the Project to reduce impacts. Project-specific environmental documents may adjust the mitigation measures identified in this EIR as necessary to respond to site-specific conditions.

3.3.2 EIR Baseline

Under CEQA, the impacts of a proposed project must be evaluated by comparing expected environmental conditions after project implementation to conditions at a point in time referred to as the baseline. State CEQA Guidelines Section 15125 states that an EIR should describe physical environmental conditions of the project as they exist at the time the Notice of Preparation (NOP) is published, or if no NOP is published, at the time environmental analysis is commenced, from both a local and regional perspective. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant.

As the State CEQA Guidelines Section 15125 states, ordinarily the appropriate baseline will be the actual environmental conditions existing at the time of CEQA analysis, typically when NOP is published. However, the CEQA Guidelines also contemplate times when a deviation from the use of the NOP date to establish the baseline is appropriate to present an accurate description of the expected environmental impacts of a proposed project.

This EIR evaluates impacts against existing conditions which are generally conditions existing at the time of the release of the NOP in March 2021. It was determined that a comparison to current, existing baseline conditions would provide the most relevant information for the public, responsible agencies and TCAG decisionmakers. However, the release date of the NOP in March 2021 was during an unplanned global pandemic caused by the COVID-19 coronavirus. These orders modified commercial and office business operations, employee commutes, and travel behavior, resulting in secondary effects related to vehicle miles traveled (VMT), air quality, and energy use.

Because the pandemic orders began in early March 2020, there is insufficient transportation data to accurately establish measured or observed conditions for VMT and other transportation metrics, such as transit use, for baseline year 2021. Also, most pandemic orders, including shelter in place orders, have been lifted. Therefore, TCAG's Regional Transportation Demand Model (RTDM) was utilized to model 2020 baseline conditions for these transportation metrics, as the model reflects more typical transportation patterns in the TCAG region that would otherwise exist had the pandemic never occurred. However, TCAG recognizes that the pandemic has affected transportation patterns in the County that will likely continue into the future. The long-term effects of the pandemic on regional and local transportation are uncertain and will be subject to continued study. For physical conditions that were not as altered by the pandemic and shelter-in-place orders, such as aesthetics, biological resources, and hydrology and water quality, the conditions for the analysis are generally as they existed in March 2021 and do not require modeling.

For some issue areas, this EIR also includes consideration of Project effects against a forecast no project condition in addition to the current, existing, or modeled 2021 baseline conditions, controlling for impacts caused by population growth and other factors that would occur whether or not the proposed 2022 RTP/SCS is adopted. This no project analysis is provided for informational purposes only. However, all impact determinations are based on a comparison to 2021 baseline conditions. Whenever this EIR refers to the 2021 baseline year, it refers to the modeled 2021 conditions or the 2020 conditions that generally existed unaltered by the COVID-19 pandemic.

3.3.2.1 Interim Timeframes

2046 is the horizon year of the proposed 2022 RTP/SCS. While the proposed 2022 RTP/SCS would be implemented gradually over the planning period, this EIR does not analyze interim time frames because the four-year update cycle of the RTP/SCS prepared by TCAG already requires short-term adjustments to the Plan. The one exception to this approach is in Section 4.8, *Greenhouse Gas Emissions/Climate Change*, which discusses years 2020, 2035, and 2050, as well as a comparative baseline of 1990 and 2005, to satisfy statutory requirements and address state goals related to GHG emissions, such as SB 375 (Health & Safety Code, § 38551(b)). A summary of the scenarios considered in the GHG analysis is provided in Section 4.8.2 in Section 4.8, *Greenhouse Gas Emissions/Climate Change.* As previously noted, TCAG has modeled GHG emissions for 2020 for illustrative purposes, though no aspect of the proposed 2022 RTP/SCS can influence the achievement or lack of achievement of target year 2020 GHG emissions.

3.3.3 Approach for Direct Impact Analysis

The programmatic nature of the proposed 2022 RTP/SCS necessitates a general approach to the evaluation of existing conditions and impacts associated with the proposed Project. As a program document, this EIR presents a regionwide assessment of the impacts of the proposed 2022 RTP/SCS. These impacts are examined for both transportation network improvements and the regional growth and land use changes forecasted. Because the EIR is a long-term document intended to guide actions over 20 years into the future, program-level and qualitative evaluation is involved. Quantitative analyses are provided where applicable with available information. During future stages in planning and implementation of specific projects envisioned by the proposed 2022 RTP/SCS, including land development resulting from regional growth and transportation improvements identified in the proposed 2022 RTP/SCS, project-specific CEQA documents would be prepared by the appropriate project implementation agency.

3.3.4 Approach for Cumulative Analysis

CEQA defines cumulative impacts as "two or more individual effects which, when considered together, are considerable, or which can compound or increase other environmental impacts." Section 15130 of the CEQA Guidelines requires that an EIR evaluate environmental impacts that are individually limited but cumulatively considerable. These impacts can result from the proposed Project alone, or together with other projects. The CEQA Guidelines state: "The cumulative impact from several projects is the change in the environment which results from the incremental impact of the Project when added to other closely related past, present and reasonably foreseeable probable future projects" (CEQA Guidelines, Section 15355). Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

CEQA Guidelines Section 15130 requires a discussion of the cumulative impacts of a project when the project's incremental contribution to a significant cumulative effect is "cumulatively considerable." This means that the project's incremental effects are considerable when viewed in connection with the effects of past, current, and probable future projects. CEQA does not require an analysis of incremental effects that are not cumulatively considerable nor is there a requirement to discuss impacts which do not result in part from the project evaluated in the EIR.

3.3.4.1 Cumulative Impact Methodology

The Project integrates transportation investments with land use strategies for an entire region of the state that shares, or is connected by, common economic, social, and environmental characteristics. This Program EIR contains detailed analysis of regional cumulative impacts, which are differentiated from localized impacts that may occur at the city level.

When evaluating cumulative impacts, CEQA allows the use of either a list of past, present, and probable future projects, including projects outside the control of the Lead Agency, or a summary of projections in an adopted planning document, or a combination of the two approaches. Although the RTP/SCS analysis is cumulative by design, additional cumulative analysis has been provided by taking into account future regional growth and development in the surrounding counties combined with the regional growth in the TCAG region. The cumulative analysis presented below primarily uses a projections-based approach [see State *CEQA Guidelines* Section 15130(B)(1)]. Under the projections-based approach, land use and growth projections for the region, which are the subject of analysis throughout this Program EIR, are combined with the growth and VMT projections for the adjoining counties. Adjoining counties include Fresno, Inyo, Kern, and Kings. The cumulative impact analysis in this Program EIR considers the impacts of planned growth and increased VMT in these adjoining counties. While Inyo County adjoins to the east however it is separated by the crest of the Sierra Nevada with no direct road connection.

The area that includes the TCAG region and the above-referenced adjoining counties is referred to in this analysis as the "cumulative impact analysis area." As shown in Table 3-1, the population for the cumulative impact analysis area is projected to grow by approximately 250,000 people by 2050 and this growth is added to the cumulative impact analyses included in this EIR.

Table 3-1 Population, Households and Employment Projections of Cumulative Impact Analysis Area, 2020-2050

	Population[2]		Households[2]		Jobs[2]	
Adjoining County	**2020**	**2050**	**2020**	**2050**	**2020**	**2050**
Fresno	1,030,895	1,261,807	307,900	390,100	762,100	916,000
Inyo	18,415	17,392	8,200	8,700	14,471	15,277
Kern	925,623	1,161,147	270,300	337,000	607,400	758,900
Kings	154,441	184,493	44.1	57.4	92,600	114,700
Total	**2,129,374**	**2,634,839**	**586,444**	**735,857**	**1,476,571**	**1,804,877**

[1] Long-Term Socio Economic Forecasts by County, Department of Transportation, 2020

In some cases, growth outside the TCAG region in neighboring counties would further contribute to significant cumulative impacts. These include the impacts of vehicle trips originating or terminating outside the region. TCAG's Regional Travel Demand Model (RTDM) accounts for these trips originating and/or ending outside the TCAG region. The RTDM incorporates a process for balancing internal and external trip utilizing the trip generation step sub-model results from the latest available version of the California Statewide Travel Demand Model (CSTDM) and regional gateway volumes. Therefore, the proposed 2022 RTP/SCS's traffic impact analysis includes the cumulative impact from these out-of-region trips as they are included in the traffic model and assessment of transportation impacts from the surrounding counties. The impacts of these external trips are also reflected in the EIR air quality, GHG, and energy impact analyses as part of their cumulative analyses that includes assessment of projects and growth in the surrounding counties.

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4 Environmental Impact Analysis

This section discusses the environmental effects of the proposed Project for the specific issue areas that were identified through the scoping process as having the potential to experience significant effects. A "significant effect" as defined by the *CEQA Guidelines* §15382 is:

> A substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment but may be considered in determining whether the physical change is significant.

The assessment of each issue area begins with a discussion of the environmental setting related to the issue, which is followed by the impact analysis. In the impact analysis, the first subsection identifies the methodologies used and the "significance thresholds," which are those criteria adopted by TCAG and other agencies, universally recognized, or developed specifically for this analysis to determine whether potential effects are significant. Significant thresholds are generally based on CEQA Guidelines Appendix G, unless otherwise indicated. The next subsection describes each impact of the proposed Project, mitigation measures for significant impacts, and the level of significance after mitigation. Each effect under consideration for an issue area is separately listed in bold text with the discussion of the effect and its significance. Each bolded impact statement also contains a statement of the significance determination for the environmental impact as follows:

- **Significant and Unavoidable**. An impact that cannot be reduced to below the threshold level given reasonably feasible mitigation measures.
- **Less than Significant with Mitigation Incorporated**. An impact that can be reduced to below the threshold level given reasonably available and feasible mitigation measures.
- **Less than Significant**. An impact that may be adverse but does not exceed the threshold levels and does not require mitigation measures.
- **No Impact.** The proposed project would have no effect on environmental conditions or would reduce existing environmental problems or hazards.

Following each environmental impact discussion is a list of mitigation measures and the residual effects or level of significance remaining after implementation of the measure(s). In cases where the mitigation measure for an impact could have an environmental impact in another issue area, this impact is discussed and evaluated as a secondary impact.

Many sections conclude with a screening-level discussion of specific proposed 2022 RTP/SCS transportation projects that may result in identified impacts. The impact analysis concludes with a discussion of cumulative effects, which are defined and discussed in detail in Section 3.0, *Environmental Setting and Impact Analysis Approach*.

EIR Scope, Content, and Format

This EIR includes discussions of environmental impacts related to several topic areas. The analysis of environmental impacts identifies impacts by category: significant and unavoidable, less than significant with mitigation incorporated, less than significant, , and no impact . It proposes mitigation measures, where feasible, for identified significant environmental impacts. Environmental topic areas that are addressed in this EIR include:

- Aesthetics/Visual Resources
- Agriculture and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Greenhouse Gas Emissions/Climate Change
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Population and Housing
- Public Services and Recreation
- Transportation and Circulation
- Tribal Cultural Resources
- Utilities and Services Systems
- Wildfire

Chapter 1, *Executive Summary*, of this EIR, summarizes all impacts and mitigation measures that apply to the proposed Project.

4.1 Aesthetics

This section analyzes the impacts of the proposed 2022 RTP/SCS to aesthetics, including the existing visual character of, and scenic views in, the TCAG region.

4.1.1 Setting

Visual Character of the Region

The TCAG region is known as a predominately agricultural region of central California. The terrain varies, with flat agricultural areas in the western portion of the region that gradually transform into the foothills and the Sierra Nevada Mountain range to the east. Many communities are small and rural, surrounded by agricultural uses such as row crops, orchards, and dairies. From several locations on major roads and highways throughout the region, electrical towers and telephone poles are noticeable.

Mature trees, development, utility structures, and other vertical forms are highly visible in the Valley portion of the region because of the flat terrain; however, where such vertical elements are absent, views are expansive. Most new structures are small, usually one story in height, through occasionally two-story structures can be seen. Exceptions can be found in the downtown commercial areas of urban locations and in industrial agricultural complexes. The aesthetic quality of the TCAG region has been affected by various forms of transportation (i.e., highways, freeways, and railroad infrastructure).

The visual character of the TCAG region consists of the following: agricultural land and pastures, mountain views, open space, habitat, and protected lands, residential and commercial development, and transportation network. The transportation network will be discussed further below in Primary Viewing Corridors.

Agricultural Land and Pasture

Agricultural lands are a dominant visual landscape in the region, with approximately 1,669,118 acres of harvestable land in 2020 (Tulare County 2020). Agriculture is a prominent economic industry for the region, but unlike most industrial uses, agricultural lands contribute to the scenic value of the region and contrast with urban landscapes. Agriculture provides an open space visual resource, characterized by no form, limited line (e.g., row crops), color, or textural features. The main agricultural uses in the region include row crops, field crops, orchards, and nursery crops. Adding additional character to the visual landscape are agricultural buildings, including barns, processing and packing facilities, storage areas, and farm housing.

Mountain Views

The mountains of the Sierra Nevada are prominent in the views within the eastern portions of the TCAG region. These ranges reach elevations up to approximately 14,505 feet at the highest point, Mt. Whitney, located on the eastern edge of Tulare County (TCAG 2018). Due to extensive open space and development patterns, some areas of the region's eastern valley offer panoramic views of the surrounding mountain ranges. On good or clear air quality days, areas of the western valley offer panoramic scenic views of the mountain ranges.

Open Space, Habitat, and Protected Lands

The TCAG region is home to substantial open space areas, including national and state parks, and habitat conservation areas. National parks in the County include Sequoia National Park and portions of Sequoia National Forest, Sequoia National Monument, Inyo National Forest, and Kings Canyon National Park. State parks include Colonel Allensworth State Historic Park and Mountain Home Demonstration State Forest. In addition, the Golden Trout Wilderness area, and portions of the Domeland Wilderness and South Sierra Wilderness areas, are public lands within the County's boundaries. Public views of and within these areas vary according to the type of open space, and may include open grasslands, rolling hills, forested areas, and cultural sites.

Residential and Commercial Development

Residential and commercial development within the TCAG region is primarily concentrated within the cities of Visalia, Tulare, and Porterville. Other population centers include Dinuba, Lindsay, Farmersville, Exeter, and smaller cities such as Woodlake. Residential and commercial development in these cities is a mix of older and newer construction and is generally not more than two or three stories tall.

Primary Viewing Corridors

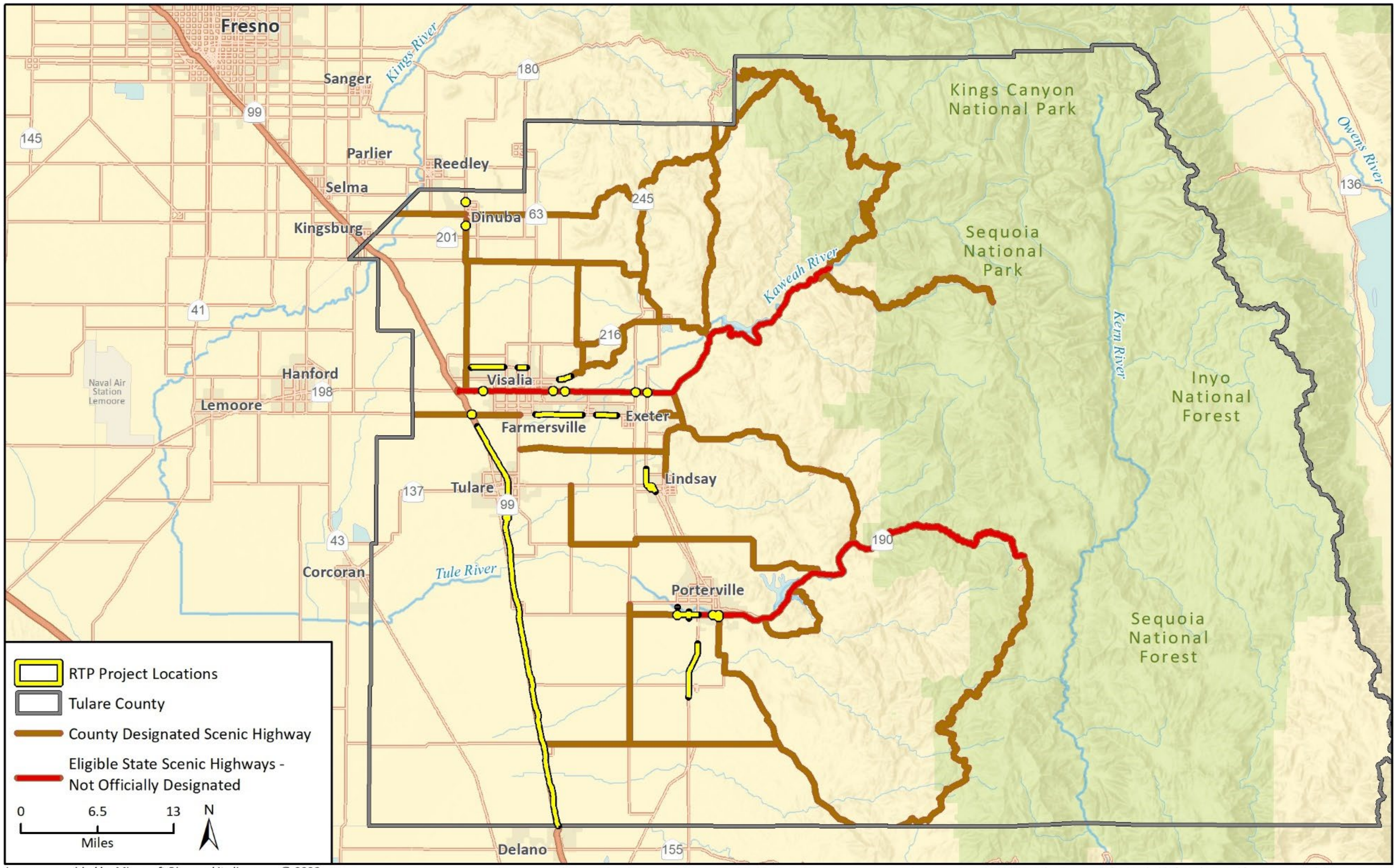
There are no officially designated State Scenic Highways in Tulare County, according to the Caltrans California Scenic Highway Mapping System (Caltrans 2021). However, two highways are designated as eligible for Scenic Highway designation:

- SR 198 (from SR 99 near Goshen to the Sequoia National Park Entrance), and
- SR 190 (from SR 65 to SR 127 near Death Valley Junction)

Figure 4.1-1 depicts the location of these eligible highways. SR 190 follows the Tule River and passes by Lake Success, while SR 198 circumvents Lake Kaweah and the Kaweah River. Both eligible scenic highways travel through agricultural areas of the valley floor to the foothills and the Sierra Nevada Range. In addition to State designations, the Tulare County General Plan identifies the following 16 routes as County-designated scenic routes (Tulare County 2010):

- Road 80 from Dinuba to Visalia
- El Monte Way to the west and east of Dinuba
- Road 168 from El Monte Way to State Route 245
- State Route 201 to the east of Road 80
- State Route 63 from State Route 201 to Visalia
- State Route 245 from Woodlake to State Route 180
- State Route 216 from near Ivanhoe to State Route 198
- Avenue 280 from the Kings County line to Visalia
- Avenue 256 from south of Visalia to Road 216
- Dry Creek Road from State Route 245 to State Route 198
- Rocky Hill Drive east of Exeter
- Avenue 196 north of Porterville
- Avenue 128 south of Porterville

Figure 4.1-1 Highways Eligible for Caltrans California Scenic Highway Designation in the TCAG Region



Imagery provided by Microsoft Bing and its licensors © 2022.
Data provided by Tulare County General Plan, 2012.

Fig X Tulare County Highways Eligible for Caltrans California Scenic Highway Designation

- Old Stage Road from Porterville to the south
- Road 192 from State Route 190 to Avenue 56
- Avenue 56 from State Route 99 to Old Stage Road

There are no scenic roads formally designated by the cities with in the TCAG region.

4.1.2 Regulatory Setting

a. Federal Laws, Regulations, and Policies

National Scenic Byway Program

The National Scenic Byway Program was established to preserve and protect the nation's scenic and less-traveled roads in an effort to promote tourism. For designation as a National Scenic Byway a road must have one of the following six intrinsic qualities: scenic, natural, historic, cultural, archeological, or recreational. Within California, there are eight federally designated byways (FHWA 2021).

U.S. Department of Transportation Act, Section 4(f)

Section 4(f) of the Department of Transportation Act (DOT Act) of 1966 (49 U.S.C. § 303) was enacted to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges and historic sites. Section 4(f) requires a comprehensive evaluation of all environmental impacts resulting from federal-aid transportation projects administered by the Federal Highway Administration (FHWA), Federal Transit Administration (FTA) and Federal Aviation Administration (FAA) that involve the use, or interference with use. Detailed inventories of the locations and likely impacts on resources that fall into the Section 4(f) category are required in project-level environmental assessments.

In August 2005, Section 4(f) was amended to simplify the process for approval or projects that have only minimal impacts on lands affected by Section 4(f). Under the new provisions, the U.S. Secretary of Transportation may find such a minimal impact if consultation with the State Historic Preservation Officer (SHPO) results in a determination that a transportation project will have no adverse effect on the historic site or that there will be no historic properties affected by the proposed action. In this instance, analysis of avoidance alternatives is not required, and the Section 4(f) evaluation process is complete.

b. State Laws, Regulations, and Policies

California Scenic Highway Program

Recognizing the value of scenic areas and view from roads in such areas, the State Legislature established the California Scenic Highway Program in 1963 (Streets and Highways Code Sections 260 et seq). This legislation preserves and protects scenic highway corridors from changes that would diminish the aesthetic value of lands adjacent to highways. The goal of the Scenic Highway Program is to preserve and enhance the natural beauty of California. Under this program, a number of State Routes have been designated as eligible for inclusion as scenic routes. Once the local jurisdiction through which the roadway passes have established a Corridor Protection Program (CPP) and the Departmental Transportation Advisory Committee recommends designation of the roadway, the State may officially designate roadways as scenic routes. Interstate highways, State Routes and county roads may be designated as scenic under the program. The Master Plan of State Highways Eligible for Official Scenic Highway Designation maps designated highway segments, as well as those that are eligible for designation. Changes to the map require an act of the State Legislature.

As noted, a CPP must be adopted by the local governments with land use jurisdiction over the area through which the roadway passes as the first step in moving a road from “eligible” to “designated” status. Each designated corridor is monitored by the State and designation may be revoked if a local government fails to enforce the provisions of the CPP. While there are no restrictions on scenic highway projects, local agencies and the California Department of Transportation (Caltrans) must together to coordinate transportation and development projects and ensure the protection of the corridor’s scenic value to the greatest extent possible, including undergrounding all visible electric distribution and communication utilities within 1,000 feet of a Scenic Highway. In some cases, local governments have their own land use and site planning regulations in place to protect scenic values along a designated corridor. At a minimum, each CPP must include the following elements:

- Regulation of land use and density of development;
- Detailed land and site planning;
- Control of outdoor advertising devices;
- Control of earthmoving and landscaping; and
- Regulation of the design and appearance of structures and equipment.

The Master Plan of State Highways Eligible for Official Scenic Highway Designation requires that proposed realignments and route improvements be evaluated for their impact on the scenic qualities of the corridor as mentioned in Section 4.1.1. Primary Viewing Corridors.

California Building Energy Efficiency Standards

California Code of Regulations Title 24, Part 6 contains California’s Energy Efficiency Standards for Residential and Non-residential Buildings. California Building Energy Efficiency Standards were established by CEC in 1978 in response to a legislative mandate to create uniform building codes to reduce California’s energy consumption and provide energy efficiency standards for residential and nonresidential buildings. The 2019 Energy Code contains standards to reduce energy consumption for outdoor lighting application in residential and non-residential developments. Mandatory measures for outdoor lighting and glare are specified in §110.9, §130.0, and §130.2 of the 2019 Energy Code.

Caltrans Adopt-a-Highway Program

To improve and maintain the visual quality of California highways, Caltrans administers the Adopt-a-Highway program, which was established in 1989. The program provides an avenue for individuals, organizations, or businesses to help maintain sections of roadside within California’s State Highway System. Groups have the option to participate as volunteers or to hire a maintenance service provider to perform the work on their behalf. Adoptions usually span a two-mile stretch of roadside, and permits are issued for five-year periods. Since 1989, more than 120,000 California residents have kept 15,000 shoulder miles of state roadways clean by engaging in litter removal, tree and flower planting, graffiti removal and vegetation removal.

c. Local Laws, Regulations, and Policies

The general plans and zoning ordinances of the cities within the TCAG region regulate design and the built environment within those communities, while the general plans for the County performs the same function within unincorporated areas. In all cases, the general plans and zoning typically prescribe visual resource policies and, in some cases, require design review of projects. In general, little direction is provided regarding the design of roadways, which are typically subject to adopted Caltrans or local engineering standards related to safety and capacity, rather than aesthetics. Outlined below are the policies for Tulare County and major cities within the TCAG region.

Tulare County

The Tulare County General Plan, Scenic Landscapes Element (Chapter 7) designates 16 County scenic roads and includes visual goals in an effort to preserve the visual characteristics of the County, the following general plan policies include (Tulare County 2012):

- SL-1: To protect and feature the beauty of Tulare County's views of working and natural landscapes;
- SL-2: To protect the scenic views for travelers along the County's roads and highways;
- SL-3: To provide distinctive communities, rural development patterns and character that is compatible with the best features of Tulare County's traditional community centers and agricultural landscapes; and
- SL-4: To design infrastructure to visually enhance the built environment while minimizing visual impact on rural and natural places.

The Scenic Landscapes Element of the General Plan also includes policies addressing community design, to ensure that communities and natural landscapes are enhanced, preserved, and protected. Relevant goals and policies to the proposed 2022 RTP/SCS EIR include the following:

- SL-3.1 Community Centers and Neighborhoods: The County shall support investments in unincorporated communities and hamlets to improve the image, quality of urban infrastructure, amenities, and visual character by:
  1. Encouraging restoration of existing historic buildings and developing new buildings that reflect the local culture and climate;
  2. Creating or enhancing overall community design frameworks with a hierarchy of connected block and street patterns, open spaces, town centers, neighborhoods, and civic facilities;
  3. Reducing the need for sound-walls and gated neighborhoods by having residential and nonresidential uses interface along streets and open spaces (not adjoining property lines) and locating residential uses on local-serving streets;
  4. Planning residential development as interconnected neighborhoods with definable social and physical centers that incorporate parks, schools, and commercial services;
  5. Enhancing the comfort and scenic experience of transit riders, cyclists, and pedestrians; and
  6. Developing open spaces, streets, and pedestrian facilities that include landscaping and streetscaping that improve the image of the community and make it a more comfortable pedestrian environment.

- SL-3.2 Urban Expansion Edges: The County shall design and plan the edges and interface of communities with working and natural landscapes to protect their scenic qualities by:
  1. Maintaining urban separators between cities and communities;
  2. Encouraging cities to master plan mixed-density neighborhoods at their edges, locating compatible lower density uses adjacent to working and natural landscapes; and
  3. Protecting important natural, cultural, and scenic resources located within areas that may be urbanized in the future.
- SL-3.4 Planned Communities: If planned communities are allowed, the County shall require that they are designed to minimize visual impact on scenic working and natural landscapes by:
  1. Avoiding development along ridgelines and other highly visible locations;
  2. Siting development in a manner that reduces the visibility of new development;
  3. Mitigating light pollution on night sky conditions;
  4. Utilizing architectural and site planning concepts that appropriately reflect local climate and site conditions; and
  5. Integrating cultural, architectural, and historic resources into their plans.
- ERM-5.8 Watercourse Development: The County, in approving recreational facilities along major watercourses, shall require a buffer of at least 100 feet from the high-water line edge/bank and screening vegetation as necessary to address land use compatibility issues. The establishment of a buffer may not be required when mitigated or may not apply to industrial uses that do not impact adjoining uses identified herein.

City of Visalia

Visalia adopted its Scenic Highways Element in February 1976, in which Highway 198 is identified as a scenic resource. The City of Visalia's Scenic Landscapes Element includes policies to protect views of working and natural landscapes; protect views for travelers along the County's roads and highways; plan the edges of communities to protect the scenic qualities of natural landscapes; and design infrastructure that minimizes visual impacts on rural and natural places. The City's General Plan Land Use Element also provides a framework to guide future land use decisions and development in Visalia, while also enhancing community character and improving the city's look and feel. The element forms the core of the General Plan, and its policies articulate the community's land use and growth management priorities through 2030.

A number of the General Plan's policies and local ordinances protect the City's scenic resources, including trees, creeks, and historic buildings to ensure that they remain visible from scenic roadways. For example, a 200-foot conservation buffer on either side of Highway 198 has been established to create a scenic entry corridor to the City and to maintain the visual separation between Highway 99 and the core of the city (Visalia 2014).

City of Tulare

Tulare's General Plan sets out a hierarchy of goals, policies, and implementation programs to guide future development in the city, encouraging infill development and providing guidance for the city's orderly expansion in a manner that is economically sustainable. Several General Plan Land Use Element policies are related to preserving the community character and design as no officially designated scenic resources are within the City. Some policies include: LU-P13.1 which would reinforce the city's unique character, scale, and identity through urban design programs, including principles and guidelines, LU-P13.12 this policy would enhance key gateways (e.g., city limit entries on Highways 99/137) and major thoroughfares using street trees, welcome signs, decorative lighting, archways, and other streetscape design techniques and LU-P13.14 this policy would preserve the City's scenic features and view corridors to the mountains (Tulare 2013).

City of Porterville

Porterville's General Plan Land Use Element and Circulation Element contain policies and implementation actions that are used to compliment the City's Open Space & Conservation Action Plan. The Land Use Element fosters a compact development pattern with strong urban "edges" in order to protect adjacent agricultural lands, the Tule River Parkway, and hillsides, and contribute to the sense of place for the community. While the expanded and interconnected trail and circulation network in the Circulation Element links Porterville's residents directly to these resources. Some guiding policies related to regulating design and community character include LU-G-1 which promotes a sustainable, balanced land use pattern that responds to existing needs and future needs of the City and LU-G-4 which requires the need to provide transitions between types and intensities of land use using high-quality urban design and greenway buffers (Porterville 2008). Additionally, to conserve the existing open space and unique landscape features and protect views, the City has a Hillside Zone Overlay District which details design and planning standards for the foothills area (Porterville 2008).

4.1.3 Impact Analysis

a. Methodology and Significance Thresholds

Environmental assessment of a proposed project's impacts to the aesthetic and visual resources of a site begins with identification of the existing visual resources on and off that site, including the site's physical attributes, its relative visibility, and its relative uniqueness. The assessment of aesthetic impacts involves qualitative analysis that is inherently subjective in nature. Different viewers react to viewsheds and aesthetic conditions differently. This evaluation measures the existing visual resource against the proposed action, analyzing the nature of the anticipated change.

It is important to distinguish between public and private views. Private views are those views seen from privately-owned land, including views from private residences, and are typically enjoyed by individuals. Public views are experienced by the collective public. These include views of significant landscape features such as the Sierra Nevada, as seen from public viewing space, not privately-owned properties. California Environmental Quality Act (CEQA) (PRC §21000 et seq.) case law has established that generally only public views, not private views, need be analyzed under CEQA. See Association for Protection etc. Values v. City of Ukiah (1991) 2 Cal. App. 4th 720 and Topanga Beach Renters Assn. v. Department of General Services (1976) 58 Cal. App. 3d 188. Therefore, for this analysis, only public views will be considered when analyzing the visual impacts of implementing the proposed 2022 RTP/SCS.

Appendix G of the State CEQA Guidelines identifies the following criteria for determining whether a project's impacts would have a significant impact related to aesthetics:

1. Have a substantial adverse effect on a scenic vista;
2. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;

3. In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site or its surroundings; if the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality; or
4. Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

b. Project Impacts and Mitigation Measures

The following section discusses potential impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. Section 4.1.3.c summarizes the impacts associated with capital improvement projects in the proposed 2022 RTP/SCS. Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time. In general, however, implementation of proposed transportation improvement projects and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1:	Have a substantial adverse effect on a scenic vista
Threshold 2:	Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway

Impact AES-1 **THE PROPOSED TRANSPORTATION PROJECTS AND LAND USE PROJECTS ENVISIONED UNDER THE PROPOSED 2022 RTP/SCS WOULD HAVE A SUBSTANTIAL ADVERSE EFFECT ON SCENIC VISTAS AND SUBSTANTIALLY DAMAGE SCENIC RESOURCES WITHIN HIGHWAYS IDENTIFIED TO HAVE HIGH SCENIC QUALITIES OR DESIGNATED BY THE STATE AS ELIGIBLE SCENIC HIGHWAYS. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.**

There are no officially designated State Scenic Highways in the TCAG region and two eligible scenic highways. Visual resource impacts from construction on or adjacent to these roadways would include blockage of views by construction equipment and staging areas; disruption of views by temporary signage; and exposure of slopes and removal of vegetation. These effects would be temporary during the construction phase.

In the long-term, implementation of the proposed 2022 RTP/SCS would generally result in modification of existing transportation facilities within existing highway, roadway, or railroad rights-of-way. Many of the proposed projects are at-grade with the surrounding environment. As such, most of the road and highway improvements are not likely to result in massive obstructions or blockages of surrounding views nor modify or substantially alter existing scenic resources viewed from a scenic vista or identified scenic highway.

Similarly, land use development envisioned by the proposed 2022 RTP/SCS would be focused primarily in urban infill areas, although some development in outlying areas would occur. Scenic vistas and designated scenic highways are generally located in undeveloped, rural areas, such that most future land use development envisioned in the proposed 2022 RTP/SCS would be unlikely to block or substantially alter scenic vistas.

Impacts of both transportation and land use projects near state-designated scenic highway corridors would be minimized to some extent through compliance with the Caltrans CPP (under the Scenic Highway Program), which requires that the local jurisdiction adopt ordinances, zoning and/or planning policies to preserve the scenic quality of the state-designated scenic highway corridor or document such regulations that already exist in various portions of local codes. However, this would not officially apply until the two identified highways were formally designated. Many local jurisdictions also have their own general plan policies relating to the protection of scenic vistas such as the conservation buffers along the 198 in Visalia, LU-P13.14 to preserve scenic views of the mountains in Tulare, and the hillside overlay zone district in Porterville. These policies would limit the amount or type of development in designated scenic corridors or require special design guidelines when developing in certain areas. However, because scenic vistas and scenic resources are protected unevenly among the various jurisdictions in the TCAG region, the proposed 2022 RTP/SCS could result in a substantial adverse effect on a scenic vista or substantially damage scenic resources within a state scenic highway.

Similarly, the future land use scenario envisioned by the proposed 2022 RTP/SCS is intended to encourage in-fill development and development near existing transportation corridors. This type of development would help to avoid the loss of scenic resources overall by concentrating development within existing urbanized areas when compared to a future scenario without the proposed 2022 RTP/SCS. This land use scenario would intensify the built environment within existing urban areas through planned in-fill development. In addition, this land use scenario would concentrate development near transportation corridors in urban areas, which would further increase the visibility of future in-fill and transit-oriented development from these corridors and potentially impact views of background scenic resources. However, not all projects and development included in the proposed 2022 RTP/SCS would be infill projects in urbanized areas, and some projects would inevitably be located in rural and other areas in the TCAG region. Therefore, the proposed 2022 RTP/SCS could also result in a substantial adverse effect on a scenic vista or substantially damage scenic resources, including within an eligible scenic highway or a locally identified scenic highway in rural areas of the TCAG region. The following mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures where applicable for transportation projects implementing the proposed 2022 RTP/SCS that would result in impacts to scenic vistas or scenic resources within highways identified to have high scenic qualities or designated by the State as eligible scenic highways. Cities and the County can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site specific conditions.

AES-1(a) Tree Protection and Replacement

The implementing agency for new roadways, extensions and widenings of existing roadways, trails and facility improvement projects shall, or can and should, avoid the removal of existing mature trees to the extent possible consistent with adopted local City and County policies as applicable. The implementing agency of a particular proposed 2022 RTP/SCS project shall replace any trees lost at a minimum 2:1 basis and incorporate them into the landscaping design for the roadway when feasible, or as required by local or County requirements. The implementing agency also shall ensure the continued vitality of replaced trees through periodic maintenance.

IMPLEMENTATION AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

AES-1(b) Discouragement of Architectural Features that Block Scenic Views

The implementing agency shall, or can and should, design projects to minimize contrasts in scale and massing between the project and surrounding natural forms and development. Setbacks and acoustical design of adjacent structures shall be preferentially used as mitigation for potential noise impacts arising from increased traffic volumes associated with adjacent land development. The use of sound walls, or any other architectural features that could block views from the scenic highways or other view corridors, shall be discouraged to the extent possible. Where use of sound walls is found to be necessary, walls shall incorporate offsets, accents, and landscaping to prevent monotony. In addition, sound walls shall be complementary in color and texture to surrounding natural features.

IMPLEMENTATION AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

Significance After Mitigation

Although identified mitigation would help reduce impacts related to state-designated scenic highway corridors and scenic resources, individual transportation infrastructure projects as well as land use development included in the proposed 2022 RTP/SCS could still result in impacts to scenic vistas and resources. And because this EIR evaluates impacts at the programmatic level, all project circumstances are not foreseeable, and these mitigation measures may not be feasible or effective for some projects. Therefore, given the extent of planned land use development and transportation projects, and the potential for site-specific impact from those projects, impacts related to the obstruction of scenic vistas and resources, including scenic highways, would be significant and unavoidable. No additional mitigation measures to reduce this impact to less-than-significant levels are feasible.

Threshold 3:	In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site or its surroundings; in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality

Impact AES-2 **THE PROPOSED TRANSPORTATION PROJECTS AND LAND USE PATTERNS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD IN NON-URBANIZED AREAS, SUBSTANTIALLY DEGRADE THE EXISTING VISUAL CHARACTER OR QUALITY OF PUBLIC VIEWS OF THE SITE OR ITS SURROUNDINGS, AND IN AN URBANIZED AREA, WOULD CONFLICT WITH APPLICABLE ZONING AND OTHER REGULATIONS GOVERNING SCENIC QUALITY. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.**

The proposed 2022 RTP/SCS includes improvements to existing facilities such as road widenings, intersection or interchange improvements, auxiliary and transition lanes, highway maintenance and other improvements. The proposed 2022 RTP/SCS would include some new road and highway facilities such as new interchanges, new roadways and overcrossings and road extensions. Most road and highway projects would occur in areas where transportation infrastructure is already a dominant feature of the landscape and therefore would not likely degrade the existing visual character of the region. In less developed areas of the region, adding new transportation infrastructure could add an element of urban character to previously undeveloped lands, but there are no new road or transit projects in the RTP that extend into rural lands. A complete listing of transportation projects with potential to alter the rural character of the TCAG region is included in Table 4.1-1.

The proposed 2022 RTP/SCS emphasizes infill development and development near existing transportation corridors, which are generally located in urbanized areas of cities and unincorporated communities. Prioritizing infill development can be beneficial at the regional scale, in terms of visual character, in that it occurs in areas already designated for and receiving growth and replaces growth in undeveloped and/or agricultural and rural areas. Infill development, in general, does not significantly change the existing visual character or quality at the regional level, but rather preserves the undeveloped character and quality in the agricultural and rural areas.

However, when compared to existing conditions, the proposed 2022 RTP/SCS land use scenario would intensify the built environment within existing urban areas through the implementation of infill and transit-oriented development (TOD) projects, thereby resulting in an overall change in the character of existing urbanized areas to a denser development pattern that could conflict with applicable zoning and other regulations governing scenic quality. For example, development in the City of Visalia at the edge of its City limits would result in a built environment that could conflict with City of Visalia General Plan goals to plan the edges of communities to protect the scenic qualities of natural landscapes and design infrastructure that minimizes visual impacts on rural and natural places. Intensifying development in or on the boundary of existing urban areas in the TCAG region may result in similar changes to visual character. In addition, land use projects that would occur in rural or agricultural areas would introduce urban development to areas that were previously undeveloped. Depending on the design and siting of these projects, the resulting change would degrade the visual character or quality of their surroundings. Some projects would inevitably be located in the more rural areas of the TCAG region near Terra Bella, Exeter and Dinuba. New development under the proposed 2022 RTP/SCS would be required to comply with applicable zoning standards or acquire an approved zoning amendment.

Projects implemented under the proposed 2022 RTP/SCS would be subject to existing regulations that would help to minimize impacts to visual character. For example, in visually sensitive areas, local land use agencies would apply development standards and guidelines to maintain compatibility with surrounding natural areas, including site coverage, building height and massing, building materials and color, landscaping and site grading. Nevertheless, even with compliance with these standards, the overall visual effect of transportation p and land use projects would contribute to an incremental, but irreversible transformation in visual character from rural or semi-rural to more urban or suburban throughout the TCAG region. Although not every new project listed in Table 4.1-1 may individually significantly alter the county’s rural character, these new projects collectively would result in a significant impact. The following mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures where applicable for transportation projects implementing the proposed 2022 RTP/SCS that would result in impacts to visual character. Cities and the County can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site specific conditions.

AES-2 Design Measures for Visual Compatibility

The implementing agency shall, or can and should, require measures that minimize contrasts in scale and massing between the project and surrounding natural forms and developments. Strategies to achieve this include:

- Siting or designing projects to minimize their intrusion into important viewsheds;
- Avoiding large cuts and fills when the visual environment (natural or urban) would be substantially disrupted;
- Ensuring that re-contouring provides a smooth and gradual transition between modified landforms and existing grade;
- Developing transportation systems to be compatible with the surrounding environments (e.g., colors and materials of construction material; scale of improvements);
- Designing and installing landscaping to add natural elements and visual interest to soften hard edges, as well as to restore natural features along corridors where possible after widening, interchange modifications, re-alignment, or construction of ancillary facilities; and
- Designing new structures to be compatible in scale, mass, character, and architecture with existing structures.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

Significance After Mitigation

Implementation of mitigation measures AES-2 would reduce project -specific impacts to the extent feasible. Mitigation Measures AES-1(a) and AES-1(b), discussed above for Impact AES-1, would also reduce impacts associated with visual character. Nevertheless, the alteration of current rural or semi-rural character to a more suburban environment is considered a significant and unavoidable impact because mitigation measures may not be feasible for all projects. Additionally, while these mitigation measures may reduce impacts from urban and infill development, some project-specific impacts may be unavoidable. No additional mitigation measures to reduce this impact to less than significant levels are feasible.

Threshold 4:	Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area

Impact AES-3 DEVELOPMENT OF PROPOSED TRANSPORTATION PROJECTS AND LAND USE PATTERNS ENVISIONED UNDER THE PROPOSED 2022 RTP/SCS WOULD CREATE A NEW SOURCE OF SUBSTANTIAL LIGHT OR GLARE THAT WOULD ADVERSELY AFFECT DAYTIME OR NIGHTTIME VIEWS IN THE AREA. IMPACTS ARE SIGNIFICANT AND UNAVOIDABLE.

Existing sources of light and glare within the TCAG region are primarily focused in the cities, towns, and other urban development boundary areas. Most of the County is used for agricultural purposes (with some scattered rural residential uses) and therefore currently contains limited sources of light and glare. Implementation of the proposed 2022 RTP/SCS would result in new or intensified lighting from land use development envisioned in the proposed land use patterns, which focuses on infill and TOD development. This would concentrate the existing sources of light and glare. In these infill areas, such increases may not adversely affect nighttime views because these existing sources of light, glare and shadow are already a dominant feature of the urban landscape. However, the intensity of light and glare in these urban areas would increase as a result of infill and TOD projects under the proposed 2022 RTP/SCS, depending on site specific conditions and lighting design associated with new structures. Additionally, intersection improvement projects could introduce a greater intensity of light and glare in rural areas that are characterized by dark night skies. Exterior lighting in some areas would be limited by compliance with existing lighting regulations, as discussed in the Regulatory Setting, Section 4.1.2.

Transportation projects envisioned in the proposed 2022 RTP/SCS to the existing roadways and highways in the TCAG region would not significantly increase the amount of light and, as these improvements would take place on existing facilities that have existing sources of light and glare. Increases in light and glare from new reflective signage, streetlights, intersection control devices and other improvements would be relatively minor compared to existing conditions. However, the expansion and widening of existing roadways or construction of new roadways would allow a greater volume of vehicles to travel through a given segment of roadway or highway throughout the day, or introduce vehicles into a new area, which would have the potential to introduce new or additional vehicle headlights as new light sources. In addition, some of the new transportation facilities included in the proposed 2022 RTP/SCS would directly introduce light, including: the replacement/improvements of existing lighting along the various freeways, highways, and bridges, construction of pedestrian lighting along various city streets, bus and transportation facility improvements and installation of lighting along bike paths and trails in the TCAG region. The introduction of light and glare could adversely affect day or nighttime views.

Overall, light and glare impacts from transportation projects implementing the proposed 2022 RTP/SCS would be significant because there would be new sources of substantial light or glare. The following mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures where applicable for transportation projects implementing the proposed 2022 RTP/SCS that would result in impacts to daytime and nighttime views. Cities and the County can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site specific conditions.

AES-3(a) Roadway and Project Lighting

The implementing shall, or can and should, roadway lighting to the extent possible, consistent with safety and security objectives, and shall not exceed the minimum height requirements of the local jurisdiction in which the project is proposed. This may be accomplished through the use of back shields, hoods, low intensity lighting, and using as few lights as necessary to achieve the goals of the project.

As part of planning, design, and engineering for transportation and land use projects, implementing agencies shall, or can and should, ensure that projects proposed near light-sensitive uses avoid substantial spillover lighting. Potential design measures include, but are not limited to, the following:

- Lighting shall consist of cutoff-type fixtures that cast low-angle illumination to minimize incidental spillover of light into adjacent properties and undeveloped open space. Fixtures that project light upward or horizontally shall not be used.
- Lighting shall be directed away from habitat and open space areas adjacent to the project site.
- Light mountings shall be downcast, and the height of the poles minimized to reduce potential for backscatter into the nighttime sky and incidental spillover of light onto adjacent private properties and undeveloped open space. Light poles will be 20 feet high or shorter. Luminary mountings shall have non-glare finishes.
- Exterior lighting features shall be directed downward and shielded in order to confine light to the boundaries of the subject project. Where more intense lighting is necessary for safety purposes, the design shall include landscaping to block light from sensitive land uses, such as residences.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction, as applicable.

AES-3(b) Glare Reduction Measures

Implementing agencies shall, or can and should, minimize and control glare from transportation and land use projects near glare-sensitive uses through the adoption of project design features such as:

- Planting trees along transportation corridors to reduce glare from the sun;
- Creating tree wells in existing sidewalks;
- Adding trees in new curb extensions and traffic circles;
- Adding trees to public parks and greenways;
- Landscaping off-street parking areas, loading areas, and service areas;
- Limiting the use of reflective materials, such as metal;
- Using non-reflective material, such as paint, vegetative screening, matte finish coatings, and masonry;

- Screening parking areas by using vegetation or trees;
- Using low-reflective glass;
- Complying with applicable general plan policies, municipal code regulations, city or local controls related to glare; and
- Tree species planted to comply with this measure shall provide substantial shade cover when mature. Utilities shall be installed underground along these routes wherever feasible to allow trees to grow and provide shade without need for severe pruning.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and Tulare County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction, as applicable.

Significance After Mitigation

In the absence of regulations specifically addressing light and glare impacts, the aforementioned mitigation measures would limit the use of reflective building materials and the potential spillage of light both upward and onto adjacent properties from exterior lighting fixtures. However, mitigation measures maybe not be feasible for all projects. Therefore, this impact would remain significant and unavoidable.

c. Specific Projects That May Result in Impacts

Table 4.1-1 identifies examples of transportation projects with the potential to cause or contribute to direct or indirect impacts to aesthetics and visual resources such as those discussed above. These projects are representative and were selected based on their potential scope and likelihood to result in the impacts identified above. Additional specific analysis would be required as individual projects are implemented to determine the project specific magnitude of impact. Mitigation discussed above would apply to these specific projects.

Table 4.1-1 Proposed 2022 RTP/SCS Projects That May Result in Aesthetic Impacts

Project Jurisdiction and Location	Improvement	Potential Impact
Caltrans		
State Route 99 - 30.6/35.2 Tulare/Tagus - Prosperity Avenue to 1.2m S of Avenue 280	Widen existing roadway from 4 to 6 lanes	AES-1, AES-2, AES-3
State Route 99 - 25.4/30.6 Tulare - Avenue 200 to Prosperity Avenue	Widen existing roadway from 4 to 6 lanes	AES-1, AES-2, AES-3
State Route 99 - 13.5/25.4 - 0.7 miles north of Court Ave to Avenue 200	Widen existing roadway from 4 to 6 lanes	AES-1, AES-2, AES-3
State Route 99 - 0.0/13.5 Near Earlimart, County Line Road to 0.7 miles north of Court Avenue	Widen existing roadway from 4 to 6 lanes	AES-1, AES-2, AES-3
State Route 65 - 10.9/15.6 Terra Bella - Avenue 88 to Avenue 124	Widen existing roadway from 2 to 4 lanes	AES-1, AES-2, AES-3
State Route 65 - 29.5/32.3 Near Lindsay-from Hermosa Road to Avenue 244	Realignment and widen existing roadway from 2 to 4 lanes	AES-1, AES-2, AES-3
State Route 190 - 13.2/15.0 Porterville - Westwood to State Route 65	Widen existing roadway from 2 to 4 lanes	AES-1, AES-2, AES-3

Project Jurisdiction and Location	Improvement	Potential Impact
State Route 99 at Caldwell Avenue	Widen on/off ramps and bridge structure	AES-1, AES-2, AES-3
State Route 99 at AgriCenter	Construct new Interchange	AES-1, AES-2, AES-3
State Route 99 at Paige Avenue	Widen on/off ramps and bridge structure	AES-1, AES-2, AES-3
State Route 198 at Road 148	Construct new interchange	AES-1, AES-2, AES-3
State Route 190 at Main Street	Widen bridge structure, new ramps	AES-1, AES-2, AES-3
Dinuba		
Nebraska Avenue at Alta Avenue	Roundabout at intersection	AES-1, AES-2, AES-3
Kamm Avenue at Alta Avenue	Roundabout at intersection	AES-1, AES-2, AES-3
Lindsay		
State Route 65 - at Tulare Avenue	Roundabout and local street improvements	AES-1, AES-2, AES-3
Porterville		
State Route 190 - at Main Street and SR-65	WB aux lane and ramp improvements	AES-1, AES-2, AES-3
Westwood Street - South of Orange Avenue to south of Tule River	Widen existing road bridges from 2 to 4 lanes	AES-1, AES-2, AES-3
Newcomb Street - North of Tule River to south of Poplar Ditch	New 4 lane overcrossing over SR 190	AES-1, AES-2, AES-3
State Route 190 at Westwood	Roundabout and intersection improvements	AES-1, AES-2, AES-3
State Route 190 at Plano Street	Roundabout and intersection improvements	AES-1, AES-2, AES-3
Plano Street at College Avenue	Roundabout at intersection	AES-1, AES-2, AES-3
Visalia		
State Route 198 at Shirk Street	Turn lane, intersection, ramp improvements	AES-1, AES-2, AES-3
State Route 198 downtown corridor interchanges	Turn lane, intersection, ramp improvements	AES-1, AES-2, AES-3
State Route 198 at Lovers Lane	Turn lane, intersection, road rehabilitation improvements	AES-1, AES-2, AES-3
Riggin Avenue - Akers to Demaree	Widen existing roadway from 2 to 4 lanes	AES-1, AES-2, AES-3
Riggin Avenue - Mooney to Conyer	Widen existing roadway from 2 to 4 lanes	AES-1, AES-2, AES-3
Riggin Avenue - Shirk to Akers	Widen existing roadway from 2 to 4 lanes	AES-1, AES-2, AES-3
Riggin Avenue - Kelsey to Shirk	Widen existing roadway from 2 to 4 lanes	AES-1, AES-2, AES-3
Tulare County		
Avenue 280 - Santa Fe (Visalia) to Lovers Ln (Visalia)	Widen existing roadway from 2 to 4 lanes	AES-1, AES-2, AES-3
Avenue 280 - Lovers Ln (Visalia) to Virginia (Farmersville)	Widen existing roadway from 2 to 4 lanes	AES-1, AES-2, AES-3
Avenue 280 - Brundage (Farmersville) to Elberta (Exeter)	Widen existing roadway from 2 to 4 lanes	AES-1, AES-2, AES-3
State Route 99 - South County interchanges	Turn lane, intersection, ramp improvements	AES-1, AES-2, AES-3
State Route 99 at Caldwell Avenue (Avenue 280)	Ramp signalization and intersection improv.	AES-1, AES-2, AES-3
State Route 198 at State Route 65	Turn lanes, intersection improvements	AES-1, AES-2, AES-3
State Route 198 at Spruce Road	Turn lanes, intersection improvements	AES-1, AES-2, AES-3

4.1.4 Cumulative Impacts

The cumulative impact analysis area for aesthetics consists of the TCAG region and adjoining counties. The TCAG region is adjacent to four counties: Fresno, Kings, Kern, and Inyo. The land between each of these counties and the TCAG region is largely undeveloped agricultural land or open space; however, the City of Reedley in Fresno County is in close proximity to the City of Dinuba in Tulare County. The existing land use scenarios in the TCAG region would continue to develop and could result in expansion of light and glare in urban areas and into undeveloped land.

Some types of impacts to aesthetic resources are localized and not cumulative in nature. For example, the creation of glare or shadows at one location is not worsened by glare or shadows created at another location. Rather these effects are independent and the determination as to whether they are adverse is specific to the project and location where they are created. Projects that block a view or affect the visual quality of a site also result in localized impacts. The impact occurs specific to a site or area and remains independent from another project elsewhere that may block a view or degrade the visual environment of a specific site. However, from some vantage points, such as mountain ridges or open valley floors, the viewshed can span for miles. Because development may be seen from distances or into the distance from some locations, the cumulative impact analysis area for aesthetics includes the TCAG region and adjoining counties.

There are two types of aesthetic impacts that may be additive in nature and thus cumulative: night sky lighting and overall changes in the visual environment as the result of increasing urbanization of the larger urban areas in the TCAG region. As development in one area, such as a relatively large city adjoining agricultural land (the cities of Tulare, Visalia, and Porterville) increases and possibly expands over time, this would meet or connect with development in an adjoining non-urban, rural area; the effect of night sky lighting experienced outside of the region may increase in the form of larger and/or more intense nighttime glow in the viewshed. Although growth envisioned in the proposed 2022 RTP/SCS is primarily focused on infill areas, development outside of those geographies with long-distance views may result in nighttime lighting becoming more visible, covering a larger area and/or appearing in new areas as a result of projected development under the proposed 2022 RTP/SCS.

With regard to the visual environment experienced throughout the cumulative impact analysis area, as planned cumulative development occurs over time the overall visual environment will change. The combination of forecasted development in the TCAG region and planned development in neighboring counties would result in a different visual environment than currently exists. The cumulative impacts associated changes in the visual environment (including scenic vistas and scenic resources) and night sky lighting and are considered significant and the contribution of the proposed 2022 RTP/SCS to these impacts is cumulatively considerable. Mitigation measures described earlier in this section would reduce impacts to aesthetics; however, even with implementation of those mitigation measures, impacts of the proposed 2022 RTP/SCS would remain cumulatively considerable.

4.2 Agriculture and Forestry Resources

This section evaluates impacts on agriculture and forestry resources from implementation of the proposed 2022 RTP/SCS.

4.2.1 Setting

a. Overview of Regional Agriculture and Forestry

Agricultural Lands

Tulare County is in California's San Joaquin Valley, one of the richest agricultural areas in the world. The County is home to 1.3 million acres of productive farmland, contributing $7.14 billion a year to the California economy. The agricultural industry is vitally important to both the County's industry and nation's food supply; it is home to 4,931 farms and 1,669,118 acres of harvested cropland (California Department of Conservation 2019).

Tulare County is among California's leaders in the production of dairy, citrus, and nuts. In 2006, over 1.3 million acres of land in Tulare County were classified as "agricultural land", according to the California Department of Conservation (California Department of Conservation 2019). Of this land, more than 379,762 acres were classified as "Prime Farmland." Due to conversion to other/nonagricultural uses, the amount of prime farmland in Tulare County has been declining since the Department started compiling such information in 1998 (DOC 2019). Similarly, the amount of land under Williamson Act Contracts has been declining in recent years. The decrease in demand from 2019 to 2020 can partially be attributed to a decrease in the value of almonds, grapes, peaches, and tangerines (Tulare County Crop and Livestock Report 2020).

Agriculture has deep roots in the region's history and future. The 2020 crop year's gross value of all agricultural commodities produced in Tulare County was $7,140,076,500 (Tulare County Crop and Livestock Report 2020). This represented a decrease (4.9 percent) from the 2019 crop value ($7,505,352,100). Tulare County consistently ranks in the top five counties of the State in overall agricultural productivity. Agriculture continues to be the main producing industry in Tulare County. The top ten revenue products in the County include milk, oranges, cattle and calves, grapes, nursery products, pistachio nuts, almonds, tangerines, lemons, corn, and peaches (Tulare County Crop and Livestock Report 2020). Cattle ranching is also prevalent throughout the County (Tulare County Crop and Livestock Report). The 11 major state highways that traverse the county, combined with its local road system, provide access to the more remote areas of the County. The County's transportation system traverses and connects these agricultural areas to their markets. Tulare County's agricultural areas also provide benefits such as wildlife habitat, flood control, groundwater recharge, and energy production (Tulare County General Plan 2030 Update).

Outside of the existing urban areas and incorporated cities, Tulare County, specifically the eastern half of the County, is primarily zoned A-1 – Agricultural Zone. The County's Zoning Ordinance states the purpose of this zone is to prepare for future changes in zoning based on planning and development proposals. The minimum parcel size for A-1 Zones is five acres. At the moment, A-1 zones also prevent land uses which are incompatible with predominately agricultural areas of the County. The southeastern area of Tulare County also contains parcels designated as Resource Conservation (RC) Zones, whose purpose is to manage existing natural resources and minimize development in areas in which it is unfeasible for the County to provide services. There are also multiple agricultural zone districts in the central and western areas of Tulare County, AE-10AE-20 (Exclusive Agriculture – 20 Acre Minimum), AE-40 (Exclusive Agricultural Zone - 40 Acre Minimum), AE-80 (Exclusive Agricultural – 80 Acre Minimum), and AF Foothill Agricultural (AF - minimum parcel size 160 acres).

Since 1998, there has been a Countywide decline of agricultural lands. From 2016 to 2018 there was a net loss of 194 acres of prime farmland, but a net gain of 4,122 and 119 acres of farmland of statewide importance and unique farmland, respectively. During the same period, urban and built-up land had a net total increase of 1,497 acres, farmland of local importance had a net total decrease of 4,156 acres, and grazing land had a net total increase of 280 acres (DOC 2019).

The conversion of irrigated farmland to urban land in the TCAG region has been primarily due to the construction of new solar facilities, homes, schools, and water control or recharge ponds. The largest concentration of conversions occurred in the form of new solar facilities, such as approximately 150 acres converted for the White River Solar Project and a groundwater recharge basin near the town of Alpaugh. In addition, near Visalia, approximately 80 acres was converted for the Ridgeview Middle School, Lennar at Vista, other new homes, and a solar facility. Non-irrigated and other land that was converted to urban land was primarily due to the construction of new solar facilities, homes, schools, parks, and other public facilities. Conversions from irrigated farmland to non-irrigated land uses were due to irrigated farmland having been fallow or used for dry grain production for three or more update cycles, and irrigated farmland that were no longer being irrigated and instead being used for cultivation of non-irrigated grain crops like in Hacienda Ranch NE, with approximately 350 acres going out of production.

Important Farmland

To characterize the environmental baseline for agricultural resources, Important Farmland Maps produced by the California Department of Conservation's (DOC) Farmland Mapping and Monitoring Program (FMMP) were reviewed. Unless otherwise expressed, the future use of "Important Farmland" in this EIR specifically includes the following definitions provided by the DOC (DOC 2018):

Prime Farmland

Land which has the best combination of physical and chemical characteristics to produce crops. It has the soil quality, growing season and moisture supply needed to produce sustained high yields of crops when treated and managed, including water management, according to current farming standards.

Farmland of Statewide Importance

Land that is like Prime Farmland but with minor shortcomings, such as greater slopes or less ability to hold and store moisture.

Unique Farmland

Land of lesser quality soils is typically used to produce specific high economic value crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to produce sustained high quality or high yields of a specific crop when treated and managed according to current farming methods. It is usually irrigated but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Examples of crops include oranges, olives, avocados, rice, grapes and cut flowers.

Farmland of Local Importance is not included in the State's definition of Prime Farmland. According to the most recent FMMP data from the California Department of Conservation, Tulare County contains a total of 704,231 acres of Important Farmland (DOC 2018).

Williamson Act Lands

The California Land Conservation Act of 1965, Sections 51200 et seq. of the California Government Code, commonly referred to as the "Williamson Act", enables local governments to restrict the use of specific parcels of land to agricultural or related open space use. Tulare County currently contains approximately 1.1 million acres of prime and non-prime agricultural land under Williamson Act preserve status as of 2016. Most Williamson Act lands are on the valley floor (DOC 2016).

Important Farmland Trends

As of 2018, Tulare County's Important Farmland totaled 704,231 acres. The Important Farmland breaks down to 365,943 acres of Prime Farmland, 326,476 acres of Farmland of Statewide Importance, 11,812 acres of Unique Farmland (see Table 4.2-1 and Figure 4.2-1). As shown in Figure 4.2-1, western Tulare County includes a substantial amount of Important Farmland. For purposes of this EIR, Important Farmland, as defined above, is limited to Prime Farmland, Farmland of Statewide Importance and Unique Farmland. Farmland of Local Importance is not included in the CEQA Guidelines Appendix G definition of Farmland; therefore, it is not included in the impact analysis below.

Table 4.2-1 shows Tulare County experienced a 9-acre net increase in Important Farmland between 2016 and 2018 (DOC 2019). Net increases in acreages occurred for Farmland of Statewide Importance and Unique Farmland, and a net decrease occurred for Prime Farmland. Prime Farmland decreased by 194 net acres; however, Farmland of Statewide Importance increased by 4,122 net acres. Furthermore, there was an increase of 119 net acres of Unique Farmland (DOC 2019).

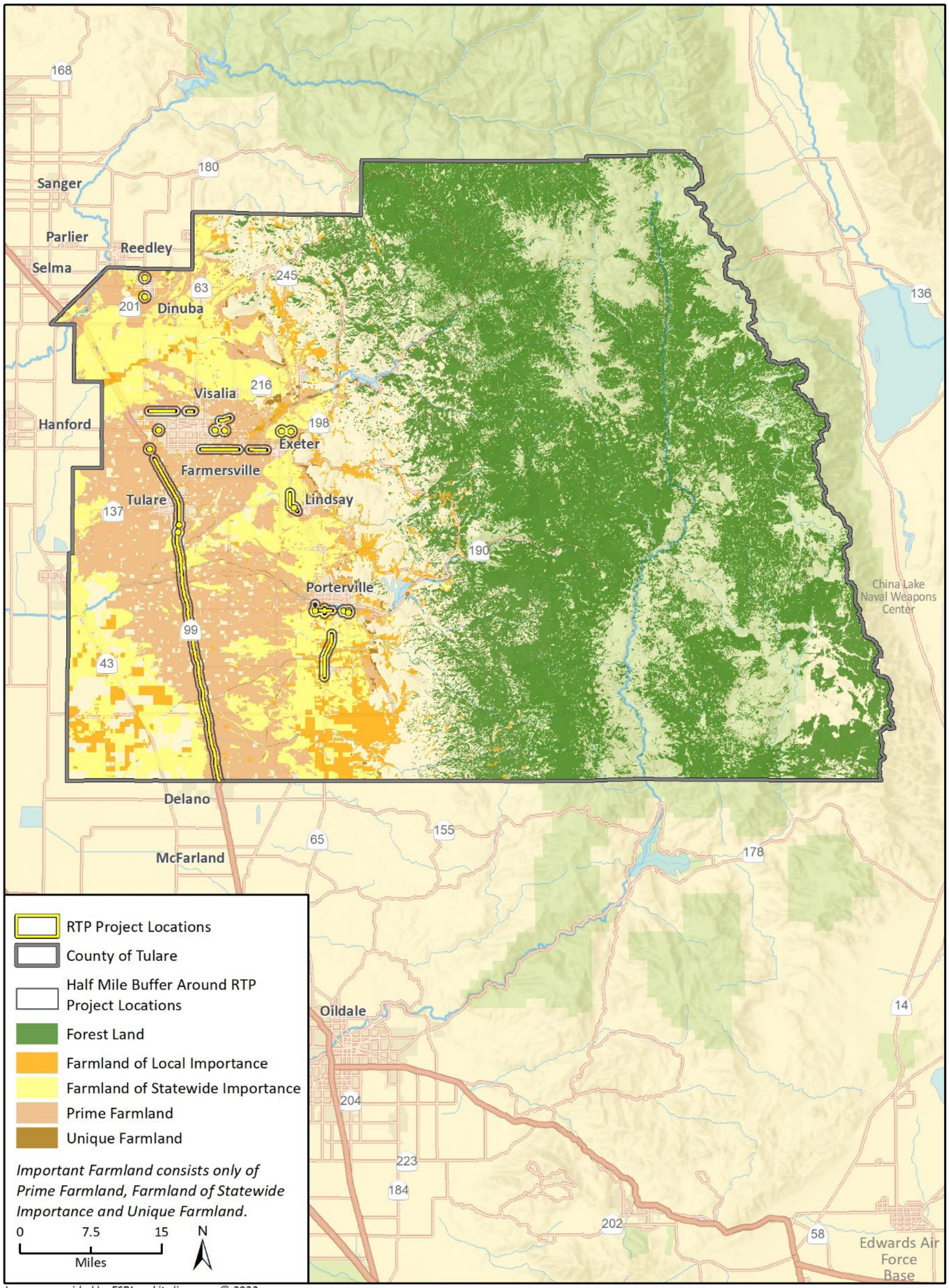
Forest Lands and Oak Woodlands

Forest land is defined in PRC Section 12220(g) is "land that can support 10-percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits."

Several types of forest land are found in the County, including red fir, pine, and conifer forest land. Most of the forest lands is located on the eastern portion of the County in the Sierra Nevada Mountains and controlled by federal agencies including the Bureau of Land Management and the U.S. Forest Service. See Section 4.4, *Biological Resources***,** for more discussion of forest lands found in Tulare County.

Most of the forest land is in eastern Tulare County, which is predominately zoned A-1 Agricultural. There are four Timber Preserve Zones in central and northern Tulare County. There are also Resource Conservation Zone Districts in the central and southeastern areas of the County.

Figure 4.2-1 Farmland, Forestry and RTP Project Locations in Tulare County



Imagery provided by ESRI and its licensors © 2022.
Additional data provided by CWHR, 2021 and FMMP, 2018.

Figure 4.2-2 Agricultural Preserve, Timber Production Zones and RTP Project Locations in Tulare County

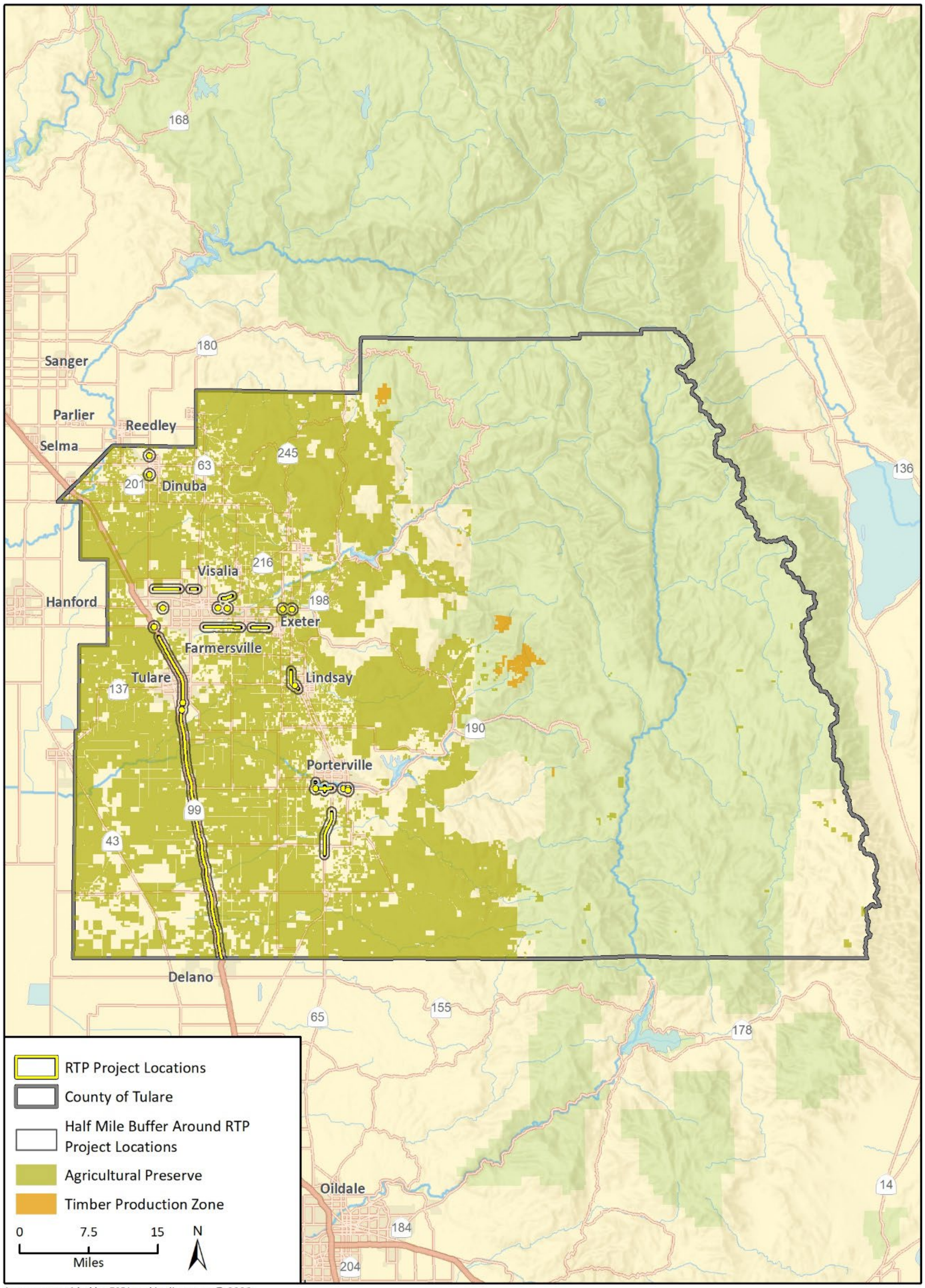


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Table 4.2-1 Important Farmland Conversion in Tulare County 2016-2018

Land Use Category	Total Acreage Inventoried		2016-2018 Acreage Changes			
	2016	2018	Acres Lost (-)	Acres Gained (+)	Total Acreage Changed	Net Acreage Changed
Prime Farmland	366,137	365,943	2,262	2,068	4,330	-194
Farmland of Statewide Importance	322,354	326,476	2,544	6,666	9,210	4,122
Unique Farmland	11,693	11,812	275	394	669	119
Important Farmland Total[1]	700,184	704,231	5,081	9,128	14,209	**9**

[1] Important Farmland represents all Prime Farmland, Farmland of Statewide, and Unique Farmland within Tulare County.

Sources: California Department of Conservation (DOC). 2018. *California Farmland Conversion Report 2016-2018*.

4.2.2 Regulatory Setting

Federal Laws, Regulations, and Policies

Farmland Protection Policy Act (FPPA)

The FPPA is intended to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It assures that to the extent possible federal programs are administered to be compatible with state, local units of government, and private programs and policies to protect farmland. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a Federal agency.

Federal Farm and Ranchland Protection Program

The Federal Farm and Ranchland Protection Program (FRPP) is a voluntary easement purchase program that helps farmers and ranchers keep their land in agriculture. Pursuant to sections 1539 to 1549 of the FPPA of 1981, the Secretary of Agriculture is directed to establish and carry out a program to "minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses, and to the extent practicable, will be compatible with state, unit of local government, and private programs and policies to protect farmland." (7 USC 4201-4209 & 7 USC 658). The program provides matching funds to state, tribal, or local governments and nongovernmental organizations with existing farmland protection programs to purchase conservation easements or other interests in land. The FRPP was re-authorized in the Farm Security and Rural Investment Act of 2002 (Farm Bill). The NRCS manages the program. Technical Committee, awards funds to qualified entities to conduct their farmland protection programs. Although a minimum of 30 years is required for conservation easements, priority is given to applications with perpetual easements.

State Laws, Regulations, and Policies

Farmland Mapping and Monitoring Program

The DOC, under the Division of Land Resource Protection, developed the FMMP to monitor the conversion of the state's farmland to and from agricultural use. Data is collected at the county level to produce a series of maps identifying eight land use classifications using a minimum mapping unit of 10 acres. The program also produces a biannual report on the amount of land converted from agricultural to non-agricultural use. The program maintains an inventory of state agricultural land and updates the “Important Farmland Series Maps” every two years (DOC 2016).

Williamson Act

The California Land Conservation Act of 1965, Sections 51200 et seq. of the California Government Code, commonly referred to as the “Williamson Act”, enables local governments to restrict the use of specific parcels of land to agricultural or related open space use. Landowners enter contracts with participating cities and counties and agree to restrict their land to agriculture or open space use for a minimum of ten years. In return, landowners receive property tax assessments that are much lower than normal because they are based upon farming and open space uses as opposed to full market (speculative) value. Local governments receive an annual subvention of forgone property tax revenues from the state via the Open Space Subvention Act of 1971 (DOC 2016e).

The Right to Farm Act of 1981

The Right to Farm Act of 1981 (Civ. Code, § 3482.5) is meant to protect commercial agricultural operations from nuisance complaints that may occur when agricultural operations are conducting business in a “manner consistent with proper and accepted customs.” The code states operations that have been in business for three or more years and not nuisances upon commencement of operation shall not be considered a nuisance because of new land use.

California Farmland Conservancy Program Act

The California Farmland Conservancy Program Act of 2010 formed the California Farmland Conservancy Program (CFCP) and provides grants for agricultural conservation easements. Agricultural conservation easements are created to support agriculture and prevent development on the subject parcels. Easements funded by the CFCP must be suitable for commercial agriculture.

Federal Forest Legacy Program

The Federal Forest Legacy Program was a part of the 1990 Farm Bill. Its purpose is to identify and protect environmentally important forestlands that are threatened by present or future conversion to non-forest uses. The program provides conservation easements and gives priority to lands that can be effectively protected and managed, as well as lands that have significant scenic, recreational, timber, riparian, fish, and wildlife, threatened and endangered species, and other cultural or environmental values. Properties that are “working forests,” whereby the forestland is managed for the production of forest products, are also eligible under this program. Involvement in this program by private landowners is voluntary.

Timberland Production Zones

The Z’berg-Warren-Keene-Collier Forest Taxation Reform Act of 1976 requires counties to enable zoning of land used for growing and harvesting timber as Timberland Preserve Zones (TPZ). A TPZ is a 10-year restriction on the use of timberland. Similar to the relationship between the Williamson Act and agricultural land, Timberland Preserve Zones are limited to growing and harvesting timber and other similar uses.

California Timberland Productivity Act of 1982

The California Timberland Productivity Act (CTPA) of 1982 describes the powers and duties of local government in protecting timberlands. The law is designed to maintain an optimum amount of timberland, ensuring its current and continued availability by establishing TPZ on all qualifying timberland, which restrict land use to growing and harvesting timber and other compatible uses. The Act discourages premature or unnecessary conversion of timberland to urban or other uses and expansion of urban services into timberland and encourages investment in timberlands based on reasonable expectation of harvest. The CTPA also provides that timber operations conducted in accordance with California forest practice rules shall not be restricted or prohibited due to land uses in or around the location of the timber operations.

Local Laws, Regulations, and Policies

Tulare County Right-to-Farm Ordinance

Tulare County has adopted a right-to-farm ordinance with the purpose of preventing non-agricultural land uses from encroaching upon agricultural land. The purpose of the ordinance is to allow nuisances associated with agricultural operations to continue as long as nearby property owners are notified, thereby excluding those activities from being considered “nuisances” (Ordinance Code section 7-29-1000 et seq.).

Tulare County General Plan

Tulare County’s 2030 General Plan Agriculture Element focuses on the long-term preservation of productive and potentially productive farmland. To achieve this goal, Policy AG-1.1 stresses the importance of agriculture within the County due to its economic value, conservation of open space, and natural resources (Tulare County 2021).

City of Dinuba General Plan

The City of Dinuba General Plan contains two objectives directly related to agriculture, (1) the preservation of Prime Farmland, Farmland of Statewide Importance and Farmland Local Importance; and (2) to provide a greenbelt around the City’s perimeter in part to protect agriculture. Policy 3.1 states the continuation of agricultural production as an important economic activity to be designated and maintained as part of the City’s greenbelt (City of Dinuba 2021).

City of Exeter General Plan

The Exeter 2020 General Plan is like other General Plans in the TCAG region. Preservation of agricultural land through compact development and efficient land use are balanced with residential, commercial, and industrial growth (City of Exeter 2021).

City of Farmersville General Plan

The City of Farmersville 2025 General Plan attempts to balance agricultural protection and the potential impacts of urbanization as the city grows. Specifically, the City’s goal is to preserve and protect agricultural lands in a manner that new development is not forced to expand onto prime agricultural lands (City of Farmersville 2021).

City of Lindsay General Plan

The City of Lindsay General Plan states that urban development should be guided away from prime agricultural land unless the action would not promote planned patterns of land use, or unless there is no other reasonable choice available to meet the needs of the City for urban annexation. Annexation is mentioned as an alternative to guide development away from prime agricultural land if the land does not contain prime agricultural soils and is not classified as prime or unique farmland. However, it should be noted the General Plan has not been updated since 1989 (City of Lindsay 2021).

City of Porterville General Plan

The City of Porterville 2030 General Plan, within the Open Space and Conservation Element of, Guiding Policy OSC-G-4 promotes the preservation of agricultural lands within and adjacent to its Planning Area. The implementation of this goal is promoted through five policies, each addressing various aspects of agricultural preservation. Specifically, Policy OSC-I-17 prohibits the conversion of prime agricultural land for urban development through General Plan amendments unless there are no other feasible alternatives for development (City of Porterville 2021).

City of Tulare General Plan

The City of Tulare General Plan was adopted in October 2014. In the Conservation and Open Space Element, the General Plan discusses policies to achieve Goal COS-3, to promote the productivity of agricultural lands surrounding Tulare and the continued viability of Tulare County agriculture (City of Tulare 2021).

City of Visalia General Plan

The City of Visalia General Plan has an Open Space and Conservation Element that includes policy OSC-O-2, which directs the City to work with the County and other stakeholders to protect Prime Farmland and Farmland of Statewide Importance outside of the City’s Urban Development Boundary for agricultural production (City of Visalia 2014).

City of Woodlake General Plan

The City of Woodlake 2008-2028 General Plan’s overall goal is to establish policies to reduce the impact of urbanization on agricultural lands, while allowing the city to grow. Efficient land use, buffers, infill development, and “hard edges” to preserve open space are the policies used to balance growth with the protection of agricultural land (City of Woodlake 2021).

Land Conservation Trusts

A land trust works to preserve land or conservation easement acquisition. A land conservation trust is another type of organization devoted to protecting open space, agricultural lands, wildlife habitats, and natural resource lands. There are approximately 80 established trusts in California. Local and regional land trusts, organized as charitable organizations under federal tax laws, are directly involved in conserving land for its natural, recreational, scenic, historical, and productive values. Local governments and special districts, either on their own or working with land trusts and conservancies, can acquire fee title to agricultural and open space lands or purchase development rights to preserve rural and agricultural areas, watersheds, or critical habitat, or to create public parks and recreational areas. Two conservation trusts have trust lands in Tulare County, the Tulare Basin Land Trust Alliance, and the Sequoia Riverlands Trust.

4.2.3 Impact Analysis

a. Methodology and Significance Thresholds

Appendix G of the State CEQA Guidelines identifies the following criteria for determining whether a project's impacts would have a significant impact on agricultural resources:

1. 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 nonagricultural use;
2. Conflict with existing zoning for agricultural use, or a Williamson Act contract;
3. Conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timber Production;
4. Result in the loss of forest land or conversion of forest land to non-forest use; or
5. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use.

The analysis assesses the impacts to agricultural forestry resources that could result from implementation of the proposed 2022 RTP/SCS. Impacts are assessed in terms of changes to both land use and transportation projects using Tulare County data and TCAG forecasts related to projected population, housing, and employment growth. The development of new transportation facilities may affect agricultural and forestry resources, through both direct and indirect effects, including traversing agricultural, timberland, and forest lands.

b. Project Impacts and Mitigation Measures

The following section discusses potential impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. Section 4.10.3.c summarizes the impacts associated with capital improvement projects in the proposed 2022 RTP/SCS. Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation projects and land use projects is not possible at this time. In general, however, implementation of proposed transportation projects and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1:	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 nonagricultural use
Threshold 2:	Conflict with existing zoning for agricultural use, or a Williamson Act contract
Threshold 5:	Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use

Impact AG-1 PROPOSED TRANSPORTATION PROJECTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD RESULT IN THE CONVERSION OF PRIME FARMLAND, UNIQUE FARMLAND, OR FARMLAND OF STATEWIDE IMPORTANCE TO NONAGRICULTURAL USE, AND/OR CONFLICT WITH EXISTING ZONING FOR AGRICULTURE OR A WILLIAMSON ACT CONTRACT. THIS WOULD BE A SIGNIFICANT AND UNAVOIDABLE IMPACT.

The FMMP has identified 704,231 acres of land as Important Farmland ("Farmland") in the TCAG region (refer to Table 4.2-1). In addition, the TCAG region has agricultural lands zoned for agriculture and lands under Williamson Act contract. The proposed 2022 RTP/SCS emphasizes infill development and development near existing transportation corridors, which are generally located in urbanized areas of cities and unincorporated communities. Such land use development within urbanized areas would not be likely to result in agricultural resource impacts since they would be located within existing urban areas. However, limited development would occur outside of urban areas of the TCAG region. Due to the proposed 2022 RTP/SCS projects, the land use pattern, which emphasizes infill development in conjunction with mixed use and transit-oriented development within existing urbanized areas and limited development in outlying areas along transportation corridors, the majority of this Important Farmland would remain available for agricultural use, though some Important Farmland would be converted to other land uses.

Transportation projects under the proposed 2022 RTP/SCS adjacent to agricultural areas, particularly those requiring new rights-of-way, could also convert Important Farmland to non-agricultural use, or conflict with agricultural zoning and/or Williamson Act contracts as described in Threshold 5 through the involvement of other changes in the existing environment which, due to their location or nature, could result in conversion of farmland, to a non-agricultural use. Although incorporated cities in Tulare County are fairly urbanized, many cities border agriculture, including FMMP-designated Important Farmland. Transportation projects that involve roadway widening have the potential to affect narrow segments of agricultural land located immediately along the existing right-of-way of proposed improvements. For example, the widening of State Route 99 through Tulare County would have the potential to impact agricultural lands immediately adjacent to both sides of the roadway, and the widening planned for Avenue 280 in Farmersville to Exeter would have the potential to impact adjacent agricultural land on either side of the roadway. In addition, improving, expanding, and extending existing roadways, along with the installation of new roadways, could remove some barriers to development taking place on the urban edge as the region's connectivity and access improves from these projects. Additionally, construction of projects adjacent to agricultural fields could result in introduction of invasive species or weeds, which could out compete agricultural crops. It is important to note that for federally funded projects, implementing and local agencies are required to follow the rules and regulations of the Farmland Protection Policy Act (FPPA) including determining the impact by completing the Farmland Conversion Impact Rating form (AD-1006). The FPPA assures that to the extent possible, federal programs are administered to be compatible with state and local programs and policies to protect farmland.

The proposed 2022 RTP/SCS would also relieve traffic congestion in urban areas and in the spheres of influence around the cities which could change which communities are on the periphery of the cities. This could change which communities are closest to certain farming activities. Some new residents may be sensitive to the noise, pesticide use, and dust generated by certain farming practices, resulting in pressure to change zoning or other laws related to those farming activities. According to the County's Right-to-Farm Ordinance, the County would condition discretionary permits for special uses and residential development within or adjacent to agricultural upon recording a Right-to-Farm Notice. Thus, residents moving into these areas in the vicinity of existing agricultural activities should be prepared to experience discomfort or inconveniences arising from typical agricultural operations, and that an established agricultural operation shall not be considered a nuisance due to changes in the surrounding area. The right-to-farm ordinance promotes understanding and cooperation between urban residents and agricultural operators.

A determination of the impacts to Important Farmland, agricultural zoning and conflicts with Williamson Act contracts would be made on a case-by-case basis as individual projects are implemented. Many individual projects would likely not create significant impacts, particularly those that involve only minor widening along existing rights-of-way or would be located in urbanized areas zoned for development. Nevertheless, because implementation of the proposed 2022 RTP/SCS may directly result in conversion of Important Farmland and/or conflict with agricultural zoning and Williamson Act contracts, this is a significant impact. The following mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures where applicable for transportation projects that would result in impacts to Important Farmland and/or conflict with agricultural zoning and Williamson Act contracts. Cities and the County can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site specific conditions.

AG-1 Agricultural Land Impact Avoidance and Minimization

Implementing agencies shall implement measures, where feasible based on project-and site-specific considerations that include but are not limited to those identified below.

- Require project relocation or corridor realignment, where feasible, to avoid Important Farmland, agriculturally zoned land and/or land under Williamson Act contract;
- Manage project construction to minimize the introduction of invasive species or weeds that may affect agricultural production on agricultural land adjacent to project sites. Managing project construction may include washing construction equipment before bringing equipment on-site, using certified weed-free straw bales for construction Best Management Practices (BMPs), and other similar measures.
- Provide buffers, berms, setbacks, fencing, or other project design measures to protect surrounding agriculture, and to reduce conflict with farming that could result from implementation of transportation projects and/or development included as a part of the RTP/SCS.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are Tulare County and incorporated cities within the County. This mitigation measure shall, or can and should, be applied during project permitting and environmental review and implemented during construction, as applicable.

Significance After Mitigation

Implementation of Mitigation Measure AG-1 would require avoidance, minimization, or compensation for Important Farmland impacts by specific projects included in the proposed 2022 RTP/SCS, thereby reducing the impact of conversion of Important Farmland to non-agriculture use and conflicts with agricultural zoning and Williamson Act contracts. However, the mitigation would not ensure that all future land use and transportation projects could reduce impacts on Important Farmland, lands zoned for agriculture, and lands under Williamson Act contract to a less than significant level. As a result, the aforementioned mitigation would reduce impacts, but impacts would remain significant and unavoidable. No additional mitigation measures to reduce this impact to less-than-significant levels are feasible.

Threshold 3:	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))
Threshold 4:	Result in the loss of forest land or conversion of forest land to non-forest use

Impact AG-2 THE PROPOSED TRANSPORTATION PROJECTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD NOT CONFLICT WITH EXISTING ZONING FOR FOREST LAND, TIMBERLAND, OR TIMBERLAND PRODUCTION, NOR CONVERT FOREST LAND TO NON-FOREST USES. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Forest lands are generally located in the eastern, mountainous sections of the TCAG region that are under state and federal control (national parks and national forests). Due to existing state and federal protections for these areas, the rate of forest land loss due to urbanization would be low. The proposed 2022 RTP/SCS, County and city polices focus development in areas that do not include forest land or timberland, as defined by statutes. Land use strategies contained within the proposed 2022 RTP/SCS encourage growth in developed areas rather than a more dispersed land use pattern that could result in conversion of forest land, timberland, or Timberland Production zones. Proposed 2022 RTP/SCS transportation projects would be limited to similar areas of the TCAG region. As such, the proposed 2022 RTP/SCS would not conflict with existing zoning for forest land, timberland, or timber production, nor convert forest land to non-forest use.

Because land use strategies contained within the proposed 2022 RTP/SCS would help to encourage growth in developed areas, and because the forest lands and timber areas are outside the identified land use development areas in the TCAG region, impacts on conversion of forest land or conflicts with land zoned for forest land, timberland, or timberland production would be less than significant.

Mitigation Measures

No mitigation is required.

c. Specific RTP/SCS Projects That May Result in Impacts

Table 4.2-2 identifies examples of transportation projects with the potential to cause or contribute to direct or indirect impacts to agricultural resources such as those discussed above. These projects are representative and were selected based on their potential scope and likelihood of disturbing agricultural lands. Additional specific analysis would be required as individual projects are implemented to determine the project specific magnitude of impact. Mitigation discussed above would apply to these specific projects.

Table 4.2-2 Proposed 2022 RTP/SCS Projects That May Result in Agriculture Impacts

Project Jurisdiction and Location	Improvement	Potential Impact
Caltrans		
State Route 99 - 25.4/30.6 Tulare - Avenue 200 to Prosperity Avenue	Widen existing roadway from 4 to 6 lanes	AG-1
State Route 99 - 13.5/25.4 - 0.7 miles north of Court Ave to Avenue 200	Widen existing roadway from 4 to 6 lanes	AG-1
State Route 99 - 0.0/13.5 Near Earlimart, County Line Road to 0.7 miles north of Court Avenue	Widen existing roadway from 4 to 6 lanes	AG-1
State Route 65 - 10.9/15.6 Terra Bella - Avenue 88 to Avenue 124	Widen existing roadway from 2 to 4 lanes	AG-1
State Route 65 - 29.5/32.3 Near Lindsay-from Hermosa Road to Avenue 244	Realignment and widen existing roadway from 2 to 4 lanes	AG-1
State Route 190 - 13.2/15.0 Porterville - Westwood to State Route 65	Widen existing roadway from 2 to 4 lanes	AG-1
State Route 99 at Caldwell Avenue	Widen on/off ramps and bridge structure	AG-1
State Route 99 at Paige Avenue	Widen on/off ramps and bridge structure	AG-1
Dinuba		
Nebraska Avenue at Alta Avenue	Roundabout at intersection	AG-1
Kamm Avenue at Alta Avenue	Roundabout at intersection	AG-1
Lindsay		
State Route 65 - at Tulare Avenue	Roundabout and local street improvements	AG-1
Porterville		
Westwood Street - South of Orange Avenue to south of Tule River	Widen existing road bridges from 2 to 4 lanes	AG-1
State Route 190 at Westwood	Roundabout and intersection improvements	AG-1
State Route 190 at Plano Street	Roundabout and intersection improvements	AG-1
Plano Street at College Avenue	Roundabout at intersection	AG-1
Visalia		
Riggin Avenue - Akers to Demaree	Widen existing roadway from 2 to 4 lanes	AG-1
Riggin Avenue - Mooney to Conyer	Widen existing roadway from 2 to 4 lanes	AG-1
Riggin Avenue - Shirk to Akers	Widen existing roadway from 2 to 4 lanes	AG-1
Riggin Avenue - Kelsey to Shirk	Widen existing roadway from 2 to 4 lanes	AG-1

Project Jurisdiction and Location	Improvement	Potential Impact
Tulare County		
Avenue 280 - Santa Fe (Visalia) to Lovers Ln (Visalia)	Widen existing roadway from 2 to 4 lanes	AG-1
Avenue 280 - Lovers Ln (Visalia) to Virginia (Farmsersville)	Widen existing roadway from 2 to 4 lanes	AG-1
Avenue 280 - Brundage (Farmersville) to Elberta (Exeter)	Widen existing roadway from 2 to 4 lanes	AG-1

4.2.4 Cumulative Impacts

The cumulative impact analysis area for agriculture and forestry resources consists of the TCAG region and adjoining counties. Future development in this region that would result in cumulative significant and unavoidable impacts to agricultural land or forestry land is considered in the analysis.

Future development within the cumulative impact analysis area would convert agricultural land, including Important Farmland, to non-agricultural uses and may result in conflicts with agricultural zoning and Williamson Act contracts. In addition, future development adjacent to agricultural land has the potential to result in a loss of agricultural land due to land use conflicts, which adds to the cumulative conversion of agricultural lands, including areas designated as Important Farmland by the FMMP. Cumulative impacts to agricultural resources would be significant.

Implementation of Mitigation Measure AG-1 would reduce the contribution of the proposed 2022 RTP/SCS to cumulative agricultural land impacts. However, the mitigation would not ensure that the future land use and transportation projects could feasibly relocate or realign to avoid impacts, and impacts would remain significant and unavoidable. The contribution of the proposed 2022 RTP/SCS to cumulative impacts to agricultural and Williamson Act lands would therefore remain cumulatively considerable post-mitigation.

In the cumulative impact analysis area, forestland and timber resources are primarily located in Fresno County and Inyo County. Specifically, the Sierra National Forest, Inyo National Forest, and Kings Canyon National Park, which are all located within these counties. National forests and national parks are protected by Federal law and greatly restrict any type of urban development that can occur in these areas. Thus, future development within the cumulative impact analysis area would not convert forestland to non-forest uses and thus would not result in conflicts with forest zoning. Cumulative impacts to forestland and timber resources would therefore be less than significant. The proposed 2022 RTP/SCS would not conflict with existing zoning for forest land, timberland, or timber production, nor convert forest land to non-forest use. The contribution of the proposed 2022 RTP/SCS to cumulative impacts to forestland and timber resources would therefore not be cumulatively considerable.

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4.3 Air Quality

This section evaluates the air quality impacts resulting from implementation of the proposed 2022 RTP/SCS. Both temporary impacts relating to construction activities and long-term impacts associated with population and employment growth and associated growth in vehicle traffic and energy consumption are discussed. In addition, the potential health risks associated with the proposed 2022 RTP/SCS land use scenario are discussed. Greenhouse gas emissions are analyzed in Section 4.8, G*reenhouse Gas Emissions/Climate Change.*

4.3.1 Setting

a. Climate and Meteorology

Air quality is affected by the rate and location of pollutant emissions and by climatic conditions that influence the movement and dispersion of pollutants. Atmospheric conditions, such as wind speed, wind direction and air temperature gradients, along with local and regional topography, mediate the relationship between air pollutant emissions and air quality.

The TCAG region is located within the San Joaquin Valley Air Basin (SJVAB), which includes San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and western Kern County counties. The SJVAB is approximately 250 miles long and 35 miles in width (on average) and is bordered by the Coast Range Mountains on the west, the Sierra Nevada mountains on the east, and the Tehachapi Mountains to the south. On the valley floor, the SJVAB is open only to the north, which heavily influences prevailing winds. Northwesterly winds are common during summer months, and air masses are often channeled towards the southeastern end of the San Joaquin Valley. Winds are often weaker in the winter, which contribute to stagnation events in which transport of pollutants is very limited (San Joaquin Valley Air Pollution Control District [SJVAPCD] 2015).

The SJVAB is generally considered to have a Mediterranean climate, characterized by sparse rainfall and hot, dry summers. With an average of over 260 sunny days per year, the SJVAB provides favorable conditions for ozone formation. While precipitation and fog during the winter block sunlight and reduce ozone concentrations, wintertime fog provides favorable conditions for the formation of particulate matter (SJVAPCD 2015a).

Local climate conditions for the TCAG region are shown in Table 4.3-1. As summarized therein, the warmest month of the year is July, and the coldest month of the year is December. The annual average maximum temperature is 77 degrees Fahrenheit (°F), while the annual average minimum temperature is 51°F.

Table 4.3-1 Tulare County Climate Conditions

Temperature Condition	Amount
Average annual rainfall	12.5 inches
Average annual maximum temperature	77°F
Average annual minimum temperature	51°F
Warmest month	July
Coolest month	December
Average annual mean temperature	62°F
Average wind speed	4.5 miles per hour
Predominant wind direction	northwest

°F = degrees Fahrenheit
Note: Averages are based on the period of record from January 1980 to December 2016.
Source: WeatherSpark 2016; Iowa Environmental Mesonet 2021.

b. Sources of Air Pollution

Air pollutant emissions in the SJVAB are generated primarily by stationary and mobile sources. Stationary sources can be divided into two major subcategories:

- Point sources occur at a specific location and are often identified by an exhaust vent or stack. Examples include boilers or combustion equipment that produce electricity or generate heat.
- Area sources are widely distributed and include such sources as residential and commercial water heaters, painting operations, lawn mowers, agricultural fields, landfills, and some consumer products.

Mobile sources refer to emissions from motor vehicles, including tailpipe and evaporative emissions, and can also be divided into two major subcategories:

- On-road sources may be legally operated on roadways and highways.
- Off-road sources include aircraft, ships, trains, and self-propelled construction equipment.

Air pollutants can also be generated by the natural environment, such as when high winds suspend fine dust particles.

c. Air Pollutants of Primary Concern

The federal and State Clean Air Acts mandate the control and reduction of certain air pollutants. Under these laws, the U.S. Environmental Protection Agency (U.S. EPA) and the California Air Resources Board (CARB) have established the National Ambient Air Quality Standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS) for "criteria pollutants" and other pollutants. Some pollutants are emitted directly from a source (e.g., vehicle tailpipe, an exhaust stack of a factory, etc.) into the atmosphere, including carbon monoxide, volatile organic compounds (VOC)/reactive organic gases (ROG),[1] nitrogen oxides (NO_X), particulate matter with diameters of up to ten microns (PM_{10}) and up to 2.5 microns ($PM_{2.5}$), sulfur dioxide, and lead. Other pollutants are

[1] CARB defines VOC and ROG similarly as, "any compound of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate," with the exception that VOC are compounds that participate in atmospheric photochemical reactions. For the purposes of this analysis, ROG and VOC are considered comparable in terms of mass emissions, and the term ROG is used in this EIR.

created indirectly through chemical reactions in the atmosphere, such as ozone, which is created by atmospheric chemical and photochemical reactions primarily between ROG and NO_X. Secondary pollutants include oxidants, ozone, and sulfate and nitrate particulates (smog). The characteristics, sources and effects of criteria pollutants are discussed in the following subsections. The following subsections describe the characteristics, sources, and health and atmospheric effects of air pollutants of primary concern.

Ozone

Ozone is produced by a photochemical reaction (triggered by sunlight) between nitrogen oxides (NO_X) and ROG. ROG are composed of non-methane hydrocarbons (with some specific exclusions), and NO_X is composed of different chemical combinations of nitrogen and oxygen, mainly nitric oxide and nitrogen dioxide. NO_X are formed during the combustion of fuels, while ROG are formed during combustion and evaporation of organic solvents. As a highly reactive molecule, ozone readily combines with many different components of the atmosphere. Consequently, high levels of ozone tend to exist only while high ROG and NO_X levels are present to sustain the ozone formation process. Once the precursors have been depleted, ozone levels rapidly decline. Because these reactions occur on a regional rather than local scale, ozone is considered a regional pollutant. In addition, because ozone requires sunlight to form, it mostly occurs in concentrations considered serious between the months of April and October. Ozone is a pungent, colorless, toxic gas with direct health effects on humans, including changes in breathing patterns, reduction of breathing capacity, increased susceptibility to infections, inflammation of lung tissue, and some immunological changes (U.S. EPA 2021a). Groups most sensitive to ozone include children, the elderly, people with respiratory disorders, and people who exercise strenuously outdoors.

Hydrocarbons and Other Organic Gases (Total Hydrocarbons, CH_4NMHC (non-methane), AHC, NHC)

Any of the vast family of compounds consisting of hydrogen and carbon in various combinations are known as hydrocarbons. Fossil fuels are included in this group. Many hydrocarbon compounds are major air pollutants, and those which can be classified as olefins or aromatics are highly photochemically reactive. Atmospheric hydrocarbon concentrations are generally higher in winter because the reactive hydrocarbons react more slowly in the winter and meteorological conditions are more favorable to their accumulating in the atmosphere to higher concentration before producing photochemical oxidants. Due to the role they play as ozone precursors, reactive hydrocarbons are one of the two criteria pollutants subject to federal ozone requirements.

Motor vehicles are a major source of anthropogenic hydrocarbons (AHC) in the basin. Other sources include evaporation of organic solvents and petroleum refining and marketing operations. Trees are the principal emitters of biogenic or natural hydrocarbons (NHC).

Certain hydrocarbons can damage plants by inhibiting growth and causing flowers and leaves to fall. Levels of hydrocarbons currently measured in urban areas are not known to cause adverse effects in humans. However, certain members of this contaminant group are important components in the reactions which produce photochemical oxidants (U.S. EPA 2021a).

Carbon Monoxide

Carbon monoxide is a localized pollutant that is found in high concentrations only near its source. The major source of carbon monoxide, a colorless, odorless, poisonous gas, is the incomplete combustion of petroleum fuels by automobile traffic. Therefore, elevated concentrations are usually only found near areas of high traffic volumes. Other sources of carbon monoxide include the incomplete combustion of petroleum fuels at power plants and fuel combustion from wood stoves and fireplaces during the winter. The health effects of carbon monoxide are related to its affinity for hemoglobin in the blood. Carbon monoxide causes a number of health problems, including aggravation of some heart diseases (e.g., angina), reduced tolerance for exercise, impaired mental function, and impaired fetal development. At high levels of exposure, carbon monoxide reduces the amount of oxygen in the blood, leading to mortality (U.S. EPA 2021a). Carbon monoxide tends to dissipate rapidly into the atmosphere; consequently, violations of the NAAQS and/or CAAQS for carbon monoxide are generally associated with localized carbon monoxide "hotspots" that can occur at major roadway intersections during heavy peak-hour traffic conditions.

Nitrogen Dioxide

Nitrogen dioxide is a by-product of fuel combustion; the primary sources are motor vehicles and industrial boilers and furnaces. The principal form of NO_X produced by combustion is nitric oxide, but nitric oxide reacts rapidly to form nitrogen dioxide, creating the mixture of nitric oxide and nitrogen dioxide commonly called NO_X. Nitrogen dioxide is an acute irritant that can aggravate respiratory illnesses and symptoms, particularly in sensitive groups (U.S. EPA 2021a). A relationship between nitrogen dioxide and chronic pulmonary fibrosis may exist, and an increase in bronchitis in young children at concentrations below 0.3 parts per million (ppm) may occur. Nitrogen dioxide absorbs blue light, gives a reddish-brown cast to the atmosphere, and reduces visibility (U.S. EPA 2021a). It can also contribute to the formation of PM_{10} and acid rain.

Sulfur Dioxide

Sulfur dioxide is included in a group of highly reactive gases known as "oxides of sulfur." The largest sources of sulfur dioxide emissions are from fossil fuel combustion at power plants (73 percent) and other industrial facilities (20 percent). Smaller sources of sulfur dioxide emissions include industrial processes such as extracting metal from ore and the burning of fuels with a high sulfur content by locomotives, large ships, and off-road equipment. Sulfur dioxide is linked to a number of adverse effects on the respiratory system, including aggravation of respiratory diseases, such as asthma and emphysema, and reduced lung function (U.S. EPA 2021a).

Particulate Matter

Suspended atmospheric PM_{10} and $PM_{2.5}$ is comprised of finely divided solids and liquids such as dust, soot, aerosols, fumes, and mists. Both PM_{10} and $PM_{2.5}$ are directly emitted into the atmosphere as by-products of fuel combustion and wind erosion of soil and unpaved roads. Particulate matter is also created in the atmosphere through chemical reactions. The characteristics, sources, and potential health effects associated with PM_{10} and $PM_{2.5}$ can be very different. PM_{10} is generally associated with dust mobilized by wind and vehicles while $PM_{2.5}$ is generally associated with combustion processes as well as formation in the atmosphere as a secondary pollutant through chemical reactions. $PM_{2.5}$ is more likely to penetrate deeply into the lungs and poses a health threat to all groups, but particularly to the elderly, children, and those with respiratory problems (CARB 2021a). More than half of $PM_{2.5}$ that is inhaled into the lungs remains there. These materials can damage health by interfering with the body's mechanisms for clearing the respiratory tract or by acting as carriers of an absorbed toxic substance (South Coast Air Quality Management District 2005). Suspended particulates can also reduce lung function, aggravate respiratory and cardiovascular diseases, increase mortality rates, and reduce lung function growth in children (U.S. EPA 2021a).

Lead

Lead is a metal found naturally in the environment, as well as in manufacturing products. The major sources of lead emissions historically have been mobile and industrial sources. However, because of the U.S. EPA's regulatory efforts to remove lead from gasoline, atmospheric lead concentrations have declined substantially over the past several decades. The most dramatic reductions in lead emissions occurred prior to 1990 due to the removal of lead from gasoline sold for most highway vehicles. Lead emissions were further reduced substantially between 1990 and 2008, with reductions occurring in the metals industries at least in part as a result of national emissions standards for hazardous air pollutants. As a result of phasing out leaded gasoline, metal processing currently is the primary source of lead emissions. The highest level of lead in the air is generally found near lead smelters. Other stationary sources include waste incinerators, utilities, and lead-acid battery manufacturers. The health impacts of lead include behavioral and hearing disabilities in children and nervous system impairment (U.S. EPA 2021a).

Toxic Air Contaminants

Toxic air contaminants (TACs) are a diverse group of air pollutants that may cause or contribute to an increase in deaths or serious illness, or that may pose a present or potential hazard to human health. TACs include both organic and inorganic chemical substances that may be emitted from a variety of common sources, including gasoline stations, motor vehicles, dry cleaners, industrial operations, painting operations, and research and teaching facilities. TACs are different than criteria pollutants because ambient air quality standards have not been established for TACs. TACs occurring at extremely low levels may still cause health effects and it is typically difficult to identify levels of exposure that do not produce adverse health effects. TAC impacts are described by carcinogenic risk and by chronic (i.e., long duration) and acute (i.e., severe but of short duration) adverse effects on human health.

TACs may result in long-term health effects such as cancer, birth defects, neurological damage, asthma, or genetic damage, or short-term acute effects such as eye watering, respiratory irritation, runny nose, throat pain, and headaches. TACs are considered either carcinogenic or non-carcinogenic based on the nature of the health effects associated with exposure. For carcinogenic TACs, potential health impacts are evaluated in terms of overall relative risk expressed as excess cancer cases per one million exposed individuals. Non-carcinogenic TACs differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur.

Diesel Particulate Matter

One of the main sources of TACs in California is diesel engine exhaust that contains solid material known as diesel particulate matter (DPM). Diesel exhaust is composed of two phases, either gas or particle, and both phases contribute to the risk. The gas phase is composed of many of the urban hazardous air pollutants, such as acetaldehyde, acrolein, benzene, 1,3-butadiene, formaldehyde, and polycyclic aromatic hydrocarbons. Diesel exhaust has a distinct odor, which is primarily a result of hydrocarbons and aldehydes contained in diesel fuel. The particle phase also has many different types of particles that can be classified by size or composition. The size of diesel particulates that are of greatest health concern are those that are in the categories of fine and ultra-fine particles. The composition of these fine and ultra-fine particles may be composed of elemental carbon with adsorbed compounds such as organic compounds, sulfate, nitrate, metals, and other trace elements.

More than 90 percent of DPM is less than one micron in diameter (about 1/70th the diameter of a human hair) and thus is a subset of $PM_{2.5}$. Because of their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lungs (CARB 2021a). The particles have hundreds of chemicals adsorbed onto their surfaces, including many known or suspected mutagens and carcinogens. The California Office of Environmental Health Hazard Assessment (OEHHA) completed a comprehensive health assessment of diesel exhaust in 1998, which formed the basis for CARB to formally identify the particles in diesel exhaust as a TAC. In California, DPM has a significant impact since it is estimated that 70 percent of total known cancer risk related to air toxics is attributable to DPM. According to CARB, DPM is estimated to increase statewide cancer risk by 520 cancers per million residents exposed over a lifetime (CARB 2021a).

DPM can also be responsible for elevated localized exposures (“hotspots”). Risk characterization scenarios conducted by CARB have determined the potential cancer risk resulting from proximity to DPM sources, such as school buses and high-volume freeways. California freeway studies show about a 70% drop off in particulate pollution levels at 500 feet from freeways and high-traffic roads (CARB 2005). Residences and communities in proximity to TAC sources are disproportionately impacted. To protect people from TACs and reduce exposure, CARB recommends avoiding siting new sensitive land uses, such as residences, schools, daycare centers, playgrounds, or medical facilities, within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day. Additional non-cancer health risk attributable to proximity to freeways was seen within 1,000 feet and was strongest within 300 feet. California freeway studies show about a 70 percent drop-off in particulate pollution levels at 500 feet (CARB 2005).

Acute exposure to diesel exhaust may cause irritation to the eyes, nose, throat and lungs and some neurological effects such as lightheadedness. Acute exposure may also elicit a cough or nausea as well as exacerbate asthma. Chronic exposure in experimental animal inhalation studies has shown a range of dose-dependent lung inflammation and cellular changes in the lung and there are also diesel exhaust immunological effects. Based upon human and laboratory studies, there is considerable evidence that diesel exhaust is a likely carcinogen. Human epidemiological studies demonstrate an association between diesel exhaust exposure and increased lung cancer rates in occupational settings.

Besides DPM, several other pollutants are emitted by vehicle exhaust are a public health concern. U.S. EPA has identified five pollutants of highest priority in addition to DPM: acrolein, acetaldehyde, formaldehyde, benzene, and 1,3-butadiene. The latter five pollutants are found in organic gases emitted by vehicles.

d. Current Air Quality

California is divided geographically into 15 air basins for managing the air resources of the state on a regional basis. Areas within each air basin are considered to share the same air masses and, therefore, are expected to have similar ambient air quality. Depending on whether the federal and state standards are met or exceeded, the local air basin is classified as in “attainment” or “non-attainment.” Once a nonattainment area has achieved the air quality standards for a particular pollutant, it may be redesignated to an attainment area for that pollutant. SJVAPCD is required to monitor air pollutant levels to assure the standards are met and, if they are not, to develop strategies to meet these standards.

Monitoring of ambient air pollutant concentrations is conducted by CARB, SJVAPCD, and the United States National Park Service. Some monitors are operated specifically for use in determining attainment status, while others are operated for other purposes, such as generating daily air quality forecasts. In total, SJVAPCD utilizes data from monitors operating at 29 sites in the SJVAB, five of which are in the TCAG region. Figure 4.3-1 shows the locations of all monitoring stations in the SJVAB, including those in Tulare County that were in operation in 2021. The Tulare County portion of the SJVAB is classified as a nonattainment area for the federal 8-hour ozone and $PM_{2.5}$ standards and State ozone, PM_{10} and $PM_{2.5}$ standards. The SJVAB is classified as in attainment (or unclassifiable/attainment) for all other State and federal standards (U.S. EPA 2021b). Table 4.3-2 presents a ten-year summary of the days that the SJVAB exceeded NAAQS and CAAQS for ozone, $PM_{2.5}$, and PM_{10}. Table 4.3-3 presents the number of days Tulare County exceeded NAAQS and CAAQS for ozone, NO_2, $PM_{2.5}$, and PM_{10}.

Table 4.3-2 Ten-Year SJVAB Air Quality Summary (2010-2019) for Days Over the Ozone, $PM_{2.5}$, and PM_{10} NAAQS and CAAQS

Year	Ozone 1-Hour CAAQS	Ozone 8-Hour NAAQS	Ozone 8-Hour CAAQS	$PM_{2.5}$ 24 Hour NAAQS	$PM_{2.5}$ 24 Hour CAAQS	PM_{10} 24 Hour NAAQS	PM_{10} 24 Hour CAAQS
2011	70	130	131	39	*	0	116
2012	72	131	134	29	*	0	89
2013	41	111	112	50	*	4	122
2014	48	122	128	40	*	8	139
2015	47	97	99	38	*	0	121
2016	51	112	113	26	*	0	158
2017	48	122	126	34	*	8	146
2018	42	111	112	42	*	10	164
2019	24	96	100	21	*	16	130
2020	50	119	121	52	*	40	157

CAAQS = California Ambient Air Quality Standard; NAAQS = National Ambient Air Quality Standard; PM10 = particulate matter with a diameter of 10 microns or less

* Insufficient data available to determine the value

Note: No measurement data available post-2020

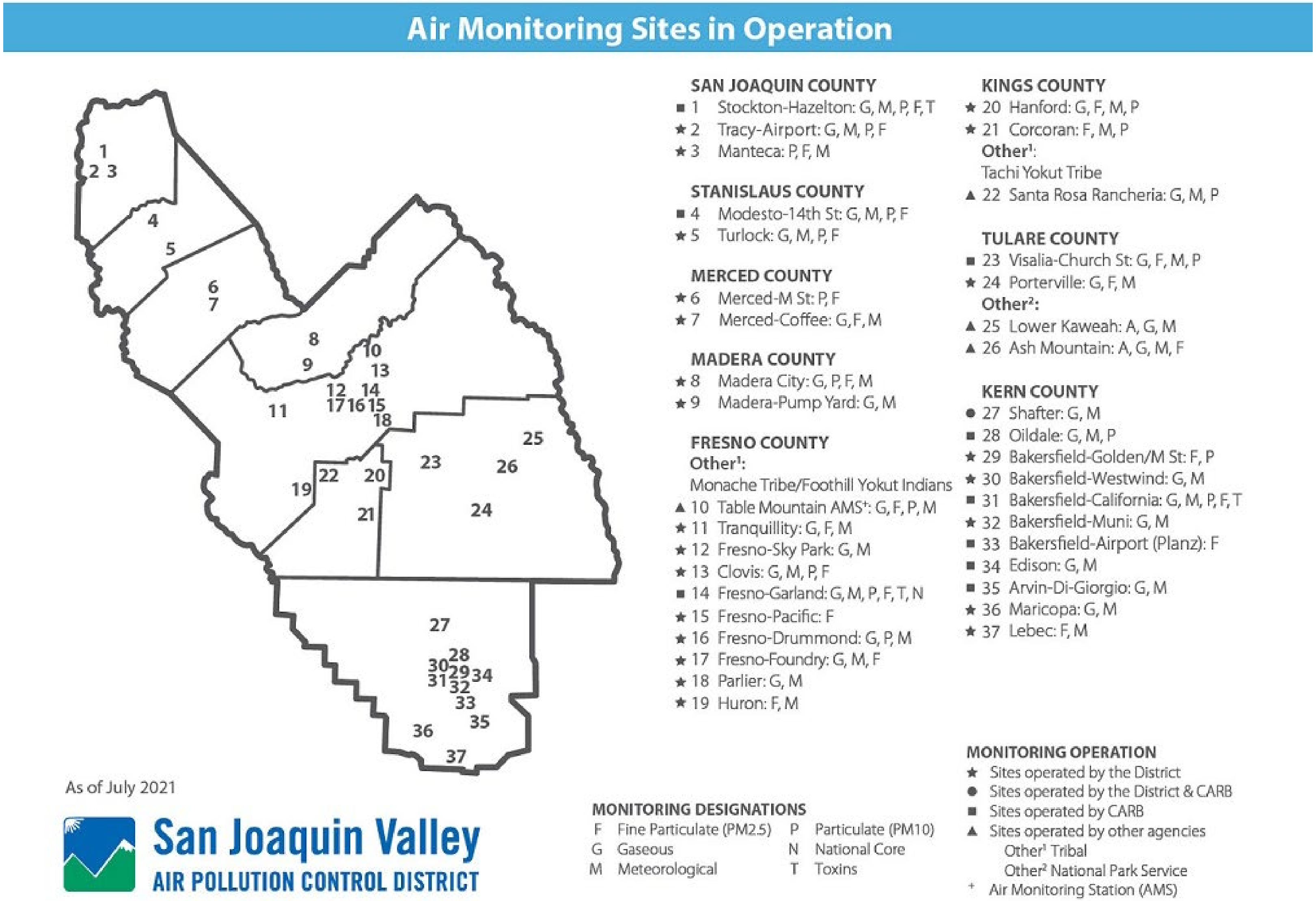
Source: CARB 2022

Table 4.3-3 Ambient Air Quality in Tulare County

Pollutant	2018	2019	2020
Ozone (ppm), Eight-Hour Average[1]	0.095	0.085	0.114
Number of days of state exceedances (>0.070 ppm)	96	70	102
Number of days of federal exceedances (>0.070 ppm)	92	67	101
Ozone (ppm), Worst Hour	0.112	0.103	0.130
Number of days of state exceedances (>0.09 ppm)	18	2	19
Nitrogen Dioxide (ppm), Worst Hour	0.0692	0.0707	0.0534
Number of days of state exceedances (>0.18 ppm)	0	0	0
Particulate Matter <10 microns ($\mu g/m^3$), Worst 24 Hours[1]	153.4	411.1	317.4
Number of days of state exceedances (>50 $\mu g/m^3$)	164	116	157
Number of days of federal exceedances (>150 $\mu g/m^3$)	0	5	20
Particulate Matter <2.5 microns ($\mu g/m^3$), Worst 24 Hours	86.8	47.2	127.1
Number of days of federal exceedances (>35 $\mu g/m^3$)	42	20	51

ppm = parts per million
[1] Data obtained from the Visalia – North Church Street Station.
Source: CARB 2022

Figure 4.3-1 SJVAB Air Quality Monitoring Stations (2021)



Source: SJVAPCD 2021a

4.3.2 Regulatory Setting

a. Federal Laws, Regulations, and Policies

Clean Air Act

The federal Clean Air Act (CAA) governs air quality in the United States and is administered by the U.S. EPA at the federal level. Air quality in California is also governed by regulations under the California Clean Air Act, which is administered by CARB at the state level. At the regional and local levels, local air districts such as SJVAPCD typically administer the federal and California Clean Air Acts.

The U.S. EPA is responsible for enforcing the federal CAA, which defines non-attainment areas as geographic regions designated as not meeting one or more of the national ambient air quality standards (NAAQS) that are required under the 1977 CAA and subsequent amendments. The federal CAA requires that a State Implementation Plan (SIP) be prepared for each non-attainment area and a maintenance plan be prepared for each former non-attainment area that subsequently demonstrated compliance with the standards. A SIP is a compilation of a state's air quality control plans and rules, approved by the U.S. EPA. Section 176(c) of the CAA provides that federal agencies cannot engage, support, or provide financial assistance for licensing, permitting, or approving any project unless the project conforms to the applicable SIP. The state and the U.S. EPA's goals are to eliminate or reduce the severity and number of violations of the NAAQS and to achieve expeditious attainment of these standards.

Table 4.3-4 summarizes the NAAQS and California Ambient Air Quality Standards (CAAQS). The CAAQS are more restrictive than the NAAQS for several pollutants, including the one-hour standard for carbon monoxide, the 24-hour standard for sulfur dioxide, and the 24-hour standard for PM_{10}.

Table 4.3-4 Current Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standards	California Standards
Ozone	1-Hour	–	0.09 ppm
	8-Hour	0.070 ppm	0.070 ppm
Carbon Monoxide	8-Hour	9.0 ppm	9.0 ppm
	1-Hour	35.0 ppm	20.0 ppm
Nitrogen Dioxide	Annual	0.053 ppm	0.030 ppm
	1-Hour	0.10 ppm	0.18 ppm
Sulfur Dioxide	Annual	–	–
	24-Hour	–	0.04 ppm
	1-Hour	0.075 ppm	0.25 ppm
PM_{10}	Annual	–	20 µg/m^3
	24-Hour	150 µg/m^3	50 µg/m^3
PM_{25}	Annual	12 µg/m^3	12 µg/m^3
	24-Hour	35 µg/m^3	–
Lead	30-Day Average	–	1.5 µg/m^3
	3-Month Average	0.15 µg/m^3	–

Pollutant	Averaging Time	Federal Primary Standards	California Standards
Visibility Reducing Particles	8-Hour	–	Extinction of 0.23 per kilometer*
Sulfates	24-Hour	–	25 µg/m^3
Hydrogen Sulfide	1-Hour	–	0.03 ppm (42 µg/m^3)
Vinyl Chloride	24-Hour	–	0.01 ppm 0.02 (26 µg/m^3)

ppm = parts per million; µg/m^3 = micrograms per cubic meter

* In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are “extinction of 0.23 per kilometer” and “extinction of 0.07 per kilometer” for the statewide and Lake Tahoe Air Basin standards, respectively.

Source: CARB 2016

1990 Amendments to the Federal Clean Air Act

The 1990 amendments to the federal Clean Air Act included a provision to address air toxics. Under Title III of the federal Clean Air Act, the U.S. EPA establishes and enforces National Emission Standards for Hazardous Air Pollutants, which are national uniform standards oriented toward controlling particular hazardous air pollutants. Section 112(b) of the federal Clean Air Act identifies 189 “Air Toxics” (hazardous air pollutants), directs U.S. EPA to identify sources of the 189 pollutants, and establishes a 10-year time period for the U.S. EPA to issue technology-based emissions standards for each source category. Title III of the federal Clean Air Act provides for a second phase under which the U.S. EPA is to assess residual risk after the implementation of the first phase of standards and impose new standards, when appropriate, to protect public health.

Safer Affordable Fuel-Efficient Vehicles Rule

In August 2018, the U.S. EPA and NHTSA issued a proposed ruling to roll back some of the fuel economy and GHG standards for medium- and heavy-duty trucks. The new ruling proposed by the U.S. EPA and NHTSA, the Safer Affordable Fuel-Efficient (SAFE) Vehicle Rules, would replace the CAFE standards set for model year 2022-2025 passenger car and light trucks, while the 2021 model year vehicles will maintain the CAFE standards. The ruling is split into two parts.

Part One, “One National Program” (84 FR 51310), revokes a waiver granted by U.S. EPA to the State of California under Section 209 of the CAA to enforce more stringent emission standards for motor vehicles than those required by U.S. EPA for the explicit purpose of GHG reduction, and indirectly, criteria air pollutants and ozone precursor emission reduction. This revocation became effective on November 26, 2019, potentially restricting the ability of CARB to enforce more stringent GHG emission standards for new vehicles and set zero emission vehicle mandates in California.

Part Two addresses CAFE standards for passenger cars and light trucks for model years 2021 to 2026. This rulemaking proposes new CAFE standards for model years 2022 through 2026 and would amend existing CAFE standards for model year 2021. The proposal would retain the model year 2020 standards (specifically, the footprint target curves for passenger cars and light trucks) through model year 2026. The proposal addressing CAFE standards was jointly developed by NHTSA and U.S. EPA, with U.S. EPA simultaneously proposing tailpipe CO_2 standards for the same vehicles covered by the same model years.

In September 2019, U.S. EPA and the National Highway Traffic Safety Administration issued the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program, which revoked California's authority to set its own GHG emissions standards and zero-emission vehicle mandates in California (84 Federal Register 51310). In April 2020, the federal agencies issued the SAFE Vehicles Rule Part Two for Model Years 2021–2026 Passenger Cars and Light Trucks, which relaxed federal GHG emissions and fuel economy standards (85 Federal Register 24174). On February 8, 2021, the incoming federal administration issued a stay in regard to the legal challenges by California and other states to the revocation of California's waiver (JDSupra 2021). On December 21, 2021, the National Highway Traffic Safety Administration (NHTSA) published its Corporate Average Fuel Economy (CAFE) Preemption rule, which finalizes its repeal of 2019's SAFE Rule Part One.

b. State Laws, Regulations, and Policies

AB 32

Assembly Bill (AB) 32, also known as the Global Warming Solutions Act of 2006 (Nunez), expanded CARB's role to development and oversight of California's main GHG reduction programs. These include cap and trade, the Low Carbon Fuel Standard, and the zero-emission vehicle programs. With the passage of additional laws (such as Senate Bill [SB] 32 in 2016 and AB 398 in 2017), CARB continues to map out how these programs and others can help California reach its next statutory target: reducing GHG emissions an additional 40 percent below 1990 levels by 2030. Reductions in GHG emissions are tied to improvements in air quality.

California Clean Air Act

The California Clean Air Act (CCAA) was enacted in 1988 (California Health & Safety Code Section 39000 et seq.) and amended in 1992. The CAAQS are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride and visibility reducing particles (see Table 4.3-4). Air basins or areas that exceed the CAAQS are designated non-attainment until compliance is disclosed in an attainment plan. In California, CARB is responsible for meeting the State requirements of the federal CAA, administering the California CAA, and establishing the California ambient air quality standards (CAAQS). The California CAA, as amended in 1992, requires all air districts in the State to endeavor to achieve and maintain the CAAQS. CARB oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level.

Senate Bill 656 (Chapter 738, Statues of 2003)

In 2003, the California Legislature enacted Senate Bill (SB) 656 (Chapter 738, Statutes of 2003), codified as Health and Safety Code Section 39614, to reduce public exposure to PM_{10} and $PM_{2.5}$. SB 656 required that, by January 1, 2005, CARB, in consultation with local air pollution control and air quality management districts (air districts), must develop and adopt a list of the most readily available, feasible, and cost-effective control measures that could be employed by CARB and the air districts to reduce PM_{10} and $PM_{2.5}$ (collectively referred to as PM). The legislation established a process for achieving near-term reductions in PM throughout California ahead of federally required deadlines for $PM_{2.5}$ and provided new direction on PM reductions in those areas not subject to federal requirements for PM. Measures adopted as part of SB 656 complement and support those required for federal $PM_{2.5}$ attainment plans, as well as for State ozone plans. This ensures continuing focus on PM reduction and progress toward attaining California's more health protective standards. This list of air district control measures was adopted by CARB on November 18, 2004.

Toxic Air Contaminant Identification and Control Act of 1983

The Toxic Air Contaminant Identification and Control Act (Assembly Bill 1807) created California's program to reduce exposure to air toxics. The program involves a two-step process: risk identification and risk management. In the risk identification step, and upon CARB's request, the Office of Environmental Health Hazard Assessment evaluates the health effects of substances other than pesticides and their pesticidal uses. Substances with the potential to be emitted or that are currently being emitted into the ambient air may be identified as a TAC. In the risk management step, once a substance is identified as a TAC, and with the participation of local air districts, industry, and interested public, CARB prepares a report that outlines the need and degree to regulate the TAC through a control measure.

Assembly Bill 2588: Air Toxics "Hot Spots" Information and Assessment Act of 1987

The Air Toxics "Hot Spots" Information and Assessment Act (Assembly Bill 2588) was enacted in 1987 to require stationary sources to report the types and quantities of substances identified as having a localized health risk. This act aims to ascertain health risks, notify nearby residents of significant risks, and reduce significant risks to acceptable levels. The California Office of Environmental Health Hazard Assessment (OEHHA) is the lead agency for the assessment of health risks posed by environmental contaminants. OEHHA, which is an office within the California Environmental Protection Agency, aims to protect human health and the environment through scientific evaluation of risks posed by hazardous substances. In addition, OEHHA develops health-protective exposure levels for contaminants in air, water, and soil as guidance for regulatory agencies and the public. These include public health goals for contaminants in drinking water and both cancer potency factors and non-cancer reference exposure levels for the Air Toxics Hot Spots Program.

Executive Order N-79-20

In 2021, Governor Newsom signed Executive Order N-79-20 which calls for the elimination of new internal combustion passenger vehicles by 2035. The Executive Order establishes a target for the transportation sector that helps put the state on a path to carbon neutrality by 2045. Furthermore, the Executive Order provides momentum for providers of charging and refueling infrastructure, electric utilities, and others to plan for and support the increasing consumer demand for these vehicles (CARB 2021b).

CARB Air Quality and Land Use Handbook and 2017 Technical Advisory

CARB's *Air Quality and Land Use Handbook: A Community Health Perspective* recommends that local agencies avoid siting new, sensitive land uses within specific distances of potential sources of TACs, such as freeways and high-traffic roads, distribution centers, railroads, and ports (CARB 2005). Specifically, CARB recommends that local agencies avoid siting new, sensitive land uses within 500 feet of a freeway. The primary concern is the effect of diesel exhaust particulate on sensitive uses.

CARB's *Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways* technical advisory (2017) identifies effective strategies that planners and other land use decision-makers can implement locally and in the near-term to reduce exposure to near-roadway pollution from increased infill development while also protecting public health. These strategies complement the state's many efforts to reduce air pollution from all sources, including cars and trucks.

Diesel Risk Reduction Program

In August 1998, CARB identified particulate emissions from diesel-fueled engines (diesel PM) as TACs, based on data linking diesel PM emissions to increased risks of lung cancer and respiratory disease. Following the identification process, CARB was required to determine if there was a need for further control, which led to creation of the Diesel Advisory Committee to assist in the development of a risk management guidance document and risk reduction plan. In September 2000, CARB adopted the Diesel Risk Reduction Plan, which recommends control measures to reduce the risks associated with diesel PM and achieve a goal of 75 percent diesel PM reduction by 2010 and 85 percent by 2020. Specific statewide regulations designed to further reduce diesel PM emissions from diesel-fueled engines and vehicles are continuing to be evaluated and developed. The goal of these regulations is to make diesel engines as clean as possible by establishing state-of-the-art technology requirements or emission standards to reduce diesel PM emissions.

Airborne Toxic Control Measures

Under the California Health and Safety Code, Division 26 (Air Resources), CARB is authorized to adopt regulations to protect public health and the environment through the reduction of TACs and other air pollutants with adverse health effects. CARB has promulgated several mobile and stationary source airborne toxic control measures (ATCMs) pursuant to this authority. For instance, effective as of July 2003, CARB approved an ATCM that limits school bus idling and idling at or near schools to only when necessary for safety or operational concerns (13 California Code of Regulations [CCR] Chapter 10, Section 2480). This ATCM is intended to reduce diesel PM and other TACs and air pollutants from heavy-duty motor vehicle exhaust. It applies to school buses, transit buses, school activity buses, youth buses, general public paratransit vehicles, and other commercial motor vehicles. This ATCM focuses on reducing public exposure to diesel PM and other TACs, particularly for children riding in and playing near school buses and other commercial motor vehicles who are disproportionately exposed to pollutants from these sources. In addition, effective February 2005, CARB approved an ATCM to limit the idling of diesel-fueled commercial motor vehicles with gross vehicular weight ratings of greater than 10,000 pounds, regardless of the state or country in which the vehicle is registered (13 CCR Chapter 10, Section 2485).

Drayage Truck Regulation

CARB established the Drayage Truck Regulation as part of its ongoing efforts to reduce PM and NO_X emissions from diesel-fueled engines and improve air quality associated with goods movement. The purpose of this regulation is to reduce emissions and public exposure to diesel PM, NO_X, and other air contaminants by setting emission standards for in-use, heavy-duty diesel-fueled vehicles.

Starting January 1, 2023, drayage trucks will be subject to the provisions of 13 CCR Section 2025, the Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and Other Criteria Pollutants from In-Use Heavy Duty Diesel-Fueled Vehicles, which requires that all not otherwise exempt in-use on-road diesel vehicles, including drayage trucks, have a 2010 model year emissions equivalent engine by January 1, 2023 (13 CCR Section 2027).

Proposition 1B: Goods Movement Emission Reduction Program

The $1 billion Proposition 1B Goods Movement Emission Reduction Program is a partnership between CARB and local agencies, air districts, and seaports to quickly reduce air pollution emissions and health risk from freight movement along California's trade corridors. Local agencies apply to CARB for funding. Then those agencies offer financial incentives to owners of equipment used in freight movement to upgrade to cleaner technologies. Projects funded under this program must achieve early or extra emission reductions not otherwise required by law or regulation.

c. Regional Laws, Regulations, and Policies

San Joaquin Valley Air Pollution Control District

Air Quality Management Plans

The Federal Clean Air Act Amendments of 1990 set a schedule for the attainment of the NAAQS. States are required to prepare a State Implementation Plan (SIP) to develop strategies to bring about attainment of the standards. In addition, the California Clean Air Act of 1988 requires areas that exceed the California ambient air quality standards to plan for the eventual attainment of the CAAQS. SJVAPCD monitors and regulates local air quality in the SJVAB and implements Air Quality Management Plans (AQMPs). Since 1992, SJVAPCD has adopted numerous attainment plans to reduce ozone and particulate emissions.

The 2016 Ozone Plan is the most recent ozone attainment plan adopted by SJVAPCD. Implementation of each of the plans has contributed to the adoption of over 600 rules and amendments aimed at reducing air pollution concentrations. These measures have substantially reduced ozone precursor pollutants, which include NO_X and ROG. SJVAPCD is mandated under federal Clean Air Act requirements to develop a new attainment plan for the revised ozone standard by 2022, which is currently in progress. Ozone precursor emissions in the SJVAB are at historically low levels, with an approximately 80 percent reduction in NO_X stationary sources emissions since 1990 (SJVAPCD 2016).

The 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards is the most recent attainment plan for particulate matter adopted by SJVAPCD (SJVAPCD 2018b). On August 19, 2021, the District's Governing Board approved the *Attainment Plan Revision for the 1997 Annual $PM_{2.5}$ Standard* to establish a new attainment target for the 1997 annual $PM_{2.5}$ standard. The Valley would have met this standard by the projected attainment target of 2020, but for the significant wildfire impacts and data collection issues at the air monitoring site in Bakersfield (operated by CARB). Based on implementation of the control strategy in the 2018 $PM_{2.5}$ Plan, it is estimated that the SJVAB will attain the 1997 annual $PM_{2.5}$ standard by 2023 (SJVAPCD 2021b).

Rules and Regulations

SJVAPCD has adopted numerous rules and regulations directed at improving regional air quality. The following District rules would be applicable to individual projects:

- **Rule 4102 Nuisance:** A person shall not discharge from any source whatsoever such quantities of air contaminants or other materials which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health or safety of any such person or the public or which cause or have a natural tendency to cause injury or damage to business or property.

- **Rule 8021 Earthmoving Activities:** Requires construction, demolition, excavation, extraction, and other earthmoving activities to include implementation of measures designed to limit fugitive dust emissions.
- **Rule 8041 Carryout and Trackout:** Requires owners and operators to sufficiently prevent or cleanup carryout and trackout as described in SJVAPCD Regulation VIII. The use of blower devices, or dry rotary brushes or brooms, for removal of carryout and trackout on public roads is expressly prohibited. The removal of carryout and trackout from paved public roads does not exempt an owner/operator from obtaining state or local agency permits which may be required for the cleanup of mud and dirt on paved public roads.
- **Rule 8061 Paved and Unpaved Roads:** Requires implementation of control measures and design criteria to limit fugitive dust emissions from any new or existing public or private paved or unpaved road, road construction project, or road modification project.
- **Rule 9510 Indirect Source Review (ISR):** Requires new developments expected to create a substantial amount of air pollution to incorporate on-site mitigation or emission reducing designs and practices into the project.

d. Local Laws, Regulations, and Policies

City and county general plans within the TCAG region contain policies to protect air quality. Listed below are the policies from the County of Tulare and cities in the TCAG region applicable to air quality. Cities in the region have generally similar policies, and examples are provided in more detail below.

County of Tulare

The County of Tulare has established a series of goals, policies, and implementation measures in the Tulare County General Plan 2030 Air Quality Element to improve air quality through a regional approach and interagency cooperation, reduce air emissions related to transportation, improve air quality and minimize impacts to human health and the economy of the County through smart land use planning and design, and implement the best available controls and monitoring necessary to regulate air emissions (County of Tulare 2012). Applicable policies related to air quality are as follows:

- **AQ-1.3 Cumulative Air Quality Impacts:** The County shall require development to be located, designed, and constructed in a manner that would minimize cumulative air quality impacts. Applicants shall be required to propose alternatives as part of the State CEQA process that reduce air emissions and enhance, rather than harm, the environment.
- **AQ-1.4 Air Quality Land Use Compatibility:** The County shall evaluate the compatibility of industrial or other developments which are likely to cause undesirable air pollution with regard to proximity to sensitive land uses, and wind direction and circulation in an effort to alleviate effects upon sensitive receptors.
- **AQ-1.5 California Environmental Quality Act (CEQA) Compliance**: The County shall ensure that air quality impacts identified during the CEQA review process are consistently and reasonable mitigated when feasible.
- **AQ-2.2 Indirect Source Review:** The County shall require major development projects, as defined by the SJVAPCD, to reasonably mitigate air quality impacts associated with the project. The County shall notify developers of SJVAPCD Rule 9510 – Indirect Source Review requirements

and work with SJVAPCD to determine mitigations, as feasible, that may include, but are not limited to the following:

- Providing bicycle access and parking facilities,
- Increasing density,
- Encouraging mixed use developments,
- Providing walkable and pedestrian-oriented neighborhoods,
- Providing increased access to public transportation,
- Providing preferential parking for high-occupancy vehicles, carpools, or alternative fuels vehicles, and
- Establishing telecommuting programs or satellite work centers.

- **AQ-2.4 Transportation Management Associations:** The County shall encourage commercial, retail, and residential developments to participate in or create Transportation Management Associations (TMAs) that may assist in the reduction of pollutants through strategies that support carpooling or other alternative transportation modes.
- **AQ-2.5 Ridesharing:** The County shall continue to encourage ridesharing programs such as employer-based rideshare programs.
- **AQ-3.3 Street Design:** The County shall promote street design that provides an environment which encourages transit use, biking, and pedestrian movements.
- **AQ-3.6 Mixed Land Uses:** The County shall encourage the clustering of land uses that generate high trip volumes, especially when such uses can be mixed with support services and where they can be served by public transportation.
- **AQ-4.3 Paving or Treatment of Roadways for Reduced Air Emissions:** The County shall require that all new roads be paved or treated to reduce dust generation where feasible as required by SJVAPCD Regulation VIII, Rule 8061- Paved and Unpaved Roads. For new projects with unpaved roads, funding for roadway maintenance shall be adequately addressed and secured.
- **AQ-4.6 Asbestos Airborne Toxic Control and Dust Protection:** Asbestos is of concern to Tulare County because it occurs naturally in surface deposits of several types of ultramafic materials (materials that contain magnesium and iron and a very small amount of silica). Asbestos emissions can result from the sale or use of asbestos-containing materials, road surfacing with such materials, grading activities, and surface mining.

City of Visalia

The Air Quality and Greenhouse Gas Element of the Visalia General Plan (2014) contains the following policies:

- **AQ-P-1:** Amend the Zoning Ordinance to prohibit locating new “sensitive receptor” uses—hospitals, residential care facilities and childcare facilities—within 500 feet of a limited access state highway (SR 99 and SR 198), except as provided by approved master plans.
- **AQ-P-11:** Continue to work in conjunction with the SJVAPCD and others to put in place additional Transportation Control Measures that will reduce vehicle travel and improve air quality and to implement Air Quality Plans

City of Porterville

The City of Porterville includes policies relating to air quality in the Open Space and Conservation Element of its General Plan (2002). Some of the policies include:

- **Policy OSC-I-58**. Continue to assess air quality impacts through environmental review and require developers to implement best management practices to reduce air pollutant emissions associated with the construction and operation of development projects.
- **Policy OSC-I-61.** Coordinate air quality planning efforts with other local, regional, and State agencies.

City of Tulare

The City of Tulare General Plan Air Quality Element (2014) contains policies that pertain to air quality, including the following:

- **Policy AQ-P1.1.** The City shall cooperate with other local, regional, federal, and State agencies in developing and implementing air quality plans to achieve State and Federal Ambient Air Quality Standards. The City shall partner with the SJVAPCD, TCAG, and the State Air Pollution Control Board to achieve better air quality conditions locally and regionally.
- **Policy AQ-P1.2**. The City shall require developments to be located, designed, and constructed in a manner that would minimize cumulative air quality impacts. Developers shall be required to present alternatives that reduce air emissions and enhance, rather than harm, the environment.
- **Policy AQ-P2.3:** When developing the regional transportation system, the City shall work with TCAG to comprehensively study methods of transportation which may contribute to a reduction in air pollution in the City of Tulare. Some possible alternatives that should be studied are:
  - Public transportation such as buses and light rail, to serve between communities of the valley, publicly subsidized if feasible.
  - Intermodal public transit such as buses provided with bicycle racks, bicycle parking at bus stations, and park and ride facilities.
  - Community bus or other public transportation systems, such as cycling or walking trails, with particular attention to high-density areas

Other cities within the TCAG region include Dinuba, Lindsay, Farmersville, Exeter, and Woodlake. The General Plans of these cities include goals and policies pertaining to air quality that are similar to those outlined above.

4.3.3 Impact Analysis

a. Methodology and Significance Thresholds

This analysis uses the guidance and methodologies recommended in the SJVAPCD's 2015 *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI) (SJVAPCD 2015a) to determine whether the proposed 2022 RTP/SCS impacts exceed the thresholds identified in CEQA Guidelines Appendix G.

Significance Thresholds

Appendix G of the State CEQA Guidelines identifies general criteria for determining whether a project's impacts would have a significant impact on air quality. TCAG has modified the language of the second criterion to provide specific quantities of criteria pollutants that would contribute to a significant impact based on SJVAPCD thresholds (SJVAPCD 2015).

The significance thresholds used for this EIR, based on CEQA Guidelines Appendix G, are:

1. Conflict with or obstruct implementation of the applicable air quality plan;
2. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard:
   a. During construction:
      i. Emit greater than 15 tons per year of PM_{10};
      ii. Emit greater than 15 tons per year of $PM_{2.5}$;
      iii. Emit greater than 100 tons per year of CO_0;
      iv. Emit greater than 10 tons per year of NOx;
      v. Emit greater than 10 tons per year of ROG; or
      vi. Emit greater than 27 tons per year of SOx.

   b. During operations:
      i. Generate emissions of ROG that exceed 10 tons/year;
      ii. Generate emissions of NO_x that exceed 10 tons/year
      iii. Generate emissions of PM_{10} exceeding 15 tons/year;
      iv. Generate emissions of $PM_{2.5}$ exceeding 15 tons/year;
      v. Generate emissions of CO exceeding 100 tons/year; or
      vi. Generate emissions of SO_X exceeding 27 tons/year.

3. Expose sensitive receptors to substantial pollutant concentrations; or
4. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Short-Term Emissions Methodology

Emissions from construction activities represent temporary impacts that are typically short in duration, depending on the size, phasing, and type of project. Air quality impacts can nevertheless be acute during construction periods, resulting in significant localized impacts to air quality. Construction-related emissions are speculative at the RTP/SCS level because such emissions are dependent on the characteristics of individual development projects. However, because construction of projects under the proposed 2022 RTP/SCS would generate temporary criteria pollutant emissions, primarily due to the operation of construction equipment and truck trips, a qualitative analysis is provided.

Long-Term Emissions Methodology

The methodology for determining the significance of air quality impacts compares baseline conditions in 2021 to the future 2046 conditions, as required in CEQA Guidelines Section 15126.2(a).

The analysis of air quality also includes a comparison between the expected future conditions under the proposed 2022 RTP/SCS and the expected future conditions if the proposed 2022 RTP/SCS was not adopted ("No Project" scenario) for informational purposes only.. State and federal clean air laws require that emissions of pollutants for which NAAQS or CAAQS are violated be reduced from current levels. Therefore, for Impact AQ-3, the project's long-term mobile source impacts to air quality would be considered significant if the proposed 2022 RTP/SCS would result in mobile source emissions that significantly exceed existing levels. In this case, the pollutants of concern are ozone precursors (NO_x and ROG) and fine particulate matter, as these are the primary pollutants associated with vehicle transportation.

Projected air emissions from mobile sources were calculated using the EMFAC2021 model with data for vehicle miles traveled (VMT) from the RTP/SCS transportation analysis completed by TCAG. Data from EMFAC outputs and TCAG's transportation analysis were used to calculate projected vehicle emissions. Calculations are available in Appendix A. Projected vehicle emissions for the year 2046 under the proposed 2022 RTP/SCS were compared to 2021 existing conditions and, for informational purposes, with future conditions under the 2046 No Project scenario.

Health Impacts

Short-term and long-term exposure to criteria pollutants and TACs may result in adverse health effects, based on the information presented in Section 4.3(c), *Air Pollutants of Primary Concern*. As discussed in that section, these effects may include aggravated asthma, increases in respiratory symptoms like coughing and difficult or painful breathing, chronic bronchitis, decreased lung function, increased cancer risk, heart attack, and premature death.

The NAAQS and CAAQS are health-based standards. Therefore, in this impact analysis, if the proposed 2022 RTP/SCS would result in cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard, or if projects implementing the proposed 2022 RTP/SCS would exceed SJVAPCD significance thresholds for criteria pollutants, they would also contribute to these adverse health effects.

SJVAPCD has determined thresholds of significance for TAC emissions from the operation of both permitted and non-permitted sources. The significance threshold for long-term public health risk is set at 20 excess cancer cases in a million for cancer risk. For non-cancer risk (i.e., chronic or acute risk), the significance threshold is set at a hazard index of greater than 1.0. The health impacts of TACs are discussed under Impact AQ-4.

b. Project Impacts and Mitigation Measures

The following section discusses impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. The following section discusses impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. Section 4.3.3. c summarizes the impacts associated with capital improvement projects in the proposed 2022 RTP/SCS. Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time. In general, however, implementation of proposed transportation improvement projects and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1:	Conflict with or obstruct implementation of the applicable air quality plan

Impact AQ-1 THE PROPOSED 2022 RTP/SCS WOULD NOT CONFLICT WITH OR OBSTRUCT IMPLEMENTATION OF THE APPLICABLE AIR QUALITY PLAN. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

The policies and land use patterns facilitated by the proposed 2022 RTP/SCS are projected to reduce emissions of ozone precursors and particulate matter below 2021 baseline levels (as well as the 2046 "No Project" alternative), as discussed in Impact AQ-3 (see Table 4.3-7), which is consistent with the goals and policies of SJVAPCD's 2016 Ozone Plan. Although VMT would increase as compared to baseline levels, emissions would decrease due to increasingly fuel-efficient vehicles, improving emissions control technology, and an increased share of electric vehicle adoption. As well, implementation of proposed transportation improvements and land use projects envisioned by the proposed 2022 RTP/SCS, which among other strategies, would improve alternative transportation options and circulation. To accommodate future growth in the region while reducing emissions, the strategy of the proposed 2022 RTP/SCS is to develop an efficient circulation network with multi-modal transportation in addition to promoting congestion management; coordinating land use, housing, and transportation systems; and providing incentives that reduce vehicle use in comparison to a future scenario in the absence of the proposed 2022 RTP/SCS. Implementation of these strategies would result in reduced overall vehicle miles traveled, which would reduce regional criteria air pollutant emissions and TAC emissions from mobile sources. The goals of the 2016 Ozone Plan and the 2018 $PM_{2.5}$ Plan are to reduce precursor pollutants, which include NO_X and ROG, and particulate matter pollutants within the TCAG region. The above RTP/SCS strategies and other actions in the proposed 2022 RTP/SCS would align with the emissions reduction goals of both SJVAPCD attainment plans. Therefore, implementation of the proposed 2022 RTP/SCS would not conflict with or obstruct implementation of the applicable air quality plans, and this impact would be less than significant.

Mitigation Measures

No mitigation measures are required.

Threshold 2:	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 (construction)

Impact AQ-2 CONSTRUCTION ACTIVITIES ASSOCIATED WITH TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD RESULT IN A CUMULATIVELY CONSIDERABLE NET INCREASE IN CRITERIA POLLUTANTS FOR WHICH THE PROJECT REGION IS NON-ATTAINMENT UNDER AN APPLICABLE FEDERAL OR STATE AMBIENT AIR QUALITY STANDARD. THIS IMPACT WOULD BE SIGNIFICANT AND UNAVOIDABLE.

There are three primary sources of short-term emissions that would be generated by construction of future transportation projects under the proposed 2022 RTP/SCS. These sources include:

- Operation of construction vehicles (i.e., scrapers, loaders, dump trucks);
- The creation of fugitive dust during clearing and grading; and
- The use of asphalt or other oil- based substances during the final construction phases, which also generate nuisance odors.

The significance of daily emissions, particularly ROG and NO_X emissions, generated by construction equipment utilized to build RTP/SCS transportation improvements would depend on the quantity of equipment used and the hours of operation. The significance of fugitive dust ($PM_{2.5}$ and PM_{10}) emissions would depend upon the following factors:

- The areal extent of disturbed soils;
- The length of disturbance time;
- Whether existing structures are demolished;
- Whether excavation is involved (including the potential removal of underground storage tanks); and
- Whether transport of excavated materials offsite is necessary.

Intersection improvements, such as signalization or signal coordination, are small-scale projects and are not expected to generate significant short-term emissions. However, other RTP/SCS projects as well as future development facilitated by the SCS land use scenario may involve grading and paving, or the construction of permanent facilities. For example, substantial grading and paving would be required for roadway widening and other large improvements on State Routes and regional roadways. The precise quantity of emissions would need to be determined at the time of proposed construction of a given transportation improvement or development project. When project-specific CEQA documents are prepared, these emissions would be compared to SJVAPCD's construction thresholds, as listed in Section 4.3.3(a), *Methodology and Significance Thresholds* under Threshold 2(a). Although any individual transportation improvement or development project may not generate significant short-term emissions, it is probable that several projects would be under construction simultaneously, generating cumulative construction emissions that could impact air quality. SJVAPCD construction emissions thresholds listed in Section 4.3.3(a), *Methodology and Significance Thresholds* under Threshold 2(a) would be used to determine whether construction impacts of individual projects are significant. In addition, construction equipment would be subject to the stringent rules and regulations adopted by the U.S. EPA and CARB to reduce criteria pollutant and hazardous emissions limits from on-road vehicles and off-road equipment. For example, CARB has the In-Use Off-Road Diesel-Fueled Fleets Regulation to reduce particulate matter and NOx from off-road heavy-duty diesel vehicles from various industries including air travel, manufacturing, and landscaping. In addition, the U.S. EPA and CARB both have ignition diesel engine standards for non-road portable equipment, such as diesel generators and air compressors, which require the non-road equipment engines to be rated a cleaner tier by specific years, which will result in reduced emissions (CARB 2021c, U.S. EPA 2016).

Even though these regulations exist, it cannot be assumed that projects under the proposed 2022 RTP/SCS would be constructed using the latest and lowest emitting construction equipment for a majority of their construction fleet. Therefore, short-term impacts would be significant because construction emissions could exceed SJVAPCD significance thresholds and result in cumulatively considerable net increases in $PM_{2.5}$ and PM_{10} and/or ozone precursor emissions. Implementation of mitigation measures for individual projects would reduce PM and ozone precursor emissions. However, this impact would remain significant and unavoidable. The following mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures developed for the proposed 2022 RTP/SCS program where applicable for transportation projects that would result in fugitive dust and ozone precursor emissions. Cities and the County can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions.

AQ-2(a) Application of SJVAPCD Feasible Mitigation Measures

For all projects, the implementing agency shall incorporate the most recent SJVAPCD feasible construction mitigation measures and/or technologies for reducing inhalable particles based on analysis of individual sites and project circumstances. Additional and/or modified measures may be adopted by SJVAPCD prior to implementation of individual projects under the proposed 2022 RTP/SCS; therefore, the most current list of feasible mitigation measures at the time of project implementation shall be used. The current SJVAPCD feasible mitigation measures include the following (SJVAPCD 2015b):

- All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover.
- All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.
- When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.
- Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.
- An owner/operator of any site with 150 or more vehicle trips per day, or 20 or more vehicle trips per day by vehicles with three or more axles shall implement measures to prevent carryout and trackout.
- Limit the hours of operation of heavy-duty equipment and/or the amount of equipment in use.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

AQ-2(b) Diesel Equipment Emissions Standards

The implementing agency shall ensure, to the maximum extent feasible, that diesel construction equipment meeting CARB Tier 4 emission standards for off-road heavy-duty diesel engines is used. If use of Tier 4 equipment is not feasible, diesel construction equipment meeting Tier 3 (or if infeasible, Tier 2) emission standards shall be used. These measures shall be noted on all construction plans, and the implementing agency shall perform periodic site inspections.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

AQ-2(c) Electric Construction Equipment

The implementing agency shall ensure that to the extent feasible, construction equipment utilizes electricity from power poles rather than temporary diesel power generators and/or gasoline power generators.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

Significance After Mitigation

Implementation of Measures AQ-2(a) through AQ-2(c) would reduce short-term construction emissions from individual projects and thus reduce the severity of impacts by requiring best practices for dust and exhaust emissions via readily available, lower-emitting diesel equipment, and/or equipment powered by alternative cleaner fuels (e.g., propane) or electricity, as well as on-road trucks using particulate exhaust filters. To the extent that an implementing agency requires an individual project to implement all feasible mitigation measures described above, individual project impacts may be reduced to a less than significant level. Implementation of Mitigation Measure GHG-1 would also reduce construction emissions from the proposed 2022 RTP/SCS. However, these mitigation measure may not be feasible or effective for all projects. Therefore, this impact would remain significant and unavoidable. No additional mitigation measures to reduce this impact to less than significant levels are feasible at the programmatic level.

Threshold 2:	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 (operation)

Impact AQ-3 **OPERATION OF THE PROPOSED TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD RESULT IN A CUMULATIVELY CONSIDERABLE NET INCREASE OF A CRITERIA POLLUTANT FOR WHICH THE PROJECT REGION IS NON-ATTAINMENT UNDER AN APPLICABLE FEDERAL OR STATE AMBIENT AIR QUALITY STANDARD. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.**

Transportation Emissions

Projected on-road vehicle emissions on the TCAG transportation network for the years 2021 and 2046 under proposed 2022 RTP/SCS conditions were compared to existing (2021) conditions. Projected on-road vehicle emissions on the TCAG transportation network for the years 2021 and 2046 under proposed 2022 RTP/SCS conditions were also compared with those projected under the future 2046 "No Project" scenario, which accounts for future growth but in which the transportation improvements identified in the proposed 2022 RTP/SCS are not implemented.

Table 4.3-5 shows the results of the long-term emissions analysis based on annual VMT for the TCAG region.

Table 4.3-5 Regional Air Pollutant Emissions – TCAG Region

Scenario	VMT	ROG (tons/day)	NO_X (tons/day)	$PM_{2.5}$ (tons/day)[1]	PM_{10} (tons/day)[1]
2021 Baseline	14,566,292	3.59	7.64	0.22	0.51
2046 No Project	17,128,558	1.45	3.34	0.19	0.51
2046 with the Proposed 2022 RTP/SCS	16,892,980	1.43	3.29	0.18	0.50
Net Change from 2021 Baseline	**2,326,688**	**(2.16)**	**(4.35)**	**(0.04)**	**(0.01)**
Net Change from 2046 No Project	**(235,578)**	**(0.02)**	**(0.05)**	**(0.01)**	**(0.01)**

( ) denotes a negative number

[1]$PM_{2.5}$ and PM_{10} includes tire wear and brake wear emissions

Notes: The on-road mobile source criteria pollutant emissions estimates for the proposed 2022 RTP/SCS were calculated using CARB's EMFAC2021 emission inventory model. VMT data was provided by TCAG.

Source: See Appendix A for EMFAC2021 modeling results

As shown in Table 4.3-5, emissions of ROG, NO_X, $PM_{2.5}$ and PM_{10} under the proposed 2022 RTP/SCS would decrease as compared to TCAG's 2021 baseline despite a projected increase in VMT. This decrease in emissions is consistent with the statewide downward trend for these pollutants as a result of CARB rules designed to emissions from cars and trucks. The transportation improvements and future land use scenario envisioned by the RTP/SCS encourage improved circulation and higher density development along transportation corridors, which would further reduce on-road mobile emissions. The proposed 2022 RTP/SCS is intended to increase residential and commercial land use capacity within existing transit corridors, shifting a greater share of future growth to these corridors and ultimately increasing density, improving circulation and multi-modal connections, and leading to lower per capita VMT, which would have a beneficial effect on air quality.

Conditions under the proposed 2022 RTP/SCS were compared to 2046 “No Project” conditions for informational purposes. The proposed 2022 RTP/SCS would result in a net decrease in VMT compared to the 2046 “No Project” scenario due to transportation improvements and land use patterns identified in the proposed 2022 RTP/SCS. As such, on-road vehicle emissions would also be reduced under proposed 2022 RTP/SCS conditions when compared to the “No Project” scenario.

As previously noted, Tulare County is currently in nonattainment for federal and state $PM_{2.5}$ and ozone standards and state PM_{10} standards. As shown in Table 4.3-5, under the “No Project” and “proposed 2022 RTP/SCS” scenarios, emissions levels for ozone precursors are forecast to decline despite projected future growth. NO_X emissions are primarily generated by trucks and are expected to decrease over time due in part to the impact of CARB rules designed to reduce NO_X emissions from diesel trucks and buses. ROG emissions are primarily due to gasoline vehicles and are lower due to improvements in vehicle emission rates. PM_{10} emissions are also generally consistent with statewide trends.

In addition to specific transportation improvements and land use scenarios, the proposed 2022 RTP/SCS also includes several policies that would contribute to a reduction of air pollutants. Below is a summary of the proposed 2022 RTP/SCS goals and policies that promote improvements to air quality:

- Encourage mixed-use developments in urbanized areas.
- Encourage provision of an adequate supply of housing for the region’s workforce and adequate sites to accommodate business expansion to minimize interregional trips and long-distance commuting.
- Support coordinated alternative modes of transportation including transit, pedestrian, bicycle, and rideshare and vanpool programs.
- Support the implementation of alternative fuel and other power sources for surface transportation, such as Compressed Natural Gas and electricity.
- Evaluate and consider current and future congestion conditions on the regional road network when investing in the transportation system.
- Encourage jurisdictions in the TCAG region to consider bicycle lanes, public transit, transit-oriented and mixed-use development, pedestrian networks, rail, and other complete streets development during updates of general plans and other local planning processes.
- Encourage non-single occupancy and lower/zero emission vehicle as preferred alternatives.

Also note that the air contaminant emissions shown in Table 4.3-5 are modeled emissions based on VMT. The results do not account for some proposed VMT reduction strategies, such as a transportation demand management plan, telecommuting, and transit service enhancements, because these strategies are off-model reductions that cannot be included in EMFAC. The mobile air contaminant emissions from the proposed 2022 RTP/SCS are expected to decrease with the inclusion of these VMT reduction strategies, such that the analysis herein represents a reasonable worst-case scenario for air contaminant emissions. Therefore, long-term operational impacts would be less than significant.

Other Land Use Emissions

In addition to the transportation-related GHG emissions shown in Table 4.3-5, land use projects envisioned by the land use scenario in the proposed 2022 RTP/SCS would also result in criteria air pollutant emissions due to sources such as architectural coatings, consumer products, fireplaces, landscaping equipment, and natural gas usage. Over the planning period, per capita emissions associated with consumer products, architectural coatings, fireplaces, landscaping equipment, and natural gas consumption are anticipated to decline, primarily as a result of increasingly stringent CARB and SJVAPCD rules and regulations. In addition, the proposed 2022 RTP/SCS would reduce per capita transportation related air pollutant emissions associated with future land use development, which would contribute to an overall reduction in per capita air pollutant emissions associated with future (2046) land use development as compared to 2021 baseline conditions. Nevertheless, the proposed land use scenario would most likely increase countywide ROG, PM_{10}, and $PM_{2.5}$ emissions based on growth forecasts, which would increase the likelihood that Tulare County continues to exceed the federal and state $PM_{2.5}$ and ozone standards and state PM_{10} standards for which Tulare County is currently in non-attainment. Also, individual land use projects could exceed the SJVAPCD operational significance thresholds as listed in Section 4.3.3(a), *Methodology and Significance Thresholds* under Threshold 2(b). Therefore, because the operational emissions generated by the proposed 2022 RTP/SCS land use scenario would contribute to existing non-attainment conditions in the SJVAB, impacts would be significant. The following mitigation measures would reduce this impact.

Mitigation Measures

For land use projects under their jurisdiction, the cities and counties in the TCAG region can and should implement Mitigation Measure AQ-3 to reduce ozone, $PM_{2.5}$, PM_{10} emissions, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions.

AQ-3 Long-term Regional Operational Emissions

Implementing agencies can and should implement long-term operational emissions reduction measures. Such reduction measures include the following:

- Require that all interior and exterior architectural coatings for all developments utilize coatings following SJVAPCD Rule 4601, *Architectural Coatings*.
- Increase building envelope energy efficiency standards in excess of applicable building standards and encourage new development to achieve zero net energy use.
- Install energy-efficient appliances, interior lighting, and building mechanical systems. Encourage installation of solar panels for new residential and commercial development.
- Locate sensitive receptors more than 500 feet of a freeway, 500 feet of urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day.
- Locate sensitive receptors more than 1,000 feet of a major diesel rail service or railyards. Where adequate buffer cannot be implemented, implement the following:
  - Install air filtration (as part of mechanical ventilation systems or stand-alone air cleaners) to indoor reduce pollution exposure for residents and other sensitive populations in buildings that are close to transportation network improvement projects.

  - Use air filtration devices rated MERV-13 or higher.

- Plant trees and/or vegetation suited to trapping roadway air pollution and/or sound walls between sensitive receptors and the pollution source. The vegetation buffer should be thick, with full coverage from the ground to the top of the canopy Install higher efficacy public street and exterior lighting.
- Use daylight as an integral part of lighting systems in buildings.
- Use passive solar designs to take advantage of solar heating and natural cooling.
- Install light colored "cool" roofs, cool pavements.
- Install solar and tankless hot water heaters.
- Exclude wood-burning fireplaces and stoves.
- Incorporate design measures and infrastructure that promotes safe and efficient use of alternative modes of transportation (e.g., neighborhood electric vehicles, bicycles) pedestrian access, and public transportation use. Such measures may include incorporation of electric vehicle charging stations, bike lanes, bicycle-friendly intersections, and bicycle parking and storage facilities.
- Incorporate design measures that promote ride sharing programs (e.g., by designating a certain percentage of parking spaces for ride sharing vehicles, designating adequate passenger loading and unloading and waiting areas for ride sharing vehicles, and providing a web site or message board for coordinating rides).

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during operation where appropriate.

Significance After Mitigation

If implementing agencies adopt and require the mitigation described above, emission impacts would be reduced because said measures encourage the use of cleaner vehicles and reduce vehicle trips. Implementation of Mitigation Measures GHG-4(a) and GHG-4(b) would also reduce operational emissions from the proposed 2022 RTP/SCS. However, since the implementation is not project or site specific, reductions cannot be estimated and cannot be guaranteed on a project-by-project basis. Therefore, this impact would remain significant and unavoidable. No additional feasible mitigation measures are available that would reduce daily emissions such that emissions would not contribute to existing nonattainment conditions in the SJVAB.

Threshold 3: Expose sensitive receptors to substantial pollutant concentrations

Impact AQ-4 THE PROPOSED TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD EXPOSE SENSITIVE RECEPTORS TO SUBSTANTIAL PARTICULATE MATTER POLLUTANT CONCENTRATIONS. HOWEVER, BECAUSE THE PROPOSED 2022 RTP/SCS WOULD REDUCE EXPOSURE IN COMPARISON TO THE BASELINE, IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Re-entrained dust refers to roadway dust that is "kicked up" by moving vehicles on paved and unpaved roadways. This type of dust would be generated by roadway activity under the proposed 2022 RTP/SCS. In addition, dust from construction activity would add to regional dust levels. The synergistic effects of road dust (typically measured as PM_{10}) with ozone and the hazardous constituents of re-entrained road dust itself (carcinogens, irritants, pathogens) may affect human heath by contributing to respiratory illnesses such as asthma and allergies. Although motor vehicle emission control advances have allowed vehicle tailpipe emissions of some pollutants to decrease over the last 20 years, the number of vehicles in use and the amount of vehicle activity has continued to increase. This would suggest that re-entrained road dust has increased as well, as the amount of re-entrained dust is related to the number of vehicles on a road.

Table 4.3-6 compares total particulate emissions for the baseline conditions in 2021 and 2046 with implementation of the proposed 2022 RTP/SCS. The conditions in 2046 without implementation of the proposed 2022 RTP/SCS are also shown for informational purposes.

Table 4.3-6 On-Road Mobile Source Particulate Matter Comparison

Scenario	PM_{10} Emissions (tons/day)	$PM_{2.5}$ Emissions (tons/day)
2021 Baseline	0.51	0.22
2046 No Project	0.51	0.19
2046 RTP/SCS	0.50	0.18
Net Change from 2021 Baseline	**(0.01)**	**(0.04)**
Percent Change from 2021 Baseline	**(2%)**	**(18%)**

Source: Appendix A

As shown in Table 4.3-6, total particulate emissions would be lower with implementation of the proposed 2022 RTP/SCS as compared to 2021 baseline conditions. Despite an increase in VMT within the TCAG region, particulate emissions would be lower under proposed 2022 RTP/SCS conditions as compared to existing conditions largely due to emission control advances. Therefore, the proposed 2022 RTP/SCS would not expose sensitive receptors to substantial pollutant concentrations associated with re-entrained road dust, and impacts would be less than significant. Implementation of Mitigation Measures AQ-2(a) and AQ-2(b) (outlined under Impact AQ-2) would further reduce re-entrained road dust emissions by encouraging the use of dust suppressants, including watering or gravel, and diesel equipment meeting stricter CARB Tier 3 and Tier 4 emission standards.

Mitigation Measures

No mitigation measures are required.

Threshold 3:	Expose sensitive receptors to substantial pollutant concentrations

Impact AQ-5 THE TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD EXPOSE SENSITIVE RECEPTORS TO SUBSTANTIAL TAC CONCENTRATIONS. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.

As described in Section 4.3.1, *Setting*, TACs are air pollutants that pose a potential hazard to human health by causing or contributing to an increase in mortality or serious illness. Common sources of TAC include high traffic freeways and roads, gas dispensing facilities, industrial facilities, and diesel engines. DPM is classified as the primary airborne carcinogen in California. CARB reports that diesel particulate matter represents about 70 percent of the potential cancer risk from vehicle travel on a typical urban freeway. To protect people from TACs and reduce exposure, CARB recommends avoiding siting new sensitive land uses, such as residences, schools, daycare centers, playgrounds, or medical facilities, within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day (CARB 2005).

According to the SJVAPCD GAMAQI, sensitive receptors are defined as people that have an increased sensitivity to air pollution or environmental contaminants. Sensitive receptor locations include schools, parks and playgrounds, day care centers, nursing homes, hospitals, and residential dwelling unit(s). The location of sensitive receptors is needed to assess toxic impacts on public health.

Although no high capacity urban or rural roadways exist in the TCAG region, there are several major state routes (State Routes 43, 63, 65, 99, 137, 190, 198, 201, 216, and 245). Within the TCAG region, the sensitive receptors residing close to freeways or busy roadways may experience adverse health effects beyond those typically found in urban areas. Because exposure of TACs is primarily based on local parameters (e.g., average daily traffic on local roadway segments and wind direction in relation to source and receptor), health risks adjacent to high volume roadways and transportation facilities would remain higher than regional averages.

As discussed above, the SJVAPCD significance threshold for long-term public health risk is set at 20 excess cancer cases in a million for cancer risk. For non-cancer risk (i.e., chronic or acute risk), the significance level is set at a hazard index of greater than 1.0. If a formal health risk assessment shows that a significant impact results, mitigation measures to reduce the predicted levels of toxic air pollutants from the facility to a less-than-significant level may be imposed by the lead agency.

To assess the impact of the proposed 2022 RTP/SCS on diesel emissions on regional roadways, an analysis of on-road mobile source diesel $PM_{2.5}$ and PM_{10} emissions (primary) and diesel NO_X, SO_X, and CO (as surrogates for secondary PM_{10}) is shown in Table 4.3-7. This table compares existing (2021) conditions and future 2046 "No Project" conditions with 2046 conditions with implementation of the proposed 2022 RTP/SCS for informational purposes. Projected emissions for 2046 with implementation of the proposed 2022 RTP/SCS would result in reductions of diesel NO_X, diesel CO, diesel $PM_{2.5}$, and diesel PM_{10} emissions. SO_X emissions are not projected to measurably increase or decrease when compared to the 2021 baseline.

Table 4.3-7 On-Road Mobile Source Diesel Toxics Comparison

Scenario	Diesel $PM_{2.5}$ (tons/day)	Diesel PM_{10} (tons/day)	Diesel NO_X (tons/day)	Diesel SO_X (tons/day)	Diesel CO (tons/day)
2021 Baseline	0.07	0.07	4.83	0.02	1.09
2046 No Project	0.03	0.03	2.64	0.02	0.92
2046 RTP/SCS	0.03	0.03	2.60	0.02	0.91
Net Change from 2021 Baseline	**(0.04)**	**(0.04)**	**(2.23)**	**0.00**	**(0.18)**
Percent Change from 2021 Baseline	**(57%)**	**(57%)**	**(46%)**	**0%**	**(17%)**

( ) denotes a negative number
Source: Appendix A

While overall toxic air contaminant concentrations and associated health risks within any given distance of mobile sources in the region would generally decrease with implementation of the proposed 2022 RTP/SCS compared to existing (2021) levels (refer to Table 4.3-7), exposure is primarily based on local parameters such as average daily traffic (ADT) on local roadway segments, or wind direction in relation to source and receptor. As such, the health risks adjacent to heavily trafficked roadways and transportation facilities (e.g., State Routes 99 and 198) would remain higher than regional averages. See Section 4.14, *Transportation*, for a summary of ADT on heavily trafficked roadways in the TCAG region.

In the *Air Quality and Land Use Handbook: A Community Health Perspective* (2005), CARB recommends avoiding siting new sensitive land uses, such as residences, schools, daycare centers, playgrounds, or medical facilities, within 500 feet of a freeway, urban roads with more than 100,000 vehicles per day, or rural roads with more than 50,000 vehicles per day. California freeway studies show about a 70 percent drop-off in particulate pollution levels at 500 feet (CARB 2005). As discussed above, proximity to freeways increases cancer risk and exposure to particulate matter. Similarly, proximity to heavily travelled transit corridors and intersections would expose residents to higher levels of diesel particulate matter and carbon monoxide.

As discussed in Section 2, *Project Description*, as a result of proposed 2022 RTP/SCS policies and the proposed land use scenario, the anticipated growth pattern would facilitate improved circulation and expanded roadway networks, which could result in more people being exposed to elevated health risks as compared to areas of the region more distant from such activities. The location and pattern of the proposed 2022 RTP/SCS growth would influence travel behavior. An efficient and well-maintained circulation network facilitates a reduction in individual vehicle trips and associated congestion (refer to Section 4.14, *Transportation).* Reduced congestion and vehicle trips are directly linked to reduced regional criteria air pollutant emissions and toxic air emissions from mobile sources.

It is important to note that a variety of other factors contribute to the decline in contaminant emissions compared to existing conditions, including vehicle technology, cleaner fuels, and fleet turnover. However, in order to achieve the greatest VMT reductions from an efficient circulation network, development also must necessarily be in relatively close proximity to public transit and major roadway corridors. Although the precise location and density of such development is not known at this time, the proposed 2022 RTP/SCS could result in new sensitive receptors sited close to existing and new TAC sources, potentially resulting in the exposure of sensitive receptors to substantial TAC concentrations. Therefore, impacts related to TAC emissions would be potentially significant. The siting of new sensitive receptors would be subject to an individual jurisdiction's land use approval processes and would be analyzed on an individual project basis and subject to mitigation measures identified below. The below mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures developed for the proposed 2022 RTP/SCS program where applicable for transportation projects that would result in fugitive dust and ozone precursor emissions. Cities and the County can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions.

AQ-4 Health Risk Reduction Measures

Transportation project sponsor agencies shall implement the following measures for projects that could facilitate an increase in vehicle trips:

- During project-specific design and CEQA review, the potential localized particulate (PM_{10} and $PM_{2.5}$) impacts and their health risks shall be evaluated for individual projects. Localized particulate matter concentrations shall be estimated using procedures and guidelines consistent with U.S. EPA 2015's *Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas*. If required based on the project-level hotspot analysis, project-specific mitigation shall be added to the project design concept or scope to ensure that local particulate (PM_{10} and $PM_{2.5}$) emissions would not reach a concentration at any location that would cause estimated cancer risk to exceed the SJVAPCD threshold of 20 in one million. Per the U.S. EPA guidance (2015), potential mitigation measures to be considered may include but shall not be limited to: providing a retrofit program for older higher emitting vehicles, anti-idling requirements or policies, controlling fugitive dust, routing traffic away from populated zones and replacing older buses with cleaner buses. These measures can and should be implemented to reduce localized particulate impacts as needed.
- For projects that do not meet screening criteria, retain a qualified air quality consultant to prepare a health risk assessment (HRA) in accordance with CARB and OEHHA requirements to determine the exposure of nearby residents to TAC concentrations.
- If impacts result in increased risks to sensitive receptors above significance thresholds, plant trees and/or vegetation suited to trapping TACs and/or sound walls between sensitive receptors and the pollution source.

In addition, consistent with the general guidance contained in CARB's *Air Quality and Land Use Handbook* (2005) and Technical Advisory *on Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways* (2017), cities and counties shall incorporate appropriate and feasible measures into project building design for land use projects, including residential, school and other sensitive uses located within 500 feet (or other appropriate distance as determined by the lead agency) of freeways, heavily travelled arterials, railways and other sources of diesel particulate matter, including roadways experiencing significant vehicle delays. The appropriate measures shall include one or more of the following methods, as appliable and as determined by a qualified professional.

The implementing agency shall incorporate health risk reduction measures based on an analysis of individual sites and project circumstances. These measures may include:

- Avoid siting new sensitive land uses within 500 feet of a freeway or railway.
- Require development projects for new sensitive land uses to be designed to minimize exposure to roadway-related pollutants to the maximum extent feasible through inclusion of design components including air filtration and physical barriers.
- Do not locate sensitive receptors near the entry and exit points of a distribution center.
- Locate structures and outdoor living areas for sensitive uses as far as possible from the source of emissions. As feasible, locate doors, outdoor living areas and air intake vents primarily on the side of the building away from nearby high-volume roadways or other pollution source. As feasible, incorporate dense, tiered vegetation that regains foliage year-round and has a long life span between the pollution source and the project.
- Maintain a 50-foot buffer from a typical gas dispensing facility (under 3.6 million gallons of gas per year).
- Install, operate, and maintain in good working order a central heating and ventilation (HV) system or other air take system in the building, or in each individual residential unit, which meets the efficiency standard of the MERV 13. The HV system should include the following features:
  - Installation of a high efficiency filter and/or carbon filter-to-filter particulates and other chemical matter from entering the building.
  - Use of either HEPA filters or ASHRAE 85 percent supply filters.
  - Completion of ongoing maintenance.
- Retain a qualified HV consultant or Home Energy Rating Systems rater during the design phase of the project to locate the HV system based on exposure modeling from the mobile and/or stationary pollutant sources.
- Maintain positive pressure within the building.
- Achieve a performance standard of at least one air exchange per hour of fresh outside filtered air.
- Achieve a performance standard of at least four air exchanges per hour of recirculation. Achieve a performance standard of 0.25 air exchanges per hour of unfiltered infiltration if the building is not positively pressurized.
- Require project owners to provide a disclosure statement to occupants and buyers summarizing technical studies that reflect health concerns about exposure to highway/freeway exhaust emissions.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during operation where appropriate.

Significance After Mitigation

Although implementation of the above mitigation would reduce health risks associated with TAC emissions, individual receptors may still be exposed to substantial TAC concentrations that would have significant health risk effects. Therefore, this impact remains significant and unavoidable. No additional mitigation measures to reduce this impact to less-than-significant levels are feasible.

Threshold 4:	Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people

Impact AQ-6 CONSTRUCTION OF THE TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD NOT RESULT IN OTHER EMISSIONS (SUCH AS THOSE LEADING TO ODORS) ADVERSELY AFFECTING A SUBSTANTIAL NUMBER OF PEOPLE. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

While offensive odors rarely cause physical harm, they can be unpleasant, leading to considerable distress among the public (SJVAPCD 2015a). The degree to which an odor is offensive is based on an individual's sensitivity and tolerance for said odor. Some people may find an odor acceptable (e.g., odors from a coffee roaster), while others may find it off-putting. Since odors are subjective, the sensory and physical response experienced by an individual varies based on their perception of the quality and intensity of the odor. Quality refers to the nature of the smell (e.g., flowery or sour) and intensity refers to the strength of the odor. Furthermore, the distance between the odor source and receptor, the wind direction, and sensitivity of the receptor can influence how the impact is perceived. Common sources of odors include landfills, agricultural uses, wastewater treatment plants, refineries, and vehicle exhaust.

Construction

Construction implementing the proposed 2022 RTP/SCS would generate oil and diesel fuel odors during construction from equipment use. The odors would be limited to the construction period and would be intermittent and temporary. Furthermore, these odors would dissipate rapidly with distance from in-use construction equipment. Accordingly, construction activities would not generate other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Operation

Development associated with the proposed 2022 RTP/SCS is related to transportation improvements such as roadway widening, interchange improvements, and installation of bicycle lanes. These types of projects are not typical operational sources of odors. However, all proposed 2022 RTP/SCS projects would be subject to SJVAPCD Rule 4102, *Nuisance*, which prohibits the discharge of air contaminants or other material that would cause injury, detriment, nuisance, or annoyance to any considerable number of persons. Furthermore, the projects would be required to adhere to local policies, zoning designations, and municipal codes that would limit odors. As discussed in Section 4.3.2, *Regulatory Setting*, counties and cities within the TCAG region have air quality-related policies in their General Plans that promote multi-modal transportation, electric-vehicles, and transit-oriented development. These types of policies aim to reduce travel with fossil-fueled vehicles and indirectly reduce odors from vehicle exhaust. However, if offensive odors are present and become a nuisance, complaints can be filed by email or phone call with SJVAPCD, who will then investigate the source. Because odorous emissions associated with the operation of the projects under the proposed 2022 RTP/SCS would be regulated by local governing bodies (i.e., SJVAPCD, County of Tulare, and local cities), implementation of the proposed 2022 RTP/SCS would not result in other emissions (such as odors) adversely affecting a substantial number of people. Impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

c. Specific RTP Projects That May Result in Impacts

The RTP/SCS projects listed in Section 2, *Project Description*, would have the potential to result in air quality impacts. All projects that include a construction component could result in the impacts described under Impact AQ-2. Projects that include roadway, rail, and transit features and/or expansions could result in the impacts described under Impacts AQ-3 and AQ-4. Additional specific analysis outlined in the above mitigation measures would need to be conducted as individual projects are designed and implemented to determine the magnitude of impacts. Because any number of the proposed 2022 RTP/SCS projects that require construction equipment or include transportation improvement would presumably increase air pollutant emissions, no specific projects are listed in this section related to the adverse impacts on air pollutant emissions in the TCAG region.

4.3.4 Cumulative Impacts

For the purposes of evaluating cumulative impacts to air quality, the geographic scope of the cumulative impacts analysis is the SJVAB, which includes the TCAG planning region as well as Kern, Kings, Fresno, Madera, Merced, Stanislaus, and San Joaquin counties. As detailed in Section 4.3.1(d), *Current Air Quality*, Tulare County is in nonattainment for federal ozone and $PM_{2.5}$ standards and state ozone, PM_{10}, and $PM_{2.5}$ standards. Because Tulare County is in nonattainment for these air quality standards, a cumulative air quality impact currently exists. Any growth within Tulare County would contribute to existing exceedances of ambient air quality standards. SJVAPCD has prepared air quality plans for both ozone and particulate matter to address this cumulative impact, improve conditions, and meet federal and state air quality standards. As stated in the SJVAPCD GAMAQI (2015), any proposed development project that would individually have a significant air quality impact related to criteria air pollutant emissions would also be considered have a cumulatively considerable contribution to existing significant cumulative impacts related to criteria air pollutant emissions. For TACS, the SJVAPCD GAMAQI (2015) states that because impacts from TACs are localized and the thresholds of significance for TACs have been established at such a conservative level, risks over the individual thresholds of significance are also considered cumulatively significant.

Construction activities associated with transportation projects under the proposed 2022 RTP/SCS, as well as the land use projects envisioned by the proposed 2022 RTP/SCS, would create fugitive dust and ozone precursor emissions and have the potential to result in temporary adverse impacts on air quality. As discussed under Impact AQ-2, although any individual improvement or development project may not generate significant short-term emissions, it is probable that several projects would be under construction simultaneously, generating cumulative construction emissions that could impact air quality. Short-term impacts would be significant because construction emissions could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment. Implementation of Mitigation Measures AQ-2(a) through AQ-2(c) for individual projects would reduce PM and ozone precursor emissions. However, the contribution of construction emissions facilitated by the proposed 2022 RTP/SCS to the existing significant cumulative impact would remain cumulatively considerable and unavoidable because it cannot be guaranteed that all future project-level impacts can be mitigated to a less-than-significant level.

As discussed under Impact AQ-3, regional ozone precursor and PM emissions from on-road mobile sources would decrease by 2046 with the proposed 2022 RTP/SCS compared to existing 2021 conditions. As a result, the long-term operational mobile source emissions under the proposed 2022 RTP/SCS would not result in a cumulatively considerable contribution to existing significant cumulative air quality impacts. However, land use operational emissions would be cumulatively considerable before and after mitigation because land use projects under the proposed 2022 RTP/SCS may contribute to an increase in ozone precursor and PM emissions. As discussed under Impact AQ-5, impacts from TAC emissions would be cumulatively considerable despite a decrease in TAC emissions from existing 2021 conditions because TAC impacts are localized and dependent on proximity to sources, prevailing wind, and other factors. The proposed 2022 RTP/SCS may result in the siting of sensitive receptors in close proximity to existing or new sources of TACs. Mitigation Measure AQ-4 would reduce impacts from TACs however it cannot be guaranteed that impacts resulting from the proposed 2022 RTP/SCS can be mitigated to a less-than-significant level and therefore the impact would remain cumulatively considerable.

4.4 Biological Resources

This section evaluates biological resources impacts within the TCAG region that would result from implementation of the proposed 2022 RTP/SCS.

4.4.1 Setting

a. Vegetation Communities and Land Cover Types

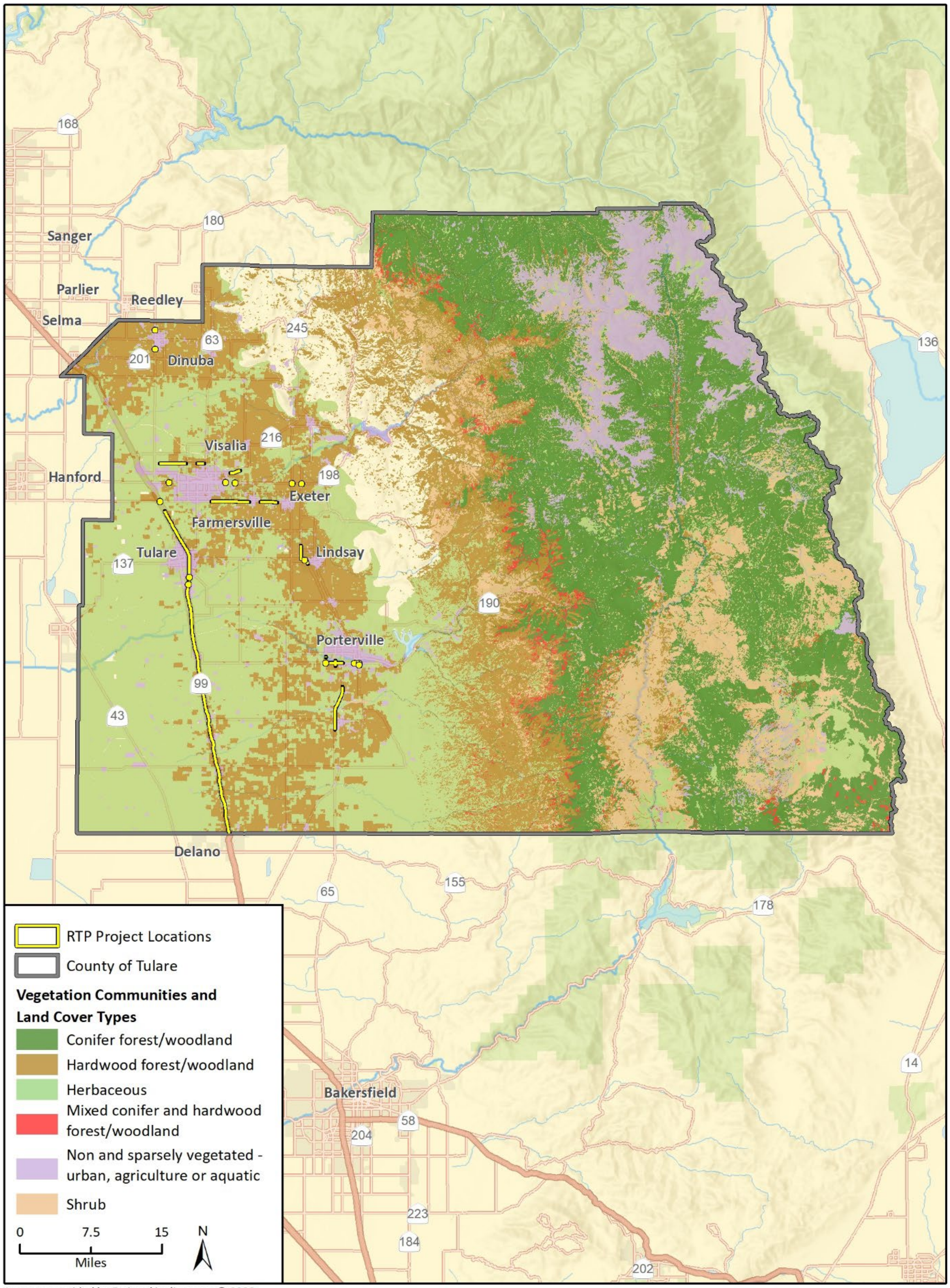
The TCAG region contains a wide diversity of tree, shrub, and herbaceous vegetation communities and land cover types. Thirty-seven (37) vegetation communities and land cover types are mapped using the California Department of Fish and Wildlife (CDFW) California Wildlife Habitat Relationships (CWHR) habitat classification system (CDFW 2014). Of the 37 vegetation communities and land cover types, 18 are tree dominated, seven are shrub dominated, three are herbaceous, and nine are either developed, sparsely/non-vegetated or cropland (see Figure 4.4-1). Because of the scale of vegetation data at the County level, the vegetation communities and land covers presented in Figure 4.4-1 depict a broad illustration of the distribution of CWHR categories (i.e., tree, shrub, herbaceous, etc.) found within Tulare County.

A description of each of the vegetation communities and land covers adapted from *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988) is presented in below. The vegetation classifications from *A Manual of California Vegetation, Second Edition* (Sawyer et al. 2009) that most closely resemble those classified by the CWHR are also presented in each description where possible. It should be noted that these vegetation communities and land covers are generalized, and that site-specific variation is likely to be present. Also note that the CWHR classification system maps vegetation communities and land covers from a broad perspective and that in many areas it is expected that two or more vegetation communities and land cover types may blend with one another. As such, due to the large scale at which vegetation communities and land covers are mapped using the CWHR classification system, vernal pools, wetlands, and drainages are discussed separately in Section 4.4.1.b utilizing sources of information that better capture aquatic and wetland habitats that are of smaller scale in the landscape. Vegetation communities and land covers which occur within populated areas can also show variation because of a greater exposure to anthropogenic influences, such as the introduction of exotic plant species.

Tree-Dominated Vegetation Communities

The TCAG region is home to a variety of hardwood, coniferous, mixed woodlands, and forests (see Figure 4.4-1). These tree-dominated vegetation communities can support diverse wildlife populations. Riparian vegetation communities are generally the terrestrial areas adjacent to freshwater bodies forming a vegetated corridor from stream edge to floodplain edge. Riparian habitats occur in and along the county's four major rivers (Kings River, Kaweah River, Tule River, and White River/Deer Creek), as well as along the many creeks, streams, arroyos, and ravines in the county. Riparian areas are rich in wildlife species, providing foraging, migration, roosting, and nesting/breeding habitat. The following are descriptions of types of tree-dominated vegetation communities that occur within three miles of construction projects outlined in the proposed 2022 RTP/SCS.

Figure 4.4-1 Vegetation Communities and Land Cover Types in the TCAG Region



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Additional Data provided by NWI, 2021.

Aspen Forest

Mature stands of quaking aspen (*Populus tremuloides*) characterize this vegetation community and usually have relatively open canopies, often shared with other deciduous trees and a few conifer species, typically pine. All stands spread by root suckering, resulting in stands comprised of clones of different age classes. Aspen stands in California occur primarily at higher elevations near seeps, streams, and meadows on the eastern slopes of the Sierra Nevada and Cascade Ranges. Aspen forests typically correspond to the *Populus tremuloides* Forest Alliance as described by Sawyer et al. (2009).

Blue Oak-Foothill Pine Woodland

This vegetation community is typically diverse in structure both vertically and horizontally and is composed primarily of a mix of hardwoods, conifers, and shrubs. Shrub distributions tend to be clumped, with interspersed patches of annual grassland. Woodlands of this type generally tend to only have small accumulations of dead and downed woody material, compared with other tree vegetation communities in California. Blue oak (*Quercus douglassii*) and foothill pine (*Pinus sabiniana*) typically comprise the overstory of this vegetation community, with blue oak usually most abundant. In the foothills of the Sierra Nevada, other tree species typically associated with this vegetation community are interior live oak (*Quercus wislizeni*) and California buckeye.

At lower elevations, where blue oaks make up most of the canopy, the understory tends to be primarily annual grasses and forbs. At higher elevations, where foothill pines and even interior live oaks sometimes comprise the canopy, the understory usually includes patches of shrubs in addition to the annual grasses and forbs. Shrub species that can be associated with this vegetation community include various buckbrush (*Ceanothus* spp.) species and manzanita (*Arctostaphylos* spp.). Other species found in this vegetation community can include California coffeeberry (*Rhamnus californicus*), poison-oak (*Toxicodendron diversilobum*), and silver lupine (*Lupinus albifrons*). This vegetation community is generally located in the foothills of the Central Valley, between 500 and 3000 feet (ft) in elevation. Blue oak-foothill pine typically corresponds to the *Quercus douglasii* Woodland Alliance or *Pinus sabiniana* Woodland Alliance as described by Sawyer et al. (2009).

Blue Oak Woodland

Generally, these woodlands have an over story of scattered trees, although the canopy can be nearly closed. The canopy is dominated by broad-leaved trees 16 ft to 50 ft tall, commonly forming open savanna-like stands on dry ridges and gentle slopes. Blue oak is typically the dominant tree species. Shrubs such as poison oak, California coffee berry (*Frangula californica*), buckbrush (*Ceanothus cuneatus*), and redberry (*Rhamnus crocea*) are often present but rarely extensive, and often occur on rock outcrops. Typical understory is composed of an extension of Annual Grassland vegetation described below. Blue oak woodland typically corresponds to the *Quercus douglasii* Woodland Alliance (Sawyer et al. 2009).

Jeffrey Pine Forest

The structure of the Jeffrey pine forest varies over its distribution. A single tree layer is characteristic of Jeffrey pine (*Pinus jeffreyi*) stands on moderately dry sites. On moist and mesic sites, a second tree layer exists which is composed of deciduous hardwood species. Jeffrey Pine vegetation communities are dominated by Jeffrey pine. A sclerophyllous shrub layer is common to most Jeffrey pine stands except on serpentine soils and extremely xeric sites. Jeffrey pine forests occur in mountainous regions such as the Sierra Nevada and ranges in elevation from 500 to 9,500 ft. Jeffrey pine forest typically corresponds to the *Pinus jeffreyi* Forest Alliance (Sawyer et al. 2009).

Juniper Woodland

Juniper vegetation communities are characterized as woodlands of open to dense aggregations of junipers (*Juniperus* spp.) in the form of arborescent shrubs or small trees. Juniper woodlands generally occur at middle elevations forming a transition between habitats at higher elevations. Juniper woodlands occur on virtually all exposures and slopes but are common on level to gently rolling topography. Junipers may be found on soils ranging from rocky to well-drained. Slope aspect has a strong influence on the elevational distribution of junipers. On north facing slopes, junipers range from 4,000 to 6,000 ft; whereas, on south facing slopes, junipers range from 6,000 to 8,000 ft. Juniper woodland typically corresponds to the *Juniperus californicus* Woodland Alliance or *Juniperus grandis* Woodland Alliance as described by Sawyer et al. (2009).

Lodgepole Pine Forest

Lodgepole pine forests typically form open stands of similarly sized trees in association with few other species and with a sparse understory. Lodgepole pine (*Pinus contorta*) overwhelmingly dominates the vegetation community. Occasional associates include aspen and mountain hemlock (*Tsuga martensiana*). The understory may be virtually absent, consisting of scattered shrubs and herbs, or a rich herbaceous layer at meadow margins. Many lodgepole stands are associated with meadow edges and streams, where the understory consists of grasses, forbs, and sedges. Lodgepole pine forest typically corresponds to the *Pinus contorta* ssp. *murrayana* Forest Alliance as described by Sawyer et al. (2009).

Montane Hardwood Forest

A typical montane hardwood vegetation community is composed of a pronounced hardwood tree layer, with an infrequent and poorly developed shrub stratum, and a sparse herbaceous layer. At higher elevations, scattered huckleberry oak (*Quercus vacciniifolia*) is present amongst an overstory of various conifers including ponderosa pine (*Pinus ponderosa*), Coulter pine (*Pinus coulteri*), California white fir (*Abies concolor*), and Jeffrey pine. At mid–elevations, typical associates include Douglas-fir (*Pseudotsuga menziesii*), tanoak (*Notholithocarpus densiflorus*), Pacific madrone (*Arbutus menziesii*), California black oak (*Quercus kelloggii*), and bristlecone fir (*Abies bracteata*). At lower elevations knobcone pine (*Pinus attenuata*), foothill pine, Oregon white oak (*Quercus garryana*). Understory vegetation is mostly scattered woody shrubs and a few forbs. Elevations range from 300 ft near the Pacific Ocean up to 9000 ft. Montane hardwood typically corresponds to the *Quercus chrysolepis* Forest Alliance as described by Sawyer et al. (2009).

Montane Riparian Forest

The vegetation of montane riparian forests is variable and often structurally diverse. Usually, these riparian areas occur as a narrow, often dense grove of broad-leaved, winter deciduous trees with a sparse understory. At high mountain elevations, more shrubs tend to occur in the understory. In the Sierra Nevada, characteristic species can include thinleaf alder (*Alnus incana*), black cottonwood (*Populus trichocarpa*), and dogwood (*Cornus* spp.). Montane riparian forest can correspond to the *Acer macrophyllum* Forest Alliance, *Umbellularia californica* Forest Alliance or *Populus trichocarpa* Forest Alliance as described by Sawyer et al. (2009).

Valley Oak Woodland

This vegetation community can range in structure from savanna-like to forest-like stands. The canopies tend to be partially closed and comprised mostly of winter-deciduous, broad-leaved species such as valley oak. Dense stands typically grow in valley soils along natural drainages and decrease with the transition from lowlands to uplands. Shrubs are also associated with this vegetation community in lowland areas, especially along drainages. Valley oak stands with little, or no grazing tend to develop a partial shrub layer of bird dispersed species, such as poison oak, toyon (*Heteromeles arbutifolia*, and California coffeeberry. Ground cover consists of a well-developed carpet of annual grasses and forbs, such as species of wild oat (*Avena* spp.), bromes (*Bromus* spp.), and ryegrass (*Lolium* spp.). Valley oak woodland typically corresponds to the *Quercus lobata* Woodland Alliance as described by Sawyer et al. (2009).

Valley Foothill Riparian

This vegetation community is associated with drainages, particularly those with low-velocity flows, flood plains, and gentle topography. This vegetation community is generally comprised of a sub-canopy tree layer dominated by cottonwoods (*Populus* spp.), sycamore (*Platanus racemosa*), and/or valley oak, and an understory shrub layer typically consisting of willows (*Salix* spp.) and/or mulefat (*Baccharis salicifolia*). Valley foothill riparian can correspond to multiple alliances, depending upon the species composition. These alliances can include, but are not limited to, *Platanus racemosa* Woodland Alliance, and the various *Populus* alliances, depending upon dominant species present (Sawyer et al. 2009).

Eucalyptus Forest

This vegetation community ranges from single-species thickets with little or no shrubby understory to scattered trees over a well-developed herbaceous and shrubby understory. Eucalyptus is a non-native, invasive species that arrived in California in the mid-1800’s. Its unique appearance and various uses enticed entrepreneurs to plant large forests and it has survived and spread since, in many places successfully dominating native hardwoods. In most cases, eucalyptus forms a dense stand with a closed canopy. Blue gum eucalyptus (*Eucalyptus globulus*) and red gum eucalyptus (*E. camaldulensis*) are the most common eucalyptus species found in these stands. The understory of these areas tends to have extensive patches of leaf litter but may include species such as poison oak. Trees within this vegetation community are typically planted in rows for use as a wind break.

Montane Hardwood-Coniferous Forest

These forests include both conifers and hardwoods, often as a closed forest. To be considered montane hardwood-coniferous forest, at least one-third of the trees must be conifer and at least one-third must be broad-leaved. The vegetation community often occurs in a mosaic-like pattern with small pure stands of conifers interspersed with small stands of broad-leaved trees. Most of the broad-leaved trees are sclerophyllous evergreen, but winter-deciduous species also occur. Relatively little understory occurs under the dense, dual layered canopy. However, considerable ground and shrub cover can occur in ecotones or following disturbance. Montane hardwood-coniferous forest can correspond to multiple alliances as described by Sawyer et al. (2009) depending upon the species composition. These alliances can include, but are not limited to, *Arbutus menziesii* Forest Alliance, *Pinus coulteri* Forest Alliance, *Lithocarpus densiflorus* Forest Alliance, *Quercus chrysolepis* Forest Alliance, and *Sequoia sempervirens* Forest Alliance.

Pinyon-Juniper Woodland

Pinyon-juniper woodland typically is an open woodland of low, round-crowned, bushy trees that are needle-leaved, evergreen, and depending on site suitability, range from less than 30 ft to 50 ft in height. Stand structure varies depending on site quality and elevation. On favorable sites with little disturbance, pinyon-juniper forms dense cover, whereas on drier sites, spacing between trees increases. Overstory species composition at lower- and mid-level elevations ranges from pure stands of pinyon (*Pinus monophylla*) to stands of pinyon mixed with juniper and oaks (shrub live, California scrub, or canyon live). At higher elevations, ponderosa pine and Jeffrey pine may be found in this habitat. Pinyon-juniper vegetation communities generally are found on slopes that are steep, rocky, dry, and face east. Most pinyon-juniper habitats are found east of the Sierra Nevada from 6,000 to 9,000 ft. Pinyon-juniper woodland typically corresponds to the *Juniperus osteosperma* Woodland Alliance or *Pinus monophylla* Woodland Alliance (Sawyer et al. 2009).

Ponderosa Pine Forest

Tree spacing in ponderosa pine forests varies from open to dense. The ponderosa pine forest includes pure stands of ponderosa pine as well as stands of mixed species, in which at least 50 percent of the canopy area is ponderosa pine. Associated species vary depending on location in the state and site conditions. Typical tree associates include but are not limited to white fir, incense-cedar (*Calocedrus decurrens*), Coulter pine (*Pinus coulteri*), Jeffrey pine, sugar pine (*Pinus lambertiana*), Douglas-fir, Bigcone Douglas-fir (*Pseudotsuga macrocarpa*). Associated shrubs include manzanita, buckbrush, and Pacific dogwood (*Cornus nuttallii*). This vegetation community is found on all aspects, depending on soils and location within the local elevational range. Ponderosa pine forest is found on suitable mountain and foothill sites throughout California except in the immediate area of San Francisco Bay, in the north coast area, south of Kern County in the Sierra Nevada and east of the Sierra Nevada Crest. Ponderosa pine forest typically corresponds to the *Pinus ponderosa* Forest Alliance (Sawyer et al. 2009).

Red Fir Forest

Large expanses of nearly monotypic stands of red fir (*Abies magnifica*) are common throughout its range, with very few other plant species in any layer. Heavy shade and a thick layer of duff tend to inhibit understory vegetation, especially in dense stands. Red fir vegetation communities are found on frigid soils over a wide range of topography, exclusive of very wet sites. Red fir is distributed in an elevational band from about 6,000 to 9,000 ft. Red fir forest extends from northern Lake County northward through the North Coast Ranges and from Kern County northward through the Sierra Nevada into the Cascade Range of southwestern Oregon. Red fir forest typically corresponds to the *Abies magnifica* Forest Alliance as described by Sawyer et al. (2009).

Sierran Mixed Conifer Forest

The Sierran mixed conifer forest is an assemblage of conifer and hardwood species that forms a multilayered forest. Five conifers and one hardwood characterize the mixed conifer forest: white fir, Douglas-fir, ponderosa pine, sugar pine, incense-cedar, and California black oak. Some species common to the understory of this habitat type include deerbrush (*Ceanothus integerrimus*), manzanita, and chinquapin (*Chrysolepis chrysophylla*). The Sierran mixed conifer forest generally forms a vegetation band ranging in elevation from 2,500 to 4,000 ft in the north and 4,000 to 10,000 ft in the southern Sierra Nevada. Sierran mixed conifer forest can correspond to multiple alliances described by Sawyer et al. (2009), depending upon the species composition.

Subalpine Conifer Forest

Subalpine conifer forests are open forests with needle-leaved evergreen trees of low to medium stature, such as Engelmann spruce (*Picea engelmannii*), subalpine fir (*Abies lasiocarpa*), and lodgepole pine. Stand density and tree height are typically greater at lower limits of its elevational range. These forests typically occupy extremely harsh environments. Stands on exposed sites and windy ridges near tree line are shaped into krummholz stunted, mat-like forms. Shrubby vegetation and herbaceous ground cover are generally sparse or lacking. Soils are generally thin and of low-quality, coarse sand, gravel, volcanic debris, and rocks derived from decomposing parent material. Subalpine coniferous forest is generally distributed at high elevations in all significant mountain ranges of the State. Subalpine conifer forest can correspond to multiple alliances described by Sawyer et al. (2009) depending upon the species composition.

White Fir Forest

The white fir forest vegetation community is characterized by nearly monotypic even aged white fir. This vegetation community is found throughout California on a variety of soils developed from different parent material, including volcanic and igneous rocks, granitics, various metamorphics, and sedimentary material. Soils are coarse-textured, well-drained, have poorly developed profiles, and are often rocky. This vegetation community occurs at about 5,500 ft in the Southern Sierra Nevada. White fir forest typically corresponds to the *Abies concolor* Forest Alliance (Sawyer et al. 2009).

Shrub Dominated Vegetation Communities

Shrub-dominated vegetation communities, such as various chaparral, are comprised primarily of woody, evergreen shrubs and occur predominantly along the foothills of the Sierra Nevada Range in eastern Tulare County. The following are descriptions of shrub-dominated vegetation communities that occur within three miles of projects outlined in the proposed 2022 RTP/SCS.

Alpine Dwarf-Shrub

This vegetation community is comprised of primarily low graminoid and forb communities with an admixture of dwarf-shrubs including creambush oceanspray (*Holodiscus discolor*), Greene goldenweed (*Ericameria greenei*), and white mountain heather (*Cassiope martensiana*). The perennial herbs or dwarf shrubs comprising these communities are usually less than 18 inches tall. Coverage may reach 100 percent at lower elevations but becomes increasingly open as elevation increases. On mesic sites, a continuous turf contrasts with patches of bunchgrasses and cushion plants on drier sites. This vegetation community is typically found above the timberline in the Sierra Nevada Mountains.

Bitterbrush Shrubland

This vegetation community comprised of Bitterbrush (*Purshia tridentata*) stands ranging from small, widely spaced shrubs to large, closely spaced shrubs with more than 90 percent canopy cover. Bitterbrush is only occasionally found in pure stands; however, most often bitterbrush occurs as a codominant with big sagebrush (*Artemisia tridentata*) or rubber rabbitbrush (*Ericameria nauseosa*). Bitterbrush vegetation communities are found on flats and slopes with deep, well-drained, rapidly permeable, slightly acidic soils.

Chamise-Redshank Chaparral

This vegetation community can range from nearly pure stands of chamise (*Adenostoma fasciculatum*) or redshank (*A. sparsifolium*) to a mixture of both. Mature chamise-redshank chaparral is single layered, generally lacking well-developed herbaceous ground cover and over story trees. Shrub canopies frequently overlap, producing a nearly impenetrable canopy of interwoven branches. Redshank stands tend to be slightly taller and more open than chamise dominated stands. Fire occurs regularly in chamise-redshank chaparral and influences community structure. Chamise-redshank chaparral typically corresponds to the *Adenostoma fasciculatum* Shrubland Alliance and *Adenostoma sparsifolium* Shrubland Alliance as described by Sawyer et al. (2009).

Low Sage Shrubland

This vegetation community is generally dominated by broad-leaved, evergreen shrubs ranging in height from about four to 19 inches, typically averaging about 15 percent cover but sometimes with crowns touching. The vegetation community may be dominated by low sagebrush (*Artemisia arbuscula*) or black sagebrush (*Artemisia nova*), often in association with antelope bitterbrush (*Purshia tridentata*), or big sagebrush (*Artemisia tridentata*); black sagebrush is also commonly associated with winterfat (*Krascheninnikovia lanata*) and Mormon-tea (*Ephedra viridis*). Low sagebrush communities are generally restricted to elevated arid plains along the eastern flanks of the Sierra Nevada, from Inyo County northward through Modoc and Siskiyou Counties.

Mixed Chaparral

Mixed Chaparral is a structurally homogeneous brushland type dominated by shrubs with thick, stiff, heavily cutinized evergreen leaves. Shrub height and crown cover vary with age since last burn, precipitation, aspect, and soil type. At maturity, cismontane mixed chaparral typically is a dense, nearly impenetrable thicket. On poor sites, serpentine soils, or transmontane slopes, shrub cover may be considerably reduced, and shrubs may be shorter. Leaf litter and standing dead material may accumulate in stands that have not burned for several decades. Mixed chaparral can correspond to multiple alliances, depending upon the species composition. These alliances can include, but are not limited to, *Ceanothus cuneatus* Shrubland Alliance and the *Arctostaphylos glauca* Shrubland Alliance (Sawyer et al. 2009).

Montane Chaparral

The growth form of montane chaparral species can vary from treelike (up to 10 ft) to prostrate. Montane chaparral varies markedly throughout California. Species composition changes with elevational and geographical range, soil type, and aspect. Species that usually characterize montane chaparral communities include, but are not limited to, whitethorn Ceanothus (*Ceanothus cordulatus*), snowbrush Ceanothus (*Ceanothus velutinus*), and greenleaf manzanita (*Arctostaphylos patula*). Montane chaparral can be found on shallow to deep soils, on all exposures, and from gentle to relatively steep slopes. Montane chaparral is associated with mountainous terrain from mid to high elevation at 3,000 to 10,000 ft. Montane chaparral can correspond to multiple alliances, depending upon the species composition. These alliances can include, but are not limited to, the Ceanothus cordulatus Shrubland Alliance as described by Sawyer et al. (2009).

Sagebrush Shrubland

Sagebrush stands are typically large, open, discontinuous stands of big sagebrush (*Artimisia tridentata*) of uniform height. Often the community is composed of pure stands of big sagebrush, but many stands include other species of sagebrush (*Artimisia* spp.), rabbitbrush (*Ericameria nauseosa*), horsebrus (*Tetradymia canescens*), and gooseberry (*Ribes* spp.). The sagebrush vegetation community is a discontinuous strip along the east and northeast borders of California south to the 37th parallel. It occupies dry slopes and flats from about 1,600 ft to 10,500 ft in elevation. Sagebrush shrubland can correspond to multiple alliances, depending upon the species composition. These alliances can include, but are not limited to, the *Artimisia tridentata* Shrubland Alliance (Sawyer et al. 2009).

Herbaceous Dominated Vegetation Communities

These vegetation communities are generally comprised of areas dominated by grasses and other non-woody species. Most herbaceous communities in the TCAG region are comprised of non-native grasslands. Native grasslands, which are dominated by perennial bunch grasses such as purple needlegrass (*Nassella pulchra*) we historically abundant within the TCAG region but are now currently patchy in distribution. The following are descriptions of the herbaceous dominated vegetation communities that occur within three miles of projects outlined in the proposed 2022 RTP/SCS.

Annual Grasslands

This vegetation community is composed primarily of non-native annual herbs and forbs and typically lacks shrub or tree cover. The physiognomy and species composition of annual grasslands is highly variable and varies considerably on a temporal scale. Grazing is a common land use within this vegetation community. Common grass species include wild oats, soft chess brome (*Bromus hordeaceous*), ripgut brome (*Bromus diandrus*), and red brome (*Bromus madritensis*). Common forb species can include species of filaree (*Erodium* spp.), and bur clover (*Medicago* spp.). California poppy can also be quite common in this vegetation community. Annual grassland can correspond to multiple alliances as described by Sawyer et al. (2009) depending upon the species composition. These alliances can include, but are not limited to, *Avena (barbata, fatua)* semi-natural stands and *Bromus (diandrus, hordeaceous) – Brachypodium distachyon* semi-natural stands.

Wet Meadow

Wet meadows at all elevations generally have a simple structure consisting of a layer of herbaceous plants. Shrub or tree layers are usually absent or very sparse; but may be found along the meadow edge. Within the herbaceous plant community, a microstructure is frequently present. Species composition generally differs between sites and includes a variety of members of the following genera: Agrostis, Carex, Danthonia, Juncus, Salix, and Scirpus. Fewer species tend to occur as surface water depth increases during spring runoff. The single most important characteristic of a wet meadow is its hydrology. Seasonality and reliability of yearly water inflows and outflows largely determine the vegetational stability of wet meadows. In the Sierra Nevada and Cascade ranges, wet meadows usually occur above 3,940 feet in the north, and above 5,900 feet in the south. Because of the high amount of variation in composition, multiple alliances as described by Sawyer et al. (2009) can describe this vegetation community.

Pasture

Pasture vegetation is a mix of perennial grasses and legumes, with typically complete canopy closure. Structurally this land cover type resembles annual grassland habitats. Height of vegetation varies, according to season and livestock stocking levels. Old or poorly drained pastures may have patches of weeds more than two feet in height. The mix of grasses and legumes varies according to management practices such as seed mixture, fertilization, soil type, irrigation, weed control, and the type of livestock on the pasture.

Developed and Sparsely/Non-Vegetated Habitats

Developed and sparsely/non- vegetated land covers are abundant in Tulare County. Developed land covers are usually sparsely or non-vegetated, and are associated with urban and agricultural areas, and are highly disturbed. Species that occur in these areas are typically adapted to anthropogenic disturbance and/or comprised of ornamental species. Sparsely vegetated land covers also tend to be associated with rock outcrops. The following are descriptions of developed and sparsely/non-vegetated land cover types that could be impacted by development (transportation projects and land use changes) proposed under the proposed 2022 RTP/SCS.

Cropland

This land cover type is characterized by areas in active agriculture and is an entirely man-made habitat. The structure of vegetation can vary in size, shape, and growing pattern. The dominant cropland use is row crops. Typical crops consist of grasses, brassicas, and forbs. Subcategories of cropland habitat classifications in the TCAG region include dryland grain crop, irrigated hayfield crop, irrigated row and field crop, and irrigated grain crop. Orchards and vineyards are classified separately.

Orchard

This land cover type is characterized by typically open, single-species, tree-dominated areas. Depending on the tree type and pruning methods, they are usually low, bushy trees with an open understory to facilitate harvest. Trees such as citrus, avocados, and olives are evergreen; others are deciduous. The understory is usually composed of low-growing grasses and other herbaceous plants but may be managed to prevent understory growth totally or partially, such as along tree rows. Currently two subcategories of orchard land cover classifications that are recognized occur in the TCAG region: deciduous orchard and evergreen orchard.

Vineyard

Vineyards are composed of single species planted in rows, usually supported on wood and wire trellises. Vines are normally intertwined in the rows, but open between rows. Rows under the vines are usually sprayed with herbicides to prevent growth of herbaceous plants. Between rows of vines, grasses and other herbaceous plants may be planted or allowed to grow as a cover crop to control erosion. Vineyards can be found on flat alluvial soils in the valley floors, in rolling foothill areas, or on relatively steep slopes. Most vineyards are in valley or foothill areas.

Urban

This land cover type is completely man-made, comprising residential, commercial, and industrial developed areas. Plant species within urban land cover types are typically comprised of ornamental and other non-native invasive plant species, with large, developed areas lacking vegetation.

Barren

This land cover type is defined by the absence of vegetation. Any area with less than two percent total vegetation cover and less than 10 percent cover by tree or shrub species is defined as barren. Structure and composition of the substrate is largely determined by the region of the state as well as surrounding environment. An example of a barren land cover includes areas of exposed parent rock and talus slope.

b. Drainages and Wetlands

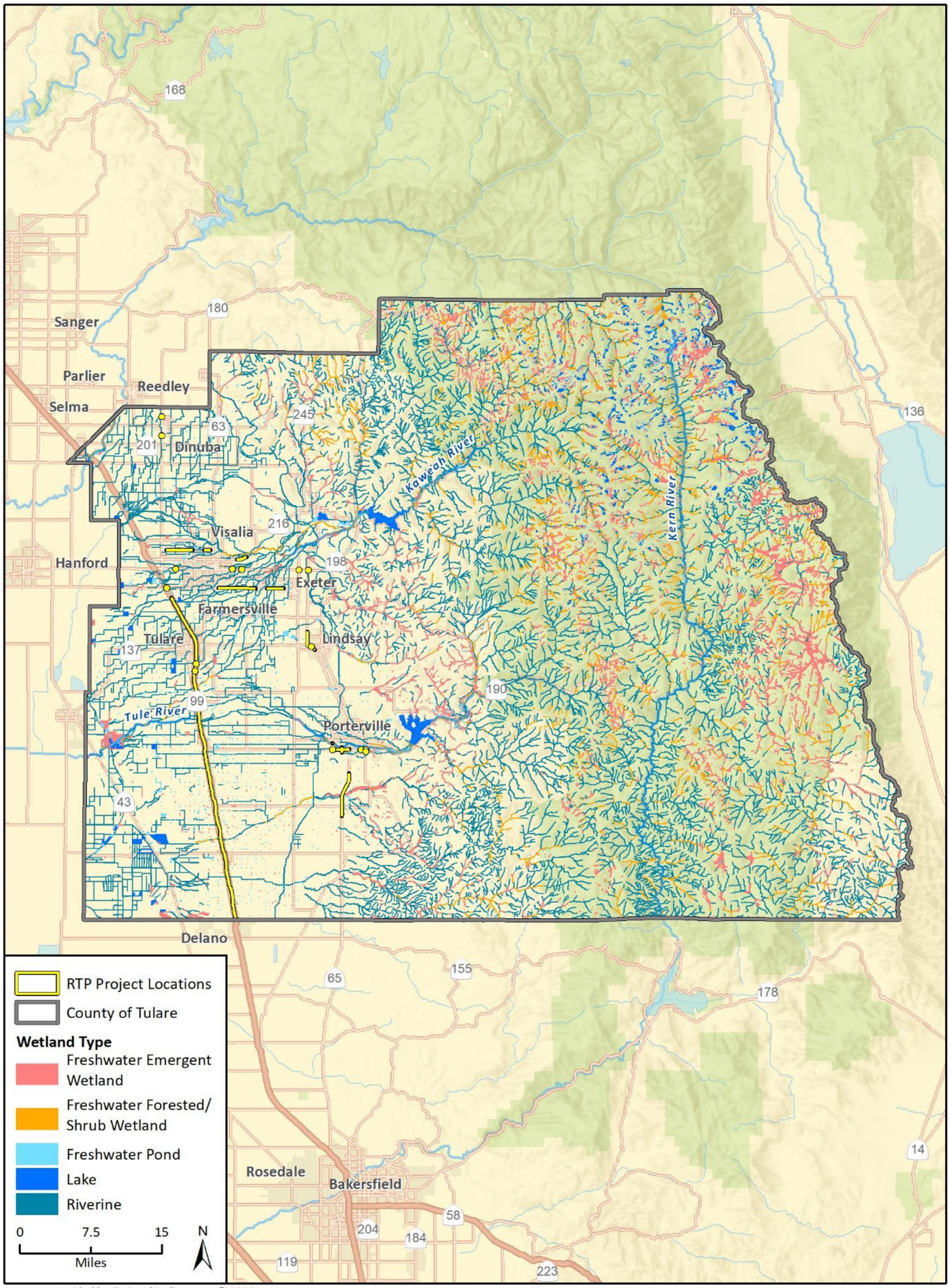
The TCAG region covers a diverse area that includes several types of waters and wetlands. These waters range from concrete-lined urban streams, reservoirs, and agricultural ditches to natural rivers, desert washes, and mountain lakes. Lakes, rivers, streams, and other water bodies are termed "jurisdictional waters" when they are protected by federal and/or state law. Special aquatic sites, which include wetlands, are considered an important subset of jurisdictional waters. State and federal resource agencies regulate activities that take place within or could affect jurisdictional waters and associated riparian resources. To identify jurisdictional features and define the jurisdictional limits, state and federal resource agencies have developed regulations (discussed below), which serve as legal definitions for jurisdictional waters and wetlands.

Drainages

The TCAG region contains four principal rivers and their watersheds: Kings River; Kaweah River; Tule River; and White River/Deer Creek. Several creeks and tributaries are associated with each one of these watersheds and generally flow from the Sierra Nevada Mountains westwards towards the San Joaquin Valley (Figure 4.4-2). The drainages within these watersheds are of biological importance as they provide valuable foraging habitat, breeding habitat, and movement habitat for a wide variety of animal species, including sensitive species such as Little Kern golden trout (*Oncorhynchus aguabonita whitei*), California red-legged frog (*Rana draytonii*), and western pond turtle (*Actinemys marmorata*). Information regarding each watershed is provided below (Tulare County 2010).

- Kings River Watershed: This watershed encompasses 1,742 square miles, ranging in elevation from 500 to 14,000 feet.
- Kaweah Watershed: The Kaweah Watershed is south of the Kings River Watershed. The Kaweah River is a tributary to the Tule River and drains 561 square miles of the Sierra Nevada Mountains.
- Tule River Watershed: the Tule River Watershed is primarily supplied by the Tule River, which drains 390 square miles above Lake Success (capacity 82,300 acre-feet).
- Deer Creek/White River Watershed: this watershed is in the southern portion of the County. Surface supplies emanate from a low-elevation stream group.

Figure 4.4-2 Wetland and Drainages in the TCAG Region



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Additional Data provided by NWI, 2021.

Wetlands and Aquatic Habitats

Wetlands are regarded as important biological resources both because of their rarity in California and because they serve a variety of functional values. The County includes numerous wetlands mapped by the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI; USFWS 2021a). Some wetlands may not have been mapped. A general description of each of the classifications is provided below. Of those wetland types mapped by the NWI, freshwater emergent wetland, riverine and lacustrine habitats are also mapped by the CWHR.

Freshwater Emergent Wetlands

Freshwater emergent wetlands include all non-tidal waters dominated by emergent herbaceous plant species, mosses, and/or lichens. Wetlands of this type are also low in salinity. Wetlands which lack vegetation can be included in this class if they are less than 20 acres, do not have an active wave-formed or bedrock shoreline feature, have a low water depth less than 6.6 feet. This wetland type is also mapped by the CWHR. Freshwater emergent wetlands are characterized by erect, rooted herbaceous hydrophytes.

Dominant vegetation is generally perennial monocots. All emergent wetlands are flooded frequently, enough so that the roots of the vegetation prosper in an anaerobic environment. The vegetation may vary in size from small clumps to vast areas covering several kilometers. The acreage of freshwater emergent wetlands in California has decreased dramatically since the turn of the century due to drainage and conversion to other uses, primarily agriculture.

This wetland type can include vernal pools which are seasonal wetlands are small depressions that fill with water during the winter, gradually drying during the spring and becoming completely dry in the summer. These pools are found in only a few places in the world outside of California. Vernal pool vegetation is characterized by herbaceous plants that begin their growth as aquatic or semi- aquatic plants and transition to a dry land environment as the pool dries. Most vernal pool plants are annual herbs. Wildlife species supported by vernal pools include the California tiger salamander (*Ambystoma californiense*) and vernal pool fairy shrimp (*Branchinecta lynchi*).

Freshwater Forested/Shrub Wetlands

These wetlands include non-tidal waters which are dominated by trees and shrubs, with emergent herbaceous plants, mosses and/or lichens. Wetlands which lack vegetation can be included in this class if they also exhibit the same criteria as described for freshwater emergent wetlands. The vegetation found in freshwater forested/shrub wetlands are generally dominated by woody vegetation such as shrubs and trees.

Freshwater Ponds

Freshwater ponds include non-tidal waters with vegetative cover along its edges such as trees, shrubs, emergent herbaceous plants, mosses, and/or lichens. Freshwater ponds can be man-made or natural and typically consist of an area of standing water with variable amounts of shoreline. These wetlands and deep-water habitats are dominated by plants that grow on or below the surface of the water. This wetland type is also mapped by the CWHR and categorized as lacustrine habitat which includes vernal pools.

Lakes

Lakes are a lacustrine system which includes wetlands and deep-water habitats that are in a topographic depression or dammed river channel. These areas tend to be greater than 20 acres. Vegetation cover within this habitat is generally less than 30 percent and often occurs in the form of emergent or surface vegetation. Substrates are composed of at least 25 percent cover of particles smaller than stones. This wetland type is also mapped by the CWHR and categorized as lacustrine habitat which also includes vernal pools.

Riverine

Riverine habitats are a riverine system which includes all wetlands and deep-water habitats contained in natural or artificial channels that contain periodically or continuously flowing water. This system may also form a connecting link between two bodies of standing water. Substrates generally consist of rock, cobble, gravel, or sand.

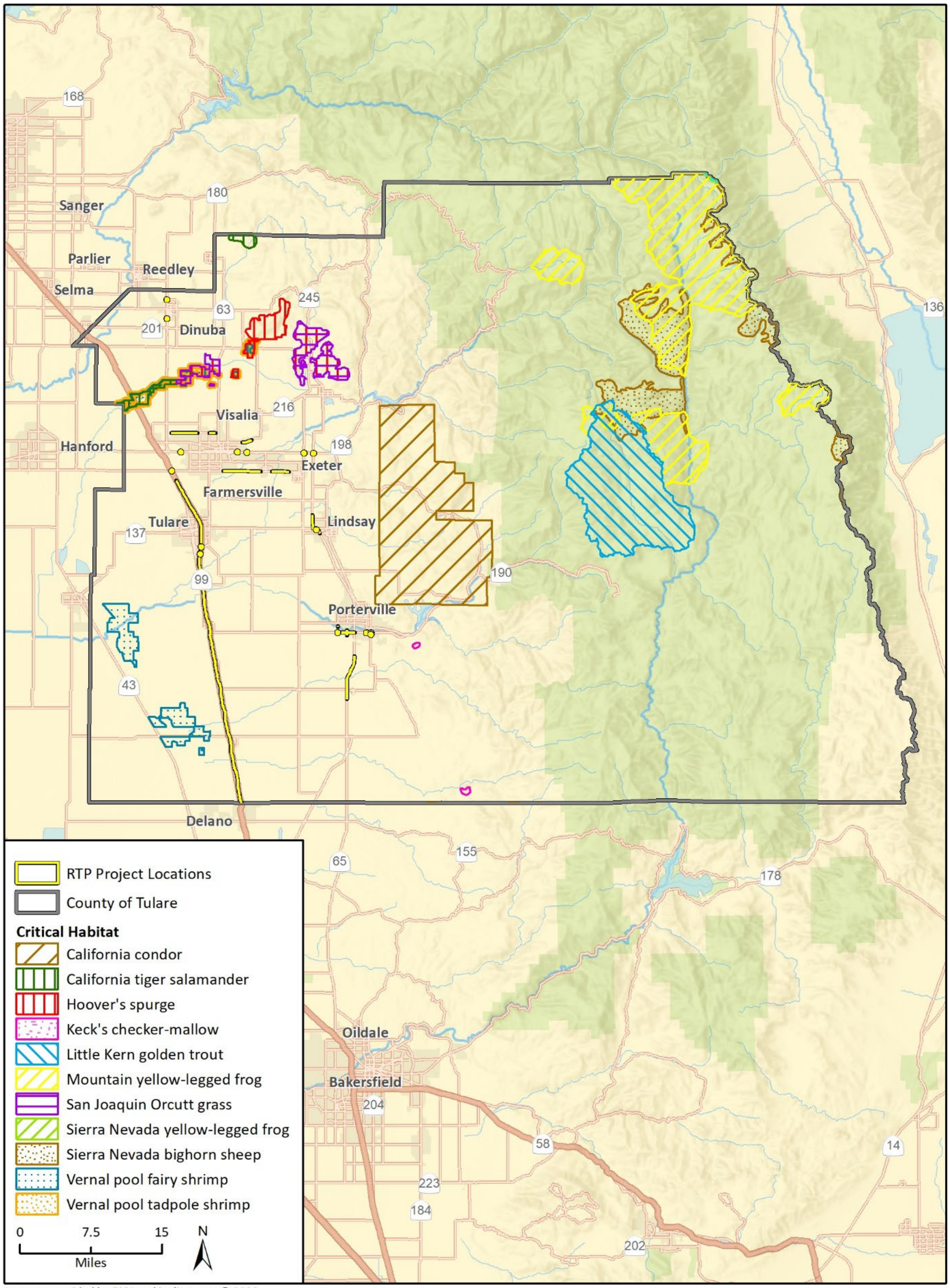
c. Sensitive Natural Communities and Critical Habitat

Sensitive natural communities are those listed by the CDFW due to the rarity of the community in the state or throughout its entire range (globally). The California Natural Diversity Database (CNDDB) lists 10 natural communities that occur with Tulare County (CDFW 2021a). The Sensitive Natural Communities List in the CNDDB is not currently maintained and no new information has been added in several years. As such, the CDFW maintains a List of Vegetation Alliances and Associations[1] (CDFW 2020). According to the CDFW's Vegetation Program, Alliances with State ranks of S1-S3 are considered to be imperiled, and thus, potentially of special concern. Because this analysis is at the county level and programmatic, vegetation mapping and analysis at the alliance and association level is not available at this time or necessary and would need to be conducted at the project level. That said, some sensitive vegetation alliances and associations are already known to occur within the TCAG region as a subset of the habitats described above in Sections 4.4.1.a and 4.4.1.b. For instance, some oak woodland alliances within Tulare County, notably Quercus lobata Woodland Alliance, which most resembles the valley oak woodland described in Section 4.4.1.a, are considered sensitive.

Critical habitat is a specific geographic area(s) that is essential for the conservation of a threatened or endangered species and that may require special management and protection. Federally designated critical habitat for 11 species also occurs in the TCAG region (Figure 4.4-3). In the region, there are approximately 428,800 acres of critical habitat, most of which is located along the Tulare/Inyo County border in Sequoia National Park. These sensitive communities and critical habitats are also listed in Table 4.4-1.

[1] CDFW classifies vegetation at the two finest levels of alliance and association. The alliance is defined by plant species composition, habitat conditions, physiognomy, and diagnostic species; at least one of the diagnostic species is typically found in the uppermost or dominant stratum (Jennings et al. 2009). The association is the most detailed classification level and reflects more specific characteristics of vegetation such as finer-level differences in species composition, topography, soils, substrate, climate, hydrology, and disturbance regime (Federal Geographic Data Committee 2008). Unlike alliances, associations often recognize two or more diagnostic species found in different vegetation layers (Sawyer et al. 2009).

Figure 4.4-3 Critical Habitat in the TCAG Region



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Additional data provided by USFWS, 2021.

Table 4.4-1 Sensitive Communities and Critical Habitats Documented within the TCAG Region

Communities Considered Sensitive by the CDFW
Big Tree Forest
Central Valley Drainage Hardhead/Squawfish Stream
Great Valley Oak Riparian Forest
Northern Claypan Vernal Pool
Northern Hardpan Vernal Pool
Southern Interior Cypress Forest
Sycamore Alluvial Woodland
Valley Sacaton Grassland
Valley Saltbush Scrub
Valley Sink Scrub
Critical Habitats
California condor (*Gymnogyps californianus*)
California tiger salamander (*Ambystoma californiense*)
Hoover's spurge (*Euphorbia hooveri*)
Keck's checker-mallow (*Sidalcea keckii*)
Little Kern golden trout (*Oncorhynchus mykiss whitei*)
Mountain yellow-legged frog (*Rana muscosa*)
San Joaquin Orcutt grass (*Orcuttia inaequalis*)
Sierra Nevada yellow-legged frog (*Rana sierrae*)
Sierra Nevada bighorn sheep (*Ovis canadensis sierrae*)
Vernal pool fairy shrimp (*Branchinecta lynchi*)
Vernal pool tadpole shrimp (*Lepidurus packardi*)
Sources: CNDDB (CDFW 2021a); USFWS IPaC (2021b)

d. Special-Status Species

For the purpose of this EIR, special-status species are those plants and animals listed, proposed for listing, or candidates for listing as threatened or endangered by the USFWS under the federal Endangered Species Act (ESA); those listed or proposed for listing as rare, threatened, or endangered by the CDFW under the California Endangered Species Act (CESA); animals designated as "Species of Special Concern," "Fully Protected," or "Watch List" by the CDFW. Those plants ranked as California Rare Plant Rank (CRPR) 1 or 2 are typically regarded as rare, threatened, or endangered under CEQA by lead agencies and were considered as such in this EIR. The CRPR utilizes the following code definitions:

- **List 1A =** Plants presumed extinct in California;
- **List 1B.1** = Rare or endangered in California and elsewhere; seriously endangered in California (over 80 percent of occurrences threatened/high degree and immediacy of threat);
- **List 1B.2** = Rare or endangered in California and elsewhere; fairly endangered in California (20-80 percent occurrences threatened);

- **List 1B.3** = Rare or endangered in California and elsewhere, not very endangered in California (<20 percent of occurrences threatened, or no current threats known); and
- **List 2** = Rare, threatened or endangered in California, but more common elsewhere.

CRPR List 3 species are "review list," and CRPR 4 species are considered "watch list" species. CRPR 3 and 4 species do not typically warrant analysis under CEQA except where they are part of a unique community, from the type locality, or designated as rare or significant by local governments, or where cumulative impacts could result in population–level effects. The CRPR 3 and 4 species reported from the region are not locally designated as rare or significant by the County of San Joaquin General Plans and are not part of a unique community. Additionally, the County is not known to be the type locality for any ranked plant species. Therefore, potential impacts to CRPR 3 and CRPR 4 species were not considered in this analysis.

Species of Special Concern (SSC) is a category used by the CDFW for those species which are considered indicators of regional habitat changes or are considered to be potential future protected species. Species of Special Concern do not have any special legal status except that which may be afforded by the Fish and Game Code. The SSC category is intended by the CDFW for use as a management tool to include these species into special consideration when decisions are made concerning the development of natural lands, and these species are considered sensitive as described under the CEQA Appendix G questions.

Queries of the USFWS *Information for Planning and Consultation* (IPaC; USFWS 2021b), the CDFW CNDDB (CDFW 2021a), and CNPS *Online Inventory of Rare, Threatened and Endangered Plants of California* (CNPS 2021) were conducted. . These queries were conducted to obtain comprehensive information regarding state and federally listed species considered to have potential to occur within Tulare County.

Special-status Plants and Animals

The TCAG region is home to several species protected by federal and state agencies. Important animal species can be found in a variety of Tulare County habitats. The CNDDB (CDFW 2021a), CNPS (2021), and USFWS IPaC (2021b) together list 166 special-status plant and animal species (117 plant species and 49 animal species) that occur or have the potential to occur within Tulare County. The status and habitat requirements of those species are presented in Appendix B as Tables B-1 and B-2 respectively.

e. Wildlife Movement Corridors

Wildlife movement corridors, or habitat linkages, are generally defined as connections between habitat patches that allow for physical and genetic exchange between otherwise isolated animal populations. Such linkages may serve a local purpose, such as providing a linkage between foraging and denning areas, or they may be regional in nature. Some habitat linkages may serve as migration corridors, wherein animals periodically move away from an area and then subsequently return. Others may be important as dispersal corridors for young animals. A group of habitat linkages in an area can form a wildlife corridor network.

The habitats within the link do not necessarily need to be the same as the habitats that are being linked. Rather, the link merely needs to contain sufficient cover and forage to allow temporary inhabitation by ground-dwelling species. Typically, habitat linkages are contiguous strips of natural areas, though dense plantings of landscape vegetation can be used by certain disturbance-tolerant species. Depending upon the species using a corridor, specific physical resources (such as rock outcroppings, vernal pools, or oak trees) may need to be located within the habitat link at certain intervals to allow slower-moving species to traverse the link. For highly mobile or aerial species, habitat linkages may be discontinuous patches of suitable resources spaced sufficiently close together to permit travel along a route in a short period of time. Wildlife movement corridors can be both large and small scale.

The mountainous regions of Tulare County may support wildlife movement on a regional scale while riparian corridors, waterways, flood control channels, canals, contiguous habitat, and upland habitat on levees may provide more local scale opportunities for wildlife movement throughout the TCAG region.

The CDFW *Biogeographical Information and Observation System* (BIOS; CDFW 2021b) mapped four essential connectivity areas (ECAs) within Tulare County (see Figure 4.4-4). Two are in the southwestern portion of the TCAG region, one is in the center, and the largest runs down through the center and eastern portions of the TCAG region from the north. In western Tulare County, one ECA is associated with Lakeland and Homeland Canals and a portion of the Tule River while the other occurs in the vicinities of Deer Creek and the White River. ECAs in western Tulare County show considerable overlap with the Pixley National Wildlife Refuge. The most significant ECA in eastern Tulare County occurs along the Sierra Nevada Range.

Seven important movement corridors are also identified from the report, *Missing Linkages: Restoring Connectivity to the California Landscape* (Penrod et al. 2001). These areas are identified as important movement corridors for species such as San Joaquin kit fox, steelhead, beaver, riparian birds, and other small carnivores.

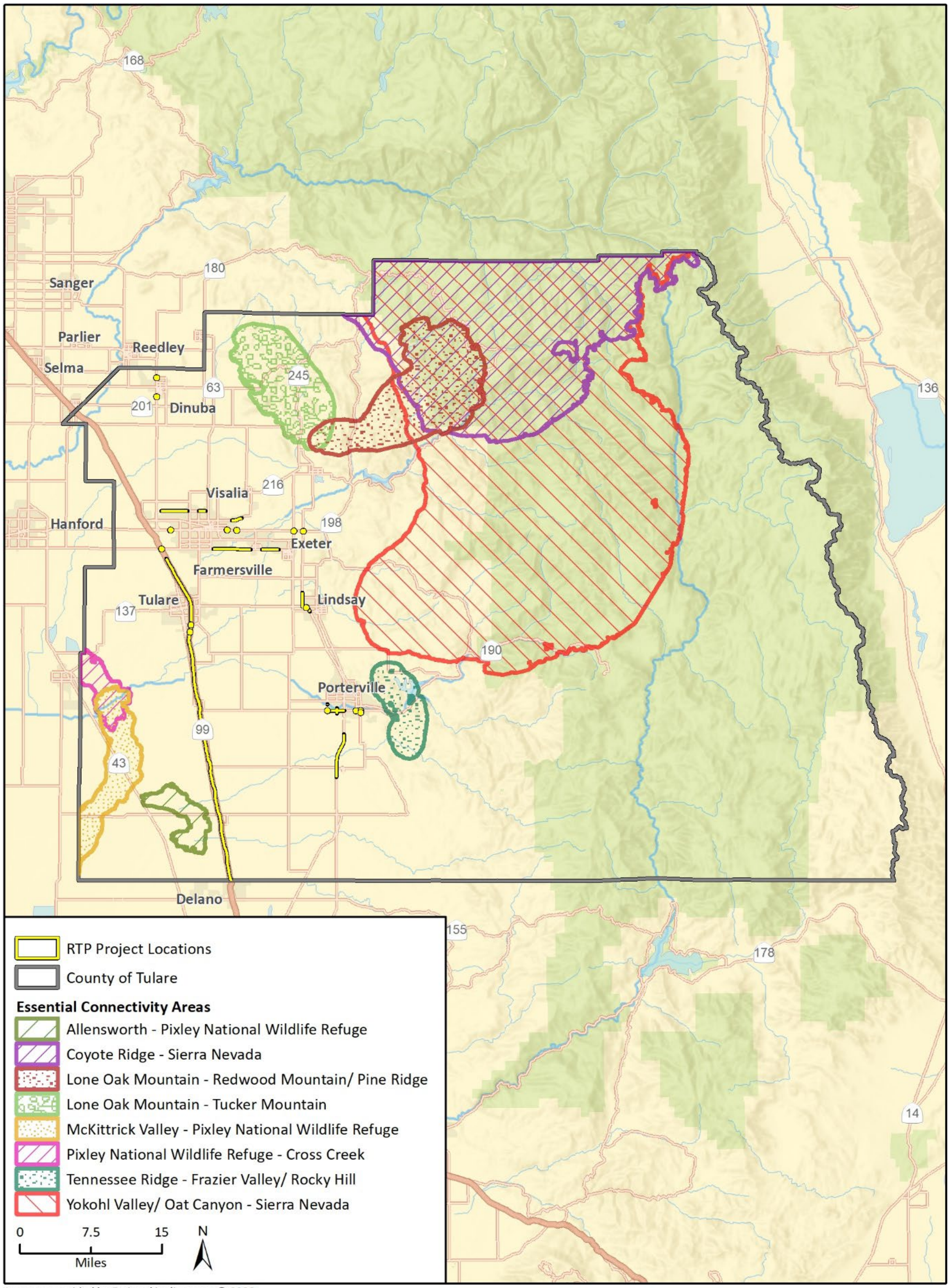
f. Habitat Conservation Plans (HCP)

There are two habitat conservation plans (HCPs) that apply to portions of the TCAG region.

The Kern Water Bank HCP applies, in Tulare County, to covered activities restricted to the Allensworth area of Tulare County. Created in 1997 with the intention of protecting wetland habitats in Kern County, the Kern Water Bank HCP establishes a land management system that allows the land to be used primarily as a water bank, but also encourages the re-emergence of native habitat (Kern Water Bank Authority 1997).

The Pacific Gas and Electric (PG&E) San Joaquin Valley Operations & Maintenance HCP applies to the western half of Tulare County that operate within the PG&E service area, as well as nine other counties in the Central Valley, covering a total of 276,350 acres. This HCP applies to covered activities within the PG&E service area of Tulare County or cities within the County that fall into the Plan Area. Beginning in 2007 with a duration of 30 years, the HCP intends to mitigate and minimize any adverse impacts on species by operations and maintenance activities by PG&E in the area (PG&E 2018).

Figure 4.4-4 Essential Connectivity Areas in the TCAG Region



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Additional Data provided by CDFW, 2020.

4.4.2 Regulatory Setting

a. Federal Laws, Regulations, and Policies

Endangered Species Act

Under the Federal Endangered Species Act (ESA), authorization is required to “take” a listed species. Take is defined under ESA Section 3 as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Under federal regulation (50 CFR Sections 17.3, 222.102); “harm” is further defined to include habitat modification or degradation where it would be expected to result in death or injury to listed wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Critical habitat is a specific geographic area(s) that is essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitat may include an area that is not currently occupied by the species but that will be needed for its recovery. ESA Section 7 outlines procedures for federal interagency cooperation to conserve federally listed species and designated critical habitat.

Section 7(a)(2) of ESA and its implementing regulations require federal agencies to consult with USFWS or National Marine Fisheries Service (NMFS) to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species, or result in the destruction or adverse modification of critical habitat. For projects where federal action is not involved and take of a listed species may occur, the project proponent may seek to obtain an incidental take permit under ESA Section 10(a). Section 10(a) allows USFWS to permit the incidental take of listed species if such take is accompanied by an HCP that includes components to minimize and mitigate impacts associated with the take.

The USFWS and NMFS share responsibility and regulatory authority for implementing ESA (7 USC Section 136, 16 USC Section 1531 et seq.).

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) authorizes the Secretary of the Interior to regulate the taking of migratory birds. The act provides that it is unlawful, except as permitted by regulations, “to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, […] any migratory bird, or any part, nest, or egg of any such bird” (16 USC Section 703(a)). The Bald and Golden Eagle Protection Act is the primary law protecting eagles, including individuals and their nests and eggs. The USFWS implements the MBTA (16 United States Code [USC] Section 703-711) and the Bald and Golden Eagle Protection Act (16 USC Section 668). Under the Act’s Eagle Permit Rule (50 CFR 22.26), USFWS may issue permits to authorize limited, non-purposeful take of bald eagles and golden eagles.

Clean Water Act

Under Section 404 of the Clean Water Act (CWA), the U.S. Army Corps of Engineers (USACE), with EPA oversight, has authority to regulate activities that result in discharge of dredged or fill material into wetlands or other “waters of the United States.” Perennial and intermittent creeks are considered waters of the United States if they are hydrologically connected to other jurisdictional waters. In achieving the goals of the CWA, the USACE seeks to avoid adverse impacts and offset unavoidable adverse impacts on existing aquatic resources. Any discharge of dredged or fill material into jurisdictional wetlands or other jurisdictional "waters of the United States" would require a Section 404 permit from the USACE prior to the start of work. Typically, when a project involves impacts to waters of the United States, the goal of no net loss of wetlands is met by compensatory mitigation; in general, the type and location options for compensatory mitigation should comply with the hierarchy established by the USACE/EPA 2008 Mitigation Rule (U.S. Environmental Protection Agency 2021) (in descending order): (1) mitigation banks; (2) in-lieu fee programs; and (3) permittee-responsible compensatory mitigation. Also, in accordance with Section 401 of the CWA, applicants for a Section 404 permit must obtain water quality certification from the appropriate Regional Water Quality Control Board (RWQCB).

b. State Laws, Regulations, and Policies

Endangered Species Act and Fully Protected Species

California Endangered Species Act (CESA; Fish and Game Code Section 2050 et. seq.) prohibits take of State-listed threatened and endangered species without a CDFW incidental take permit. Take under CESA is restricted to direct harm of a listed species and does not include indirect harm by way of habitat modification.

Protection of fully protected species is described in Fish and Game Code Sections 3511, 4700, 5050 and 5515. These statutes prohibit take or possession of fully protected species. Incidental take of fully protected species may be authorized under an approved NCCP.

California Fish and Game Code Sections 3503, 3503.5 and 3511

California Fish and Game Code (CFGC) sections 3503, 3503.5 and 3511 describe unlawful take, possession, or destruction of birds, nests, and eggs. Fully protected birds (CFGC Section 3511) may not be taken or possessed except under specific permit. Section 3503.5 protects all birds-of-prey and their eggs and nests against take, possession, or destruction of nests or eggs.

California Fish and Game Code Sections 1360-1372

Sections 1360 through 1372 of the CFGC comprise the Oak Woodlands Conservation Act. The act was enacted to protect oak woodland habitats that were being diminished by development, firewood harvesting, and agricultural conversions. The Oak Woodlands Conservation Program was established because of the Act and is intended to provide project funding opportunities for private landowners, conservation organizations, and cities and counties to conserve and restore oak woodlands. The program authorizes the Wildlife Conservation Board to purchase oak woodland conservation easements and provide grants for land improvements and oak restoration efforts. CEQA (PRC Section 21083.4) requires counties to determine if a project within their jurisdiction may result in conversion of oak woodlands that would have a significant adverse effect on the environment. If the lead agency determines that a project would result in a significant adverse effect on oak woodlands, mitigation measures to reduce the significant adverse effect of converting oak woodlands to other land uses are required.

Native Plant Protection Act

CDFW also has authority to administer the Native Plant Protection Act (NPPA) (CFGC Section 1900 et seq.). The NPPA requires the CDFW to establish criteria for determining if a species, subspecies, or variety of native plant is endangered or rare. Under Section 1913(c) the NPPA (CFGC Section

1913(c), the owner of land where a rare or endangered native plant is growing is required to notify the department at least 10 days in advance of changing the land use to allow for salvage of the plant(s).

Section 1600 et seq. of the California Fish and Game Code

Section 1600 et seq. of the CFGC prohibits, without prior notification to CDFW, the substantial diversion or obstruction of the natural flow of, or substantial change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. For these activities to occur, the CDFW must receive written notification regarding the activity in the manner prescribed by the department and may require a lake or streambed alteration agreement. Lakes, ponds, perennial, and intermittent streams and associated riparian vegetation, when present, are subject to this regulation.

Natural Community Conservation Planning Act

The Natural Communities Conservation Planning (NCCP) Act was established by the California Legislature, is directed by the CDFW, and is implemented by the state, as well as public and private partnerships to protect habitat in California. The NCCP Act takes a regional approach to preserving habitat. An NCCP identifies and provides for the regional protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity. Once an NCCP has been approved, CDFW may provide take authorization for all covered species, including fully protected species, Section 2835 of the CFGC.

Porter-Cologne Water Quality Control Act

The State Water Resources Control Board (SWRCB) and each of nine local RWQCB has jurisdiction over “waters of the State” pursuant to the Porter-Cologne Water Quality Control Act which are defined as any surface water or groundwater, including saline waters, within the boundaries of the State. SWRCB adopted a State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (Procedures), for inclusion in the forthcoming Water Quality Control Plan for Inland Surface Waters and Enclosed Bays and Estuaries and Ocean Waters of California (SWRCB 2021). The Procedures consist of four major elements: 1) a wetland definition; 2) a framework for determining if a feature that meets the wetland definition is a water of the state; 3) wetland delineation procedures; and 4) procedures for the submittal, review, and approval of applications for Water Quality Certifications and Waste Discharge Requirements for dredge or fill activities (SWRCB 2021).

California Department of Transportation - California Streets and Highways Code Section 156.3

Assessments and remediation of potential barriers to fish passage for transportation projects using State or federal transportation funds are required. Such assessments must be conducted for any projects that involve stream crossings or other alterations and must be submitted to the CDFW. New projects must be constructed so that they do not present a barrier to fish passage

c. Local Laws, Regulations, and Policies

General Plans typically contain elements which address protection of biological resources. Typically, these elements consist of goals, policies and actions that protect natural resources, such as environmentally sensitive habitats, special-status species, native trees, creeks, wetland, and riparian habitats. Local jurisdictions approve development if it is consistent with those elements of the General Plan.

Some resources are afforded protection via local ordinances such as those that protect trees, riparian corridors, and environmentally sensitive habitats. Tulare County and many cities in the TCAG region have municipal codes which protect natural resources and addresses compliance with environmental regulations. For example, local ordinances and policies may be in place that protect native and non-native trees in urban landscapes, as well as in unincorporated county lands. These ordinances and policies vary in their definitions of protected trees (e.g., certain species, minimum diameter at breast height [dbh], trees that form riparian corridors or a combination thereof) and in the requirements for ordinance or policy compliance. In addition, the County and cities may have local ordinances or policies that are intended to protect other biological resources such as wetlands and drainages, riparian habitat, and other sensitive habitat areas.

Tulare County General Plan 2030 Update

The Tulare County General Plan 2030 Update includes policies for the protection of biological resources in Tulare County (Tulare County 2010). The goals and policies of the Environmental Resources Management Chapter of Tulare County General Plan are aimed at protecting and conserving listed species and their habitat, critical habitat, as well as environmentally sensitive areas including riparian areas and wetlands. In addition, the County's General Plan includes Policy ERM-1.16 which requires the County to cooperate with State and federal wildlife agencies to address linkages between habitat areas and provide movement opportunities for wildlife.

City General Plans and Regulations

The City of Visalia has numerous goals and policies related to biological resources in the General Plan, especially in the Biological Resources section of the Open Space and Conservation element which covers special-status resources such as riparian corridors, wetlands, and special-status species (City of Visalia 2014). The Open Space and Conservation Element focuses on Objective OSC-O-10 to protect and enhance natural vegetation throughout the city, especially those considered sensitive by CDFW. This objective is implemented by Policies such as OSC-P-27 (No net loss for sensitive habitat), OSC-P-28 (valley oak woodland protection and conservation), OSC-P-30 (require biological resources assessments for development projects) and OSC-P-31 (protect habitat for special-status species). The Visalia Municipal Code contains oak tree preservation requirements in Chapter 12.24, and requirements for the care, preservation, pruning, replanting, or removal of street trees in Chapter 12.20.

The City of Tulare contains a Biological Resources section of the Open Spaces and Conservation element of its 2035 General Plan, including several goals and policies related to the protection of biological resources and sensitive habitats within the city (City of Tulare 2014). Goal COS-2 is focused on preserving and protecting sensitive significant habitats, enhancing biodiversity, and promoting healthy ecosystems throughout the urban development boundary for the City of Tulare. Implementation Policies include COS-P2.1 (protection of rare and endangered species), COS-P2.2 (protection of natural areas), COS-P2.3 (protection of environmentally sensitive areas), and COS-

P2.7 (valley oaks preservation). The Tulare City Code has numerous regulations and ordinances related to biological resources, including Chapter 8.32 to protect street trees and designate heritage trees throughout the city for preservation.

Many cities in the TCAG Region, such as Porterville and Exeter, have similar provisions, goals, policies, and regulations in their General Plans and municipal ordinances.

4.4.3 Impact Analysis

a. Methodology and Significance Thresholds

Appendix G of the State CEQA Guidelines identifies the following criteria for determining whether a project would have any significant impacts to biological resources:

1. 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;
2. 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 U.S. Fish and Wildlife Service;
3. Have a substantial adverse effect on state and 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;
4. 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;
5. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; and/or
6. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Data on biological resources were collected from numerous sources, including relevant literature, aerial photographs, maps of natural resources, and data on special-status species and sensitive habitat information obtained from the CDFW CNDDB (2021a), CDFW BIOS (2021b), CWHR (CDFW 2014), CNPS online *Inventory of Rare and Endangered Plants of California* (2021), and the USFWS IPaC (2021b). The USFWS NWI (2021a) and Critical Habitat Mapper (2021c) were also queried. Potential areas of disturbance associated with construction projects or land use development as discussed in the proposed 2022 RTP/SCS, were compared to the identified biological resource occurrences to determine whether an impact may occur.

b. Project Impacts and Mitigation Measures

The following section discusses l impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. Table 4.4-2 summarizes the impacts associated with capital improvement projects in the proposed 2022 RTP/SCS. Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time. In general, however, implementation of proposed transportation projects and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1:	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 Wildlife or U.S. Fish and Wildlife Service

Impact BIO-1 IMPLEMENTATION OF TRANSPORTATION PROJECTS AND THE LAND USE SCENARIO ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD HAVE A SUBSTANTIAL ADVERSE EFFECT, EITHER DIRECTLY OR THROUGH HABITAT MODIFICATIONS, ON 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 WILDLIFE OR U.S. FISH AND WILDLIFE SERVICE. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.

For the purposes of this analysis, special-status plant and wildlife species include those designations described under 4.4.1.d above. Most of the transportation projects proposed under the proposed 2022 RTP/SCS consist of expansions or modifications of existing facilities that would likely not involve construction in habitats for candidate, sensitive, or special-status species. However, several projects could affect areas occupied by special-status plant and wildlife species. The projects that could impact such species are listed in Table 4.4-2 below. As mentioned above, there are 166 special-status species known to occur or with potential to occur within Tulare County. Forty-one (41) of these species are given high levels of protection by the federal government through listing under ESA or by the State government through listing under CESA or designation of Fully Protected status (wildlife only). The remaining species show in Tables B-1 and B-2 in Appendix B are protected through CEQA and/or through local ordinances. Most special-status species have very limited ranges within the County and are associated with sensitive habitats, such as riparian habitats and drainages.

Because of the programmatic nature of the 2022 RTP/SCS EIR, a precise, project-level analysis of the specific impacts of individual transportation projects on special-status species is not possible. As future transportation system improvement projects identified in the proposed 2022 RTP/SCS are planned and designed, site-specific environmental review will be conducted by the agencies responsible for implementing such projects. Nevertheless, some special-status species would experience substantial adverse effects affected at the locations where projects under the proposed 2022 RTP/SCS would occur, significant impacts would therefore occur.

For example, transportation projects such as those that occur over or in the vicinity of rivers and creeks are within suitable habitat for species such as California red-legged frog (Federally Threatened and State SSC) and Little Kern golden trout (Federally Threatened). Bridge replacement sites proposed under proposed 2022 RTP/SCS may contain potentially suitable habitat for California red-legged frog and Little Kern golden trout. Many of the creeks and rivers found within the County are considered accessible by steelhead and currently support or have historically supported steelhead populations (USFWS 2021c).

In addition to the rivers and creeks that may be impacted, future transportation projects under the proposed 2022 RTP/SCS could impact upland habitats and the sensitive species that may occupy them. For example, coast horned lizards (*Phrynosoma blainvillii*), a State SSC, may be present in scrub, grassland, and some woodland habitats in the western portion of the TCAG region near roads where projects could occur. The federally threatened and state threatened California tiger salamander can also occupy annual grassland habitats containing small mammal burrows if such habitat is within 1.24 miles (the dispersal distance of the species) of known or potentially suitable breeding habitat. Several special-status bat species may be affected by proposed projects where they occur under bridges or similar structures, or in native habitat adjacent to construction areas. Furthermore, the wide variety of habitats within the proposed2022 RTP/SCS area can support many species of nesting birds, including sensitive species such as the State Fully Protected white-tailed kite (*Elanus luecurus*) and the State SSC burrowing owl (*Athene cunicularia*). Disturbance of special-status plants could result in reductions in local population size, habitat fragmentation, or lower reproductive success.

Direct impacts to special-status species include injury or mortality occurring during implementation of projects under the proposed 2022 RTP/SCS. Direct impacts also include habitat modification and loss such that it results in the mortality or otherwise alters the foraging and breeding behavior substantially enough to cause injury. Indirect impacts could occur due to the spread of invasive non-native species that out-compete native species and/or alter habitat towards a state that is unsuitable for special-status species. For example, the spread of certain weed species can reduce the biodiversity of native habitats, potentially eliminating special-status plant species and reduce the availability of suitable forage and breeding sites for special-status wildlife species. Indirect impacts could also result due to increased access by humans and domestic animals, particularly in areas where trails may be planned. Increased human and domestic animal (especially dogs and cat) presence foster the spread of non-native invasive plant species and disrupt the normal behaviors of animal species.

In addition to direct and indirect impacts that may result from transportation improvement projects, the proposed 2022 RTP/SCS also contains a future land use scenario that emphasizes infill development and transit-oriented development (TOD). This land use scenario focuses future development concentrated in existing urbanized areas, which would minimize impacts to biological resources in non-urbanized areas, but also includes some development in outlying areas. It is possible that sensitive plant and animal species would be located on future infill and TOD sites, as well as more undeveloped project sites. As a result, future development projects would impact special-status plant and animal species that may be present on or in proximity to undeveloped areas. Many special-status animal species are associated with creeks even in the most densely developed urban areas. Both native and non-native trees and shrubs throughout urban areas may support nesting birds. Impacts of land use projects would be significant because substantial adverse effects on special-status species would occur. The following mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under TCAG jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures for applicable transportation projects that would result in biological impacts. The County and cities in the TCAG region can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions.

BIO-1(a) Biological Resources Screening and Assessment

The implementing agencies shall, or can and should, implement the following measures during CEQA review of projects implementing the proposed 2022 RTP/SCS. On a project-by-project basis, a preliminary biological resource screening shall be performed to determine whether the project has any potential to impact biological resources. If it is determined that the project has no potential to impact biological resources, no further action is required. If the project would have the potential to impact biological resources, prior to construction, a qualified biologist shall conduct a biological resources assessment (BRA) or similar type of study to document the existing biological resources within the project footprint plus an appropriate buffer determined by a qualified biologist and to determine the potential impacts to those resources. The BRA shall evaluate the potential for impacts to all sensitive biological resources including, but not limited to special-status species, nesting birds, wildlife movement, sensitive plant communities/critical habitat and other resources judged to be sensitive by local, state, and/or federal agencies. Pending the results of the BRA, design alterations, further technical studies (i.e., protocol surveys) and/or consultations with the USFWS, CDFW and/or other local, state, and federal agencies may be required. The following Mitigation Measures [BIO-1(b) through BIO-1(i)] shall be incorporated, only as applicable, into the BRA and/or the project CEQA document for projects where specific resources are present, or may be present, and may be impacted by the project. Note that specific surveys described in the mitigation measures below may be completed as part of the BRA where suitable habitat is present.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during project permitting and environmental review.

BIO1(b) Special-Status Plant Species Surveys

If completion of the project-specific BRA determines that special-status plant species have potential to occur on-site, the implementing agency shall contract a qualified biologist to complete surveys for special-status plants prior to any vegetation removal, grubbing, or other construction activity of each project (including staging and mobilization). The surveys shall be floristic in nature and shall be seasonally timed to coincide with the target species identified in the project-specific BRA. Whenever practicable, surveys shall be conducted in accordance with the most current protocols established by the CDFW, USFWS, and the local jurisdictions if said protocols exist. A report of the survey results shall be submitted to the implementing agency for review. If special-status plant species are identified, mitigation measure BIO-1(c) shall apply.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during project permitting and environmental review, prior to project construction but no earlier than one year before construction commences.

BIO-1(c) Special-Status Plant Species Avoidance, Minimization, and Mitigation

If state or federally listed and/or CRPR 1 and 2 species are found during special-status plant surveys [pursuant to mitigation measure BIO-1(b)], then the implementing agency shall redesign the project to avoid impacting these plant species to the maximum extent feasible. Occurrences of these species that are not within the immediate disturbance footprint but are located within 50 feet of disturbance limits shall have bright orange protective fencing installed at least 30 feet beyond their extent, or other distance as approved by a qualified biologist, to protect them from harm. If CRPR 3 and 4 species are found, the qualified biologist contracted to conduct the plant surveys [pursuant to mitigation measure BIO-1(b)] shall evaluate to determine if they meet criteria to be considered special-status, and if so, the same process as identified for CRPR 1 and 2 species shall apply.

If special-status plants species cannot be avoided and would be impacted by a project implemented under the proposed 2022 RTP/SCS, the implementing agency shall require all impacts shall be mitigated at an appropriate ratio to fully offset project impacts, as determined by a qualified biologist for each species as a component of habitat restoration. A restoration plan shall be prepared and submitted to the implementing agency.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be implemented prior to issuance of project construction permits and approvals.

BIO-1(d) Endangered/Threatened Animal Species Habitat Assessment and Protocol Surveys

If the results of the BRA determine that suitable habitat may be present for federally and/or state endangered or threatened animal species, the implementing agency shall require habitat assessments/surveys. Whenever practicable the surveys shall be completed in accordance with CDFW and/or USFWS/NMFS protocols prior to issuance of any construction permits/project approvals.

Alternatively, in lieu of conducting protocol surveys, the implementing agency may choose to assume presence within the project footprint and proceed with development of appropriate avoidance measures, consultation, and permitting, as applicable.

If the target species is detected during protocol surveys, or protocol surveys are not conducted and presence assumed based on suitable habitat, mitigation measure BIO-1(e) shall apply.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be implemented prior to issuance of project construction permits and approvals.

BIO-1(e) Endangered/Threatened Animal Species Avoidance and Compensatory Mitigation

If habitat is occupied or presumed occupied by federal and/or state listed species and would be impacted by the project, the implementing agency shall redesign the project in coordination with a qualified biologist to avoid impacting occupied/presumed occupied habitat to the extent feasible. If occupied or presumed occupied habitat cannot be avoided, the implementing agency shall estimate the total acreages for habitat that would be impacted prior to the issuance of construction permits/approvals.

Compensatory mitigation shall be achieved through purchase of credits at a USFWS, NMFS and/or CDFW approved conservation bank if available for the affected species, and/or through providing compensatory mitigation to offset impacts to federal and/or state listed species habitat.

Compensatory mitigation shall be provided at an appropriate ratio to fully offset project impacts, as determined by a qualified biologist for permanent impacts. Compensatory mitigation may be combined/nested with special-status plant species and sensitive community restoration where applicable. Temporary impact areas shall be restored to pre-project conditions.

If on and/or off-site compensatory mitigation sites are identified, the implementing agency shall retain a qualified biologist to prepare a Habitat Mitigation and Monitoring Plan (HMMP) to ensure the success of compensatory mitigation sites that are to be conserved for compensation of permanent impacts to federal and/or state listed species. The HMMP shall identify long term site management needs, routine monitoring techniques, techniques, and success criteria, and shall determine if the conservation site has restoration needs to function as a suitable mitigation site. If restoration is required on the conservation site, the HMMP shall contain the restoration components outlined under the Restoration Plan listed in measure BIO-1(c). The HMMP shall be submitted to the implementing agency.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be implemented prior to issuance of project construction permits and approvals.

BIO-1(f) Endangered/Threatened Species Avoidance and Minimization During Construction

The implementing agency shall apply the following measures to aquatic and terrestrial species, where appropriate. Implementing agencies shall select from these measures as appropriate depending on site conditions, the species with potential for occurrence and the results of the biological resources screening and assessment (measure BIO-1[a]).

- Preconstruction surveys for federal and/or state listed species with potential to occur shall be conducted where suitable habitat is present by a qualified biologist not more than 48 hours prior to the start of construction activities. The survey area shall include the proposed disturbance area and all proposed ingress/egress routes, plus a 100-foot buffer. If any life stage of federal and/or state listed species is found within the survey area, the qualified biologist shall recommend an appropriate course of action, which may include consultation with USFWS, NMFS and/or CDFW. The results of the pre-construction surveys shall be submitted to the implementing agency for review and approval prior to start of construction.
- Ground disturbance shall be limited to the minimum necessary to complete the project. The project limits of disturbance shall be flagged. Areas of special biological concern shall have highly visible orange construction fencing.
- All projects occurring within/adjacent to aquatic habitats (including riparian habitats and wetlands) shall be completed between April 1 and October 31, to avoid impacts to sensitive aquatic species.
- All projects occurring within or adjacent to sensitive habitats that may support federally and/or state endangered/threatened species shall have a qualified biologist present during all initial ground disturbing/vegetation clearing activities. Once initial ground disturbing/vegetation clearing activities have been completed, said biologist shall conduct daily pre-activity clearance surveys for endangered/threatened species. Alternatively, and upon approval of the CDFW and/or USFWS/NMFS or as outlined in project permits, said biologist may conduct site

inspections at a minimum of once per week to ensure all prescribed avoidance and minimization measures are begin fully implemented.

- No endangered/threatened species shall be captured and relocated without authorization from the CDFW and/or USFWS.
- If pumps are used for dewatering activities, all intakes shall be completely screened with wire mesh not larger than five millimeters to prevent animals from entering the pump system.
- If at any time during construction of the project an endangered/threatened species enters the construction site or otherwise may be impacted by the project, all project activities shall cease. At that point, a qualified biologist shall recommend an appropriate course of action, which may include consultation with USFWS, NMFS and/or CDFW.
- All vehicle maintenance/fueling/staging shall occur not less than 100 feet from any riparian habitat or water body. Suitable containment procedures shall be implemented to prevent spills.
- No equipment shall be permitted to enter wetted portions of any affected drainage channel.
- All equipment operating within streambeds (restricted to conditions in which water is not present) shall be in good conditions and free of leaks. Spill containment shall be installed under all equipment staged within stream areas and extra spill containment and clean up materials shall be located in close proximity for easy access.
- At the end of each workday, excavations shall be secured with cover or a ramp shall be provided to prevent wildlife entrapment.
- All trenches, pipes, culverts, or similar structures shall be inspected for animals prior to burying, capping, moving, or filling.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be implemented prior to and ongoing through project construction.

BIO-1(g) Non-Listed Special-status Animal Species Avoidance and Minimization

Depending on the species identified in the BRA, the implementing agency shall select from among the following to reduce the potential for impacts to non-listed special-status animal species:

- Preconstruction clearance surveys shall be conducted within 14 days prior to the start of construction (including staging and mobilization). The surveys shall cover the entire disturbance footprint plus a minimum 100-foot buffer and shall identify all special-status animal species that may occur on-site. All non-listed special-status species shall be relocated from the site either through direct capture or through passive exclusion. A report of the preconstruction survey shall be submitted to the implementing agency for their review and approval prior to the start of construction.
- A qualified biologist shall be present during all initial ground disturbing activities, including vegetation removal, to recover special-status animal species unearthed by construction activities.
- Upon completion of the project, a qualified biologist shall prepare a final compliance report documenting all compliance activities implemented for the project, including the preconstruction survey results.

- If special-status bat species may be present and impacted by the project, within 30 days of the start of construction a qualified biologist shall conduct presence/absence surveys for special-status bats, in consultation with the CDFW, where suitable roosting habitat is present. Surveys shall be conducted using acoustic detectors and by searching tree cavities, crevices, and other areas where bats may roost. If active bat roosts or colonies are present, the biologist shall evaluate the type of roost to determine the next step.
  - If a maternity colony is present, all construction activities shall be postponed within a 250-foot buffer around the maternity colony until it is determined by a qualified biologist that the young have dispersed or as recommended by CDFW through consultation. Once it has been determined that the roost is clear of bats, the roost shall be removed immediately.
  - If a roost is determined by a qualified biologist to be used by a large number of bats (large hibernaculum), alternative roosts, such as bat boxes if appropriate for the species, shall be designed and installed near the project site. The number and size of alternative roosts installed will depend on the size of the hibernaculum and shall be determined through consultations with the CDFW.
  - If other active roosts are located, exclusion devices such as valves, sheeting or flap-style one-way devices that allow bats to exit but not re-enter roosts discourage bats from occupying the site.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be implemented prior to, during, and after project construction.

BIO-1(h) Preconstruction Surveys for Nesting Birds

The implementing agencies shall, or can and should, implement the following measures during CEQA review of projects implementing the proposed 2022 RTP/SCS. For construction activities occurring during the nesting season (generally February 1 to September 15), surveys for nesting birds covered by the CFGC, the MBTA, and Bald and Golden Eagle Protection Act shall be conducted by a qualified biologist no more than 10 days prior to vegetation removal activities.

A qualified biologist shall conduct preconstruction surveys for raptors. The survey for the presence of bald and golden eagles shall cover all areas within of the disturbance footprint plus a one-mile buffer where access can be secured. The survey area for all other nesting bird and raptor species shall include the disturbance footprint plus a 300-foot and 500-foot buffer, respectively.

If active nests (nests with eggs or chicks) are located, the qualified biologist shall establish an appropriate avoidance buffer based on the species biology and the current and anticipated disturbance levels occurring in vicinity of the nest. All buffers shall be marked using high visibility flagging or fencing, and, unless approved by the qualified biologist, no construction activities shall be allowed within the buffers until the qualified biologist has verified that young have fledged from the nest, or the nest fails.

For bald or golden eagle nests identified during the preconstruction surveys, an avoidance buffer of up to one mile shall be established on a case-by-case basis in consultation with the USFWS and CDFW. The size of the buffer may be influenced by the existing conditions and disturbance regime, relevant landscape characteristics, and the nature, timing, and duration of the expected disturbance. The buffer shall be established between February 1 and September 15; however, buffers may be relaxed earlier than September 15 if a qualified ornithologist determines that a given nest has failed or that all surviving chicks have fledged, and the nest is no longer in use.

A report of these preconstruction nesting bird surveys and nest monitoring (if applicable) shall be submitted to the implementing agency for review and approval prior to the start of construction.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be implemented once prior to commencement of project construct and then during construction activities if needed.

BIO-1(i) Worker Environmental Awareness Program (WEAP)

The implementing agencies shall, or can and should, implement the following measures during CEQA review of projects implementing the proposed 2022 RTP/SCS. Prior to initiation of construction activities (including staging and mobilization), all personnel associated with project construction shall attend WEAP training, conducted by a qualified biologist retained by the implementing agency, to aid workers in recognizing special-status resources and review of the limits of construction and mitigation measures required. A fact sheet conveying this information shall also be prepared for distribution to all contractors, their employers, and other personnel involved with construction of the project. All employees shall sign a form documenting that they have attended the WEAP and understand the information presented to them.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during project permitting and environmental review.

Significance After Mitigation

Compliance with the above mitigation measures would reduce impacts to special-status species and their habitat because the mitigation measures require pre-project surveys and biological monitoring, focused biological surveys, avoidance or minimization of project related disturbance or loss of special-status species, compensation for disturbed or loss of special-status species habitat and coordination with permitting agencies, as required prior to project implementation. However, it cannot be guaranteed that all future project level impacts to special-status species can be mitigated to a less than significant level for all species. Additionally, complete avoidance is the only mitigation for fully protected species, which may not be feasible under some circumstances. There are no other feasible mitigation measures. Therefore, impacts would remain significant and unavoidable.

Threshold 2:	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service
Threshold 3:	Have a substantial adverse effect on state or federally protected wetlands (including but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means

Impact BIO-2 IMPLEMENTATION OF TRANSPORTATION PROJECTS AND THE LAND USE SCENARIO ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD RESULT IN SUBSTANTIAL ADVERSE IMPACTS ON SENSITIVE HABITATS, INCLUDING SENSITIVE NATURAL COMMUNITIES, AND STATE AND FEDERALLY PROTECTED WETLANDS. THIS IMPACT WOULD BE SIGNIFICANT AND UNAVOIDABLE.

Transportation projects and land use development that may be implemented under the proposed 2022 RTP/SCS have the potential to impact sensitive habitats, including sensitive natural communities and wetlands as mapped on Figure 4.4-1 and Figure 4.4-2. Due to the programmatic nature of this analysis, the project-specific extent and severity of the impacts is not known at this time. Some examples of potential impacts include culvert improvements or construction and bridge improvements over rivers and creeks, including the Kaweah and Tule Rivers, and Outside, Lewis, Deer, and Packwood Creeks. These types of projects would have potential to impact riparian areas, as well as water bodies. In addition, projects such as multiuse trails and bike paths may also involve development along riparian corridors or construction of bridges across rivers and creeks. Riparian areas provide wildlife habitat and movement corridors, enabling both terrestrial and aquatic organisms to move along river systems between areas of suitable habitat. Construction of the proposed facilities could have both direct impacts associated with the disturbance of riparian flora and fauna and indirect impacts caused by increased erosion and sedimentation, which can adversely affect downstream water quality. Construction could also impact aquatic features protected by CDFW and require a Lake and Streambed Alteration Agreement. These features include rivers, streams, and lakes, including the banks of these features.

In addition, other sensitive habitats, including oak woodlands, could occur at locations of transportation improvement projects and land use development sites. As noted in Section 4.4.1.c, vegetation Alliances with State ranks of S1-S3 are considered imperiled and thus, potentially of special concern and sensitive (CDFW 2020). Impacts to these sensitive communities, including oak woodlands, would be significant.

Direct impacts to sensitive habitats include loss of habitat during construction of individual projects. Indirect impacts include habitat degradation caused by the introduction of invasive plant species incidentally from construction equipment and through selection of invasive landscape plants, as well as erosion of disturbed areas.

The future land use scenario envisioned by the proposed 2022 RTP/SCS would emphasize development within existing urbanized areas, although some development would occur in more undisturbed outlying areas. As a result, future infill and TOD projects are likely to result in only limited impacts riparian habitat or sensitive habitat, though areas that have been relatively free of ground disturbance may contain sensitive native habitats such as vernal pools, oak woodlands, valley sink or saltbush scrub, or other vegetation alliances and associations that are deemed sensitive by the CDFW. Furthermore, some areas mapped by CWHR as somewhat disturbed habitats, such as annual grasslands, may at the local scale include sensitive native vegetation with unique assemblages of native plants, such as areas dominated by native wildflowers, vernal pools, and native grasslands. Impacts would be significant.

In conclusion, implementation of the proposed 2022 RTP/SCS would have substantial adverse impacts on sensitive habitats, including State and federally protected wetlands, and this impact is therefore significant. The following mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under TCAG jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures for applicable transportation projects identified in Table 4.4-2. The County and cities in the TCAG region can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions.

BIO-2(a) Aquatic Resources Jurisdictional Delineation and Impact Avoidance

The implementing agencies shall, or can and should, implement the following measures during CEQA review of projects implementing the proposed 2022 RTP/SCS. If the results of measure BIO-1(a) indicates projects implemented under the proposed 2022 RTP/SCS occur within or adjacent to wetland, drainages, riparian habitats, or other areas that may fall under the jurisdiction of the CDFW, USACE, and/or RWQCB, a qualified biologist shall complete an aquatic resources delineation in accordance with the requirement set forth by each agency. The result shall be submitted to the implementing agency, USACE, RWQCB, and/or CDFW, as appropriate, for review and approval, and the project shall be designed to avoid and minimize impacts to jurisdictional areas to the extent feasible. The delineation shall serve as the basis to identify potentially jurisdictional areas to be protected during construction, through implementation of the avoidance and minimization identified in measure BIO-2(f).

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during project permitting and environmental review.

BIO-2(b) Wetland, Drainages, and Riparian Habitat Restoration

The implementing agencies shall, or can and should, implement the following measures during CEQA review of projects implementing the proposed 2022 RTP/SCS. Unavoidable impacts to jurisdictional wetlands, drainages, and riparian habitat shall be mitigated at an appropriate ratio to fully offset project impacts, as determined by a qualified biologist retained by the implementing agency and shall occur on-site or as close to the impacted habitat as possible. A mitigation and monitoring plan consistent with regulatory agency requirements shall be developed by a qualified biologist and submittal to the regulatory agency overseeing the project for approval. Alternatively, mitigation shall be accomplished through purchase of credits from an approved wetlands mitigation bank.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during project permitting and environmental review.

BIO-2(c) Landscaping Plan

If landscaping is proposed for a specific project, a qualified biologist/landscape architect retained by the implementing agency shall prepare a landscape plan. Drought tolerant, locally native plant species shall be used. Noxious, invasive and/or non-native plant species that are recognized on the Federal Noxious Weed List, California Noxious Weeds List and/or California Invasive Plant Council Inventory shall not be permitted. Species selected for planting shall be regionally appropriate native species that are known to occur in the adjacent native habitat types.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during project permitting and environmental review.

BIO-2(d) Sensitive Natural Community Avoidance and Mitigation

If the results of measure BIO-1(a) indicates projects implemented under the proposed 2022 RTP/SCS would impact sensitive natural communities, the implementing agency shall avoid impacts to sensitive natural communities through final project design modifications if feasible.

If the implementing agency determines that sensitive natural communities cannot be avoided, impacts shall be mitigated on-site or offsite at an appropriate ratio to fully offset project impacts, as determined by a qualified biologist based on any applicable resource agency guidelines. Temporarily impacted areas shall be restored to pre-project conditions. A Restoration Plan shall be developed by a qualified biologist and submitted to the implementing agency.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during project permitting and environmental review.

BIO-2(e) Invasive Weed Prevention and Management Program

Prior to start of construction for each project that occurs within or adjacent to native habitats, an Invasive Weed Prevention and Management Program shall be developed by a qualified biologist retained by the implementing agency to prevent invasion of native habitat by non-native plant species. The plan shall be submitted to the implementing agency for review and approval. A list of target species shall be included, along with measures for early detection and eradication.

The plan, which shall be implemented by the implementing agency, shall also include, but not be limited to, the following measures to prevent the introduction of invasive weed species:

- During construction, limit the use of imported soils for fill. If the use of imported fill material is necessary, the imported material must be obtained from a source that is known to be free of invasive plant species.

- To minimize colonization of disturbed areas and the spread of invasive species, the contractor shall stockpile topsoil and redeposit the stockpiled soil after construction or transport the topsoil to a permitted landfill for disposal.
- All erosion control materials, including straw bales, straw wattles, or mulch used on-site must be free of invasive species seed.
- Exotic and invasive plant species shall be excluded from any erosion control seed mixes and/or landscaping plant palettes associated with the proposed project
- All disturbed areas shall be hydroseeded with a mix of locally native species upon completion of work in those areas.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during project permitting and environmental review, and implemented prior to project construction and during construction activities.

BIO-2(f) Wetlands, Drainages, and Riparian Habitat Best Management Practices During Construction

The following best management practices shall be required by the implementing agency for development within or adjacent to wetlands, drainages, or riparian habitat:

- Access routes, staging and construction areas shall be limited to the minimum area necessary to achieve the project goal and minimize impacts to other waters including locating access routes and ancillary construction areas outside of jurisdictional areas.
- To control sedimentation during and after project implementation, appropriate erosion control materials shall be deployed to minimize adverse effects on jurisdictional areas in the vicinity of the project.
- Project activities within the jurisdictional areas should occur during the dry season (typically between June 1 and November 1) in any given year, or as otherwise directed by the regulatory agencies.
- During construction, no litter or construction debris shall be placed within jurisdictional areas. All such debris and waste shall be picked up daily and properly disposed of at an appropriate site.
- Raw cement, concrete, or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances which could be hazardous to aquatic species resulting from project related activities, shall be prevented from contaminating the soil and/or entering wetlands, drainages, or riparian habitat.
- All refueling, maintenance and staging of equipment and vehicles shall occur at least 100 feet from bodies of water and in a location where a potential spill would not drain directly toward aquatic habitat (e.g., on a slope that drains away from the water source). Prior to the onset of work activities, a plan must be in place for prompt and effective response to any accidental spills.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during project permitting and environmental review, and implemented prior to project construction and during construction activities.

Significance After Mitigation

Compliance with the above mitigation measures would reduce impacts to sensitive communities and wetlands because the mitigation measures require focused biological surveys, best management practices for avoidance or minimization impacts, compensation for disturbed or loss of sensitive communities and wetlands and coordination with permitting agencies, as required prior to project implementation. However, it cannot be guaranteed that all future project level impacts can be mitigated to a less than significant level for all sensitive habitats. There are no other feasible mitigation measures. As such, impacts would remain significant and unavoidable.

Threshold 4:	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

Impact BIO-3 IMPLEMENTATION OF TRANSPORTATION PROJECTS AND THE LAND USE SCENARIO ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD 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. THIS IMPACT WOULD BE SIGNIFICANT AND UNAVOIDABLE.

As discussed above in Section 4.4.1, *Setting*, the TCAG region contains four mapped ECAs (CDFW 2021b). These areas are composed primarily of wildlands located within the eastern portion of the TCAG region, but also include some agricultural and developed areas (mostly rural residential) and some are bisected by major roadways. As such, several transportation projects in the proposed 2022 RTP/SCS may overlap with areas of mapped ECAs or other locally important wildlife movement corridors including rivers and watercourses within the region.

Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts of individual transportation projects on wildlife movement and nurseries is not possible. Transportation projects in the proposed 2022 RTP/SCS primarily involve expansion of existing facilities in urbanized or already developed areas, rather than the construction of new or extension of existing infrastructure into undeveloped portions of the TCAG region. However, expansion of existing roadways can decrease connectivity as widening of roads creates a larger barrier and make movement more difficult, especially if roadways prior to widening and expansion were narrow enough and traffic volumes low enough that movement was still possible. Construction of new roadways and crossings (across rivers and drainages) would introduce new potential barriers to movement. In addition to the roadways themselves, transportation improvement projects could include new segments of fencing or walls that that could hinder wildlife movement. Temporary disruption of wildlife movement could also occur during construction if temporary water diversions are required for projects located within creeks and rivers. For example, temporary water diversions may impact movement of native and migratory fish species, such as the Kern River rainbow trout and Little Kern golden trout. Likewise, improperly designed culverts beneath roadways can impede fish migration. In addition, construction activity and noise could also temporarily alter the behavior wildlife in the area and therefore temporarily disrupt wildlife movement patterns.

New roadways, bike paths, and trails would also increase human activity in areas where sensitive biological resources could occur and have the potential to indirectly disrupt behavior of animals which could in turn disrupt wildlife movement patterns. In particular, proposed bridge, trail and bikeway and new road construction projects could increase human activity (and domestic animals) in the vicinity of riparian areas, wildlife nurseries or corridors and potentially sensitive habitats. Increased noise and human presence during construction, as well as increased trash which may attract predators to the project site and discourage wildlife use of surrounding natural habitat. Indirect impacts include invasion of natural habitats by non-native species and increased presence of humans and domestic animals over the long-term. In addition, transportation improvement projects could include new segments of fencing or walls that that could hinder wildlife movement.

The future land use scenario envisioned by the proposed 2022 RTP/SCS would encourage infill and TOD within existing urbanized areas. Most of the future infill and TOD projects would likely be in areas that provide limited or no wildlife movement, although some development would occur in more undisturbed outlying areas. However, even the elimination of limited wildlife movement opportunities could further isolate areas of native habitat occupied by both sensitive and common native wildlife species.

As noted in Section 4.4.2, the County of Tulare and several city general plans include policies that require projects within the region to be designed to maintain wildlife movement and habitat connectivity. Impacts related to transportation projects as identified in Table 4.4-2 and impacts related to the future land use scenario envisioned by the proposed 2022 RTP/SCS would be significant. The following mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under TCAG jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures for applicable transportation projects. The County and cities in the TCAG region can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions.

BIO-3(a) Project Design for Wildlife Connectivity

The implementing agency shall implement the following measures. All projects including long segments of fencing and lighting shall be designed to minimize impacts to wildlife. Where fencing or other project components is required for public safety concerns, these project components shall be designed to permit wildlife movement by incorporating design features such as:

- A minimum 16 inches between the ground and the bottom of the fence to provide clearance for small animals;
- A minimum 12 inches between the top two wires, or top the fence with a wooden rail, mesh, or chain link instead of wire to prevent animals from becoming entangled;
- If privacy fencing is required near open space areas, openings at the bottom of the fence measure at least 16 inches in diameter shall be installed at reasonable intervals to allow wildlife movement, or the fence may be installed with the bottom at least 16 inches above the ground level;

- If fencing or other project components must be designed in such a manner that wildlife passage would not be permitted, wildlife crossing structures shall be incorporated into the project design as appropriate; and
- Lighting installed as part of any project shall be designed to be minimally disruptive to wildlife (see mitigation measure AES-3(a) Roadway Lighting for lighting requirements).

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during project permitting and environmental review.

BIO-3(b) Maintain Connectivity in Drainages

The implementing agency shall implement the following measures. Permanent structures shall be avoided to the extent feasible within any drainage or river that serves as a wildlife migration corridor that would impede wildlife movement.

In addition, upon completion of construction within any drainage, areas of stream channel and banks that are temporarily impacted shall be returned to pre-construction contours and in a condition that allows for unimpeded passage through the area once the work has been complete.

If water is to be diverted around work sites, a diversion plan shall be submitted to the implementing agency for review and approval prior to issuance of project construction permits/approvals. The diversion shall be designed in a way as to not impede movement while the diversion is in place.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during project permitting and environmental review.

BIO-3 (c) Construction Best Management Practices to Minimize Disruption to Wildlife

The following construction best management practices shall be incorporated by the implementing agency into all grading and construction plans to minimize temporary disruption of wildlife, which could hinder wildlife movement:

- Designation of a 20 mile per hour speed limit in all construction areas.
- Daily construction work schedules shall be limited to daylight hours only.
- Mufflers shall be used on all construction equipment and vehicles shall be in good operating condition.
- All trash shall be placed in sealed containers and shall be removed from the project site a minimum of once per week.
- No pets are permitted on project site during construction.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be implemented prior to the issuance or project grading and construction permits.

Significance After Mitigation

Compliance with the above mitigation measures would reduce impacts to wildlife movement by requiring projects to be designed in a way that maintains connectivity. However, it cannot be guaranteed that movement of terrestrial species will not be impeded due to the large scale of the proposed 2022 RTP/SCS and the multiple projects that would implement it. No additional feasible mitigation measures are available to reduce impacts on wildlife movement. Therefore, impacts would remain significant and unavoidable.

Threshold 5:	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance

Impact BIO-4 **IMPLEMENTATION OF TRANSPORTATION PROJECTS AND THE LAND USE SCENARIO ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD NOT CONFLICT WITH ANY LOCAL POLICIES OR ORDINANCES PROTECTING BIOLOGICAL RESOURCES, SUCH AS A TREE PRESERVATION POLICY OR ORDINANCE. THIS IMPACT WOULD BE LESS THAN SIGNIFICANT.**

Most municipalities in the TCAG region have local ordinances and policies in place that protect native habitat and/or native and non-native trees in urban landscapes, as well as in unincorporated County lands. These ordinances and policies vary in their definitions of protected trees (e.g., certain species, percent within the public right-of-way, aesthetically suitable, deep-rooted trees, or a combination thereof) and in the requirements for ordinance or policy compliance. In addition, counties and cities may have local ordinances or policies that are intended to protect other biological resources such as wetlands and drainages, riparian habitat, and other sensitive habitat areas.

Protected trees and other biological resources which are protected by city and/or county ordinances and/or policies would be encountered at the locations where projects administered under the propsoed 2022 RTP/SCS would occur and therefore there is potential for conflict with local ordinances and/or policies. Most of the transportation projects in the proposed 2022 RTP/SCS are expansions or maintenance of existing roads, although some transportation projects may result in development or infrastructure improvements in undisturbed outlying areas. Because ground disturbances would be fairly limited as a result, the removal of native trees and disturbances to other biological resources protected by local policies or ordinances would likely be minimal for most projects, although the potential for conflicts with local policies and/or ordinances to some degree remains.

In addition to potential conflicts with local policies and/or ordinances that may result from transportation projects, the proposed 2022 RTP/SCS also contains a future land use scenario that emphasizes infill development and TOD. This land use scenario focuses future development concentrated in existing urbanized areas, although some development would occur in more undisturbed outlying areas. This would reduce impacts to biological resources that are protected by city or county ordinances; however, there remains the potential for conflict with local policies and ordinances from development associated with the future land use scenario.

All future development projects as part of the future land use scenario as well as the transportation projects proposed for implementation under the proposed 2022 RTP/SCS would be required to follow city and county development requirements, including compliance with local policies, ordinances and applicable permitting procedures related to protection biological resources. Project-level analysis would identify significant conflicts with local policies and ordinances as well as minimize, mitigate, or avoid those impacts through the design, siting and permitting process; and provide mitigation for any significant impacts as a condition of project approval and permitting. Therefore, the potential for development projects under the future land use scenario as well as proposed transportation projects to conflict with local policies or ordinances protecting biological resources is considered a less than significant impact.

Mitigation Measures

Mitigation measures are not required.

Threshold 6:	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan

Impact BIO-5 IMPLEMENTATION OF TRANSPORTATION PROJECTS AND THE LAND USE SCENARIO ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD NOT CONFLICT WITH THE PROVISIONS OF AN ADOPTED HABITAT CONSERVATION PLAN, NATURAL COMMUNITY CONSERVATION PLAN, OR OTHER APPROVED LOCAL, REGIONAL, OR STATE HABITAT CONSERVATION PLAN. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

There are two adopted HCPs within Tulare County: the Kern Water Bank HCP and the PG&E San Joaquin Valley Operations & Maintenance HCP. These HCPs have been developed specifically for use by these agencies to address, or cover, identified impacts from their projects within their respective HCP plan area. Therefore, individual proposed 2022 RTP/SCS transportation and development projects do not qualify as covered projects under either HCP as they are not Kern Water Bank or PG&E projects, and as such no conflict with the HCPs would occur. Therefore, the potential for development projects under the future land use scenario as well as proposed transportation projects to conflict with existing adopted or approved local, regional, or state conservation plans is considered a less than significant impact.

Mitigation Measures

Mitigation measures are not required.

c. Specific RTP Projects That May Result in Impacts

Table 4.4-2 identifies those projects that may create biological resource impacts. Projects that may have potential impacts are illustrated on Figure 2-4 through Figure 2-10 in Section 2, *Project Description*. The individual projects listed below could create significant biological impacts but would not necessarily do so. Additional specific analysis will need to be conducted as the individual projects are implemented in order to determine the actual magnitude of impact. Mitigation measures discussed above could apply to these specific projects.

Table 4.4-2 Proposed 2022 RTP/SCS Projects with Potential to Impact Biological Resources

Project Jurisdiction and Location	Improvement	Potential Impact
Caltrans		
State Route 99 - 30.6/35.2 Tulare/Tagus - Prosperity Avenue to 1.2m S of Avenue 280	Widen existing roadway from 4 to 6 lanes	Increase Capacity and Relieve Congestion
State Route 99 - 25.4/30.6 Tulare - Avenue 200 to Prosperity Avenue	Widen existing roadway from 4 to 6 lanes	Increase Capacity and Relieve Congestion
State Route 99 - 13.5/25.4 - 0.7 miles north of Court Ave to Avenue 200	Widen existing roadway from 4 to 6 lanes	Increase Capacity and Relieve Congestion
State Route 99 - 0.0/13.5 Near Earlimart, County Line Road to 0.7 miles north of Court Avenue	Widen existing roadway from 4 to 6 lanes	Increase Capacity and Relieve Congestion
State Route 65 - 10.9/15.6 Terra Bella - Avenue 88 to Avenue 124	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
State Route 65 - 29.5/32.3 Near Lindsay-from Hermosa Road to Avenue 244	Realignment and widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
State Route 190 - 13.2/15.0 Porterville - Westwood to State Route 65	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
State Route 99 at Caldwell Avenue	Widen on/off ramps and bridge structure	Improve Circulation and Relieve Congestion
State Route 99 at AgriCenter	Construct new Interchange	Improve Circulation and Relieve Congestion
State Route 99 at Paige Avenue	Widen on/off ramps and bridge structure	Improve Circulation and Relieve Congestion
State Route 198 at Road 148	Construct new interchange	Improve Circulation and Relieve Congestion
State Route 190 at Main Street	Widen bridge structure, new ramps	Improve Circulation and Relieve Congestion
Dinuba		
Nebraska Avenue at Alta Avenue	Roundabout at intersection	Improve Circulation and Safety
Kamm Avenue at Alta Avenue	Roundabout at intersection	Improve Circulation and Safety
Lindsay		
State Route 65 - at Tulare Avenue	Roundabout and local street improvements	Improve Circulation and Safety
Porterville		
State Route 190 - at Main Street and SR-65	WB Aux lane and ramp improvements	Improve Circulation and Safety
Westwood Street - South of Orange Avenue to south of Tule River	Widen existing road bridges from 2 to 4 lanes	Increase Capacity and Relieve Congestion
Newcomb Street - North of Tule River to south of Poplar Ditch	New 4 lane overcrossing over SR 190	Improve Circulation and Relieve Congestion
State Route 190 at Westwood	Roundabout and intersection improvements	Improve Circulation and Safety
State Route 190 at Plano Street	Roundabout and intersection improvements	Improve Circulation and Safety
Plano Street at College Avenue	Roundabout at intersection	Improve Circulation and Safety

Project Jurisdiction and Location	Improvement	Potential Impact
Visalia		
State Route 198 at Shirk Street	Turn lane, intersection, ramp improvements	Improve Circulation and Safety
State Route 198 downtown corridor interchanges	Turn lane, intersection, ramp improvements	Improve Circulation and Safety
State Route 198 at Lovers Lane	Turn lane, intersection, road rehabilitation improvements	Improve Circulation and Safety
Riggin Avenue - Akers to Demaree	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
Riggin Avenue - Mooney to Conyer	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
Riggin Avenue - Shirk to Akers	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
Riggin Avenue - Kelsey to Shirk	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
Tulare County		
Avenue 280 - Santa Fe (Visalia) to Lovers Ln (Visalia)	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
Avenue 280 - Lovers Ln (Visalia) to Virginia (Farmsersville)	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
Avenue 280 - Brundage (Farmersville) to Elberta (Exeter)	Widen existing roadway from 2 to 4 lanes	Increase Capacity and Relieve Congestion
State Route 99 - South County interchanges	Turn lane, intersection, ramp improvements	Improve Circulation and Safety
State Route 99 at Caldwell Avenue (Avenue 280)	Ramp signalization and intersection improv.	Improve Circulation and Safety
State Route 198 at State Route 65	Turn lanes, intersection improvements	Improve Circulation and Safety
State Route 198 at Spruce Road	Turn lanes, intersection improvements	Improve Circulation and Safety

4.4.4 Cumulative Impacts

The cumulative impact analysis area for biological resources consists of the TCAG region and the adjoining counties, as further described in Section 3.3.4.1 Cumulative Impact Methodology and Table 3-1. This geographic scope is appropriate for biological resources because it encompasses the mosaic of representative land cover and habitat types (and associated biological resources) affected by the proposed 2022 RTP/SCS, including creeks and drainages, natural communities, and agricultural land uses. Future transportation projects and growth in the region, including growth in adjoining counties, could impact resources in the surrounding counties, and the interaction between the affected environment and the proposed 2022 RTP/SCS projects would occur throughout this larger cumulative impact analysis area.

Biological resources impacts resulting from cumulative development within the cumulative impact analysis area would include direct and indirect impacts to sensitive/special status species or their habitat; impacts to riparian, wetland, or other sensitive natural communities; interference with wildlife movement; or potential conflicts with local policies, ordinances, and/or other approved local, regional, and/or state conservation plans. Given the extent of future development anticipated in the cumulative impact analysis area, these cumulative impacts would likely be significant. Implementation of the transportation projects and land use development patterns under the proposed 2022 RTP/SCS would contribute to these impacts, as described above in Section 4.4.3. Due to the potential direct and indirect impacts that may occur as a result of the proposed 2022 RTP/SCS, the proposed 2022 RTP/SCS's contribution to this impact would be cumulatively considerable.

Mitigation Measures BIO-1(a) through BIO-3(c) presented above in Section 4.4.3.b set requirements for surveys and actions to be taken if biological resources have potential to be impacted by the proposed 2022 RTP/SCS transportation and land use projects. However, as discussed above, impacts to special-status species and their habitats; riparian, wetland, or other sensitive natural communities; and wildlife movement would be significant and unavoidable. The contribution of the proposed 2022 RTP/SCS to cumulative impacts would therefore remain cumulatively considerable post-mitigation.

4.5 Cultural Resources

This section analyzes impacts to cultural resources within the TCAG region that would result from implementation of the proposed 2022 RTP/SCS. Tribal cultural resources are addressed in Section 4.15.

4.5.1 Setting

The TCAG region is located in the center of California, 200 miles south of San Francisco and 180 miles north of Los Angeles. The region stretches across a vast and varied landscape, extending from center of the San Joaquin Valley in the west to the crest of the Sierra Nevada in the east, with elevations ranging from approximately 280 feet above mean sea level down in the valley to 14,494 feet above mean sea level on the summit of Mount Whitney. The western half of Tulare County lies within the San Joaquin Valley. The eastern half, situated within the southern Sierra Nevada mountains, transitions west to east from lower rolling foothills and ridge and canyon systems to meadows and rugged peaks in the higher country. Tulare County was inhabited by several aboriginal California Native American groups including the Southern Valley Yokuts, Foothill Yokuts, Tübatulabal, Monache, and the Owens Valley Paiute[1]. Of the main groups inhabiting the TCAG region, the Southern Valley Yokuts occupied the largest territory. This is described in more detail in Section 4.16 Tribal Cultural Resources.

a. Prehistoric Background

California prehistory is generally divided into three broad time periods: Paleoindian period (ca. 11,550-8,550 BCE), Archaic Period (8,550 BCE-CE. 1100) and Emergent Occupation (CE 1000-European Contact) (Fredrickson 1973a, 1973b; Moratto 1984; Rosenthal et al. 2007). Little archaeological work has been completed around Tulare Lake, but the research that has been conducted has shown that humans have inhabited the Tulare lakeshore continuously since as early as 9,000 BCE (Wallace 1993). The prehistoric chronological sequence for the Central Valley presented below is based on Rosenthal et al. (2007) and Moratto (1984). Geoarchaeological studies have demonstrated that erosion and deposition have buried or destroyed early archaeological deposits. Currently, the earliest accepted date of human occupation in the Central Valley ranges from 11,550 to 9,550 BCE.

Climate change at the end of the Pleistocene caused significant periods of alluvial deposition beginning around 9,050 BCE with hunting being an important subsistence activity. The relationship between foothill and valley floor adaptations is largely unknown during the Lower Archaic. However, distinct adaptations are apparent in the Middle Archaic, and it is possible that these divergent traditions first emerged in the Lower Archaic (Rosenthal et al. 2007).

The Middle Archaic began with substantial climate change to much warmer, drier conditions. Tulare Lake shrank and eventually disappeared sometime around 5,500 BCE (Blunt et al. 2015) during this time span. What is available of the Middle Archaic record has revealed a pattern of organized subsistence strategies and increased residential stability. Middle Archaic sites are relatively common in the foothills surrounding the Central Valley and show relatively little change from the Lower Archaic (McGuire 1995). During this time, the mortar and pestle become more widespread suggesting a shift toward more intensive subsistence practices. Fishing technologies, such as bone

[1] The territory of the Western Shoshone overlaps just slightly on the southeastern edge of the county on the crest of the Sierra Nevada; because that overlapping area is so minimal, the Western Shoshone will not be discussed in further detail here.

gorges, hooks, and spears, also appear during the Middle Archaic suggesting a new focus on fishing. Several other technologies also become apparent during this time. Baked-clay impressions of twined basketry, simple pottery, and other baked clay objects have been found at several sites. Personal adornment items additionally became more frequent. Exchange with outside groups is evidenced by the presence of obsidian, shell beads and ornaments (Rosenthal et al. 2007; Moratto 1984). Trade seemed to be focused on utilitarian items such as obsidian or finished obsidian tools from at least five separate sources (Moratto 1984).

The Upper Archaic is better represented in the archaeological record than earlier periods. Cultural diversity was more pronounced and is marked by contrasting material cultures throughout the valley (Rosenthal et al. 2007). Upper Archaic period economies varied by region throughout the Central Valley. Economies were apparently primarily focused on seasonal resources such as acorns, salmon, shellfish, rabbits, and deer (Rosenthal et al. 2007).

The stable climatic conditions of the Upper Archaic continued into the Emergent Period. After CE 1000, many of the technologies witnessed during the Archaic disappeared to be replaced by cultural traditions witnessed at European contact. During the Emergent Period, the bow and arrow replaced the atlatl as the preferred hunting method sometime between CE 1000 and 1300. Increased social complexity is evidenced by increased variation in burial types and offerings and larger residential communities. Grave offerings such as shell beads, ornaments, and ritually “killed” mortars and pestles are often found in burials. Pottery was frequently obtained through trade with groups living in the foothills to the east.

As with the Archaic Period, Emergent Period economies varied geographically, though throughout the Central Valley fishing and plant harvesting increased in importance. Most Emergent residential sites contain diverse assemblages of mammal and bird remains and large amounts of fish bone. After 1,000 years ago, the mortar and pestle become the dominant tool type and small seeds increase in archaeological deposits over time (Rosenthal et al. 2007).

b. Historic Background

Post-Contact history for the state of California is generally divided into three periods: the Spanish Period (1769 – 1822), Mexican Period (1822 – 1848), and American Period (1848 – present). Although Spanish, Russian, and British explorers visited the area for brief periods between 1529 and 1769, the Spanish Period in California begins in 1769 with the establishment of a settlement at San Diego and the founding of Mission San Diego de Alcalá. Independence from Spain in 1821 marks the beginning of the Mexican Period, and the signing of the Treaty of Guadalupe Hidalgo in 1848, ending the Mexican American War, signals the beginning of the American Period when California became a territory of the United States.

In 1542, Juan Rodriguez Cabrillo led the first European expedition to observe what is now called southern California. For more than 200 years, Cabrillo and other Spanish, Portuguese, British, and Russian explorers sailed the Alta (upper) California coast and made limited inland expeditions but did not establish permanent settlements (Bean 1968; Rolle 2003).

Gaspar de Portolá and Franciscan Father Junipero Serra established the first Spanish settlement in Alta California at Mission San Diego de Alcalá in 1769. This was the first of 21 missions erected by the Spanish between 1769 and 1823. Portolá continued north, eventually reaching the San Francisco Bay in 1769. In 1772, Pedro Fages led the first Europeans to enter the San Joaquin Valley (Wallace 1978; Johnson et al. 1993). Fages led a small expedition into the southernmost part of the valley, stopping at a village on the shores of Buena Vista Lake, before heading towards San Luis Obispo

(Wallace 1978). The next European to enter the valley was Francisco Garcés in 1776 (Wallace 1978). In the early 1800s, numerous expeditions were made into the Central Valley to search for land for new missions or to recapture runaway neophytes (Hoover et al. 2002). However, the Spanish never succeeded in taking control of the region and no missions were established in the Central Valley.

During this period, Spain also deeded ranchos to prominent citizens and soldiers, though very few in comparison to the subsequent Mexican Period. To manage and expand their herds of cattle on these large ranchos, colonists enlisted the labor of the surrounding Native American population (Engelhardt 1927). Very few of the Central Valley tribes came under the control of the Spanish missions or ranchos. However, numerous runaway neophytes fled to the Central Valley, influencing local populations (Wallace 1978). The increased local population and contact with diseases brought by Europeans greatly reduced the Native American population (McCawley 1996).

The Mexican Period commenced when news of the success of the Mexican Revolution (1810-1821) against the Spanish crown reached California in 1822. This period was an era of extensive interior land grant development and exploration by American fur trappers west of the Sierra Nevada Mountains. Beginning in 1833, mission lands were conferred as rancho grants. However, no ranchos were established in the Central Valley proper (Wallace 1978).

The American Period officially began with the signing of the Treaty of Guadalupe Hidalgo in 1848, in which the United States agreed to pay Mexico $15 million for the conquered territory, including California, Nevada, Utah, and parts of Colorado, Arizona, New Mexico, and Wyoming. Settlement of southern California continued dramatically in the early American Period. The discovery of gold in northern California in 1848 led to the California Gold Rush (Guinn 1915; Workman 1935). In 1850, California was admitted into the United States and by 1853, the population of California exceeded 300,000. Thousands of settlers and immigrants continued to move into the state, particularly after the completion of the transcontinental railroad in 1869.

The Mediterranean climate of San Joaquin Valley attracted many settlers to the area and established the valley as a key producer of several varieties of crops. Today, the region is a leading producer of raisins and yields more than half of the grapes grown in the United States. Key themes in the areas' history include mining, agriculture, transportation, and military use.

Tulare County History and Historic Development

Located in central California, Tulare County was established in 1852 after separating from Mariposa County. Later, Tulare County was divided again to create Fresno, Kings, and Inyo counties (Tulare County 2019). The name Tulare stems from the tule plant that used to flourish among the area's marshland. Prior to the introduction of agriculture, Tulare Lake was the largest freshwater lake west of the Mississippi until the construction of dams, levees, and canals diverted natural water flow (The Leader 2015).

Early settlement in the county focused on ranching (Tulare County 2012). The Southern Pacific Railroad (SPRR) established the town of Tulare in 1872 to serve as its San Joaquin Valley headquarters (City of Tulare 2017). At approximately the same time, settlers developed water conveyance systems including canals, dams, and ditches across the valley. With reliable water supplies and rail transport, various farming colonies were established throughout the region. Crops included grain, fruit, and row crops. Some of those colonies grew to become cities such as Porterville, Visalia and Hanford. Visalia later became the county seat and the service, processing and distribution center for the area farms, dairies, and cattle ranches. By 1900, the county had a population of 18,000 residents. Transportation improvements such as major roads, and the development of light industry, supported the valley's continued growth (Tulare County 2012).

Like much of the San Joaquin Valley, the TCAG region experienced an influx of migrants from the U.S. Southwest seeking farm jobs in the region during the Great Depression. A result of the Great Depression-era boom, the TCAG region's population increased by more than 38 percent between 1935 and 1940 (Autobee n.d.). World War II-era demand for farm products led to an expansion of local agricultural economy (City of Porterville 2021; Autobee n.d.). To meet the needs of military production, many growers in the region shifted to cotton farming, and cotton quickly surpassed citrus as the area's chief farm product (Autobee n.d.).

Growth in the region accelerated in the post-World War II era, thanks to the construction of the Central Valley Project (CVP) federal water management system, which helped to ensure a reliable supply of water for crop irrigation in the San Joaquin Valley. Although the CVP was formalized with the passage of the federal Rivers and Harbors Acts of 1935 and 1937, the benefits were not realized in Tulare County until 1951, when the Friant-Kern Canal was completed as part of a system of dams and canals intended to "[impound or divert] the entire flow of the San Joaquin River, except for flood control and irrigation releases" (Stene n.d.). Improved water distribution through the CVP supported more intensive forms of farming in the San Joaquin Valley and, as a result, promoted post-World War II-era population growth in the TCAG region (City of Porterville 2021).

Since 1950, the TCAG region has experienced steady, decade-over-decade growth, increasing from 149,000 in 1950 to an estimated 466,000 in 2019. Today, the county spans over a geographically diverse region which today includes 7,826 square kilometers. The eastern part of the county includes the Sierra Nevada range and recreational public lands, and the western half of the county, with its fertile valley floor, makes the county a top agricultural producer in the United States. Tulare County is home to 1.3 million acres of productive farmland, contributing $7.14 billion a year to the California economy (TULOCFB 2020). Packing and shipping operations, as well as light and medium manufacturing plants have also increased in number in the county (Tulare County 2019).

c. Cultural Resources Inventory

To compile a listing of recognized significant historic and prehistoric resources in the TCAG region, information was obtained from the State Office of Historic Preservation. The statewide Historical Resources Inventory is not available for public review according to the California Historical Information System Information Center Rules of Operation Manual (Section III.A). Therefore, this section does not include a complete list of all recorded cultural resources in the TCAG region. A review of the NRHP and the California Office of Historic Preservation (OHP) web site identified a list of California Historical Landmarks and NHRP listed historical resources located in the County. However, there may be other known and potential historical resources located in the County. Resources identified on the OHP web site are listed in Table 4.5-1. Table 4.5-2 lists in-service bridges in the Caltrans Bridge Inventory that may have historical significance and are eligible or are potentially eligible for inclusion in the NRHP, pending further evaluation.

Table 4.5-1 TCAG Region Historical Resources

Reference Number	Location	Resource Name	Address and/or Date Listed
California Historical Landmarks			
388	Porterville	First Tule River Indian Reservation	Alta Vista School, 2293 E Crabtree, Porterville – Listed 8/19/1947
389	Kaweah	Kaweah Post Office, Kaweah Colony	43795 N Fork Dr, Kaweah – Listed 8/26/1947
410	Visalia	Charter Oak/Election Tree	On Charter Oak Dr. 0.3 mi West of Road 180, 7 mi East of Visalia – Listed 11/15/1948
413	Fountain Springs	Tailholt	SW corner of County Hwy M109 (old Springville Stage Route) and County Hwy M12, 8 mi South of Fountain Springs – Listed 11/15/1948
417	Lindsay	Butterfield Stage Route	SW corner of Hermosa St. (Ave 228) and State Hwy 65, 1 mi West of Lindsay – Listed 8/30/1950
473	Porterville	Tule River Stage Station	Porterville Public Park, SW corner of N Main St. and W Henderson Ave. – Listed 9/11/1950
648	Fountain Springs	Fountain Springs	SW corner of County Roads J22 and M109 (old Springville Stage Route), Fountain Springs – Listed 5/29/1958
934	Tulare	Temporary Detention Camps for Japanese Americans – Tulare Assembly Center	Tulare County Fairgrounds, Tulare – Listed 5/13/1980
1047	Colonel Allensworth State Historic Park	Allensworth Historic Town Site	State Highway 43, 9 mi West of State Highway 99, Colonel Allensworth State Historic Park – Listed 8/5/2012
National Register of Historic Places			
N158	Allensworth	Allensworth Historic District	Town of Allensworth and its environs along CA 43—Listed 2/23/1972
N595	Three Rivers	Ash Mountain Entrance Sign	N of Three Rivers in Sequoia National Park, Three Rivers—Listed 4/27/1978
N1086	Visalia	Bank of Italy Building	128 E. Main Street, Visalia—Listed 4/1/1982
N573	Mineral King	Barton-Lackey Cabin	North of Mineral King in Kings Canyon National Park—Listed 3/30/1978
N596	Wilsonia	Cabin Creek Ranger Residence and Dormitory	Southeast of Wilsonia on Generals' Highway in Sequoia National Park—Listed 4/27/1978
N518	Three Rivers	Cattle Cabin	Northeast of Three Rivers on Sequoia National Park—Listed 9/15/1977
N1082	Springville	Elster, C.A., Building	Intersection of CA 190 and Tule River Drive, Springville—Listed 3/25/1982
N1665	Exeter	Exeter Public Library	309 S. E Street, Exeter—Listed 12/10/1990
N2043	Porterville	First Congregational Church	165 E. Mill Street, Porterville—Listed 1/5/1999
N663	Mineral King	Generals' Highway Stone Bridges	North of Mineral King in Sequoia National Park—Listed 9/13/1978
N603	Three Rivers	Giant Forest Lodge Historic District	Northeast of Three Rivers in Sequoia National Park—Listed 5/5/1978
N619	Three Rivers	Giant Forest Village-Camp Kaweah Historic District	North of Three Rivers in Sequoia National Park—Listed 5/22/1978

Reference Number	Location	Resource Name	Address and/or Date Listed
N574	Three Rivers	Groenfeldt Site	Address restricted—Listed 3/30/1978
N597	Silver City	Hockett Meadow Ranger Station	South of Silver City in Sequoia National Park—Listed 4/27/1978
N515	Three Rivers	Hospital Rock	Address restricted—Listed 8/29/1977
N770	Visalia	Hyde House	500 S. Court Street, Visalia—Listed 4/26/1979
N2217	Mineral King	Mineral King Road Cultural Landscape	Mineral King Road, Sequoia National Park—Listed 10/24/2003
N736	Three Rivers	Moro Rock Stairway	North of Three Rivers in Sequoia National Park—Listed 12/29/1978
N1230	Orosi	Orosi Branch Library	12662 Avenue 416, Orosi—Listed 8/25/1973
N604	Mineral King	Pear Lake Ski Hut	North of Mineral King on Sequioa National Park—Listed 5/5/1978
N493	Visalia	The Pioneer	27000 S. Mooney Boulevard, Visalia—Listed 5/5/1977
N1718	Lemoncove	Pogue Hotel	32792 Sierra Drive, Lemoncove—Listed 8/5/1991
N488	Mineral King	Quinn Ranger Station	South of Mineral King on Sequoia National Park—Listed 4/13/1977
N587	Three Rivers	Redwood Meadow Ranger Station	Northeast of Three Rivers in Sequoia National Park—Listed 4/13/1978
N2097	Visalia	Sequoia Field – Visalia-Dinuba School of Aeronautics	Near the junction of Avenue 368 and Road 112, 9 mi. North of Visalia—Listed 6/9/2000
N475	Lone Pine	Smithsonian Institution Shelter	West of Lone Pine in Sequoia National Park—Listed 3/8/1977
N476	Three Rivers	Squatter's Cabin	Northeast of Three Rivers—Listed 3/8/1977
N1460	Porterville	Tenalu	Address restricted—Listed 9/4/1986
N477	Three Rivers	Tharp's Log	Northeast of Three Rivers—Listed 3/8/1977
N2078	Tulare	Tulare Union High School Auditorium and Administration Building	755 E. Tulare Avenue, Tulare—Listed 12/17/1999
N1339	Porterville	US Post Office – Porterville Main	65 W. Mill Avenue, Porterville—Listed 1/11/1985
N1340	Visalia	US Post Office – Visalia Town Center Station	11 W. Acequia Street, Visalia—Listed 1/11/1985
N1938	Wilsonia	Wilsonia Historic District	Roughly bounded by Pine Lane, Fern Lane, Hillcrest Road, Sierra Lane, Kaweah Lane, Goddard Lane, and Park Road, Wilsonia—Listed 3/14/1996
N1494	Porterville	Zalud House	393 N. Hockett Street, Porterville—pawListed 3/31/1987
N/A	Three Rivers	Bearpaw High Sierra Camp	Along High Sierra Trail, 11 miles east of Crescent Meadow, Sequoia National Park—Listed 4/21/2016

* This list may not include all historical resources listed on the NRHP and CRHR.

Sources: California Office of Historic Preservation, 2021; NRHP 2021

Table 4.5-2 Caltrans Historic Bridge Inventory

Bridge Number	Bridge Name	Location	Historical Significance	Year Built
Local Agency Bridges				
46C0182	Friant-Kern Canal	0.5 mi south of SR 198	2. Bridge is Eligible for the NRHP	1949
46C0196	East Fork Kaweah River	6.68 mi east of SR 198	2. Bridge is Eligible for the NRHP	1923
46C0239	Friant-Kern Canal	0.1 mi east of Road 204	2. Bridge is Eligible for the NRHP	1949
46C0410	Cameron Creek	0.5 mi east of 63	2. Bridge is Eligible for the NRHP	1915
State Agency Bridges				
12 0038	North Fork Feather River	03-BUT-070-40.99	2. Bridge is eligible for NRHP	1932
12 0109	Arch Rock Tunnel	03-BUT-070-47.15	2. Bridge is eligible for NRHP	1937
12 0134	W. Br. Feather River (Lake Oroville)	03-BUT-070-28.22	2. Bridge is eligible for NRHP	1962

Source: California Department of Transportation 2019

4.5.2 Regulatory Setting

Federal Laws, Regulations, and Policies

National Register of Historic Places

The National Register of Historic Places (NRHP) was established by the National Historic Preservation Act of 1966 as “an authoritative guide to be used by Federal, state, and local governments, private groups and citizens to identify the Nation’s cultural resources and to indicate what properties should be considered for protection from destruction or impairment” (36 Code of Federal Regulations 60.2). The NRHP recognizes properties that are significant at the national, state, and local levels. To be eligible for listing in the NRHP, a resource must be significant in American history, architecture, archaeology, engineering, or culture. Districts, sites, buildings, structures, and objects of potential significance must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. A property is eligible for the NRHP if it meets any one of the following criteria:

- **Criterion A:** Are associated with events that have made a significant contribution to the broad patterns of our history
- **Criterion B:** Are associated with the lives of persons significant in our past
- **Criterion C:** Embody the distinctive characteristics of a type, period, or method of installation, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction
- **Criterion D:** Have yielded, or may be likely to yield, information important in prehistory or history

In addition to meeting at least one of the above designation criteria, resources must also retain integrity. The National Park Service recognizes seven aspects or qualities that, considered together, define historic integrity. To retain integrity, a property must possess several, if not all, of these seven qualities, defined in the following manner:

- **Location:** The place where the historic property was constructed or the place where the historic event occurred
- **Design:** The combination of elements that create the form, plan, space, structure, and style of a property
- **Setting:** The physical environment of a historic property
- **Materials:** Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property
- **Workmanship:** The physical evidence of the crafts of a particular culture or people during any given period in history or prehistory
- **Feeling:** A property's expression of the aesthetic or historic sense of a particular period of time
- **Association:** The direct link between an important historic event or person and a historic property

The Department of Transportation Act

Passed in 1966, the Department of Transportation Act (49 United States Code 303, formerly 49 United States Code 1651(b)(2) and 49 United States Code 1653f) includes Section 4(f), which states that the Federal Highway Administration and other U.S. Department of Transportation agencies cannot approve the use of land from public and private historical sites unless certain conditions apply. These conditions are the following: If there is no feasible and prudent avoidance alternative to the use of land, and if the action includes all possible planning to minimize harm to the property resulting from such use; or if the Federal Highway Administration determines the use of the property will have a *de minimis* impact.

Archaeological Resources Protection Act of 1979 (ARPA)

This regulation was enacted to protect archaeological resources and sites that are on public lands and tribal lands, to foster increased cooperation and exchange of information between government representatives, the professional archaeological community, and private individuals. Section 4 of the statute and Sections 16.5-16.12 of the uniform regulations describe the requirements that must be met before federal authorities can issue a permit to excavate or remove any archaeological resource on federal or tribal lands. The curation requirements of artifacts, other materials excavated or removed, and the records related to the artifacts and materials are described in Section 5 of the ARPA. This section also authorizes the Secretary of the Interior to issue regulations describing in more detail the requirements regarding these collections.

State Laws, Regulations, and Policies

California Register of Historical Resources

The CRHR program was designed for use by state and local agencies, private groups, and citizens to identify, evaluate, register, and protect California's historical resources. A historical resource can include any object, building, structure, site, area, or place that is determined to be historically or archaeologically significant. The CRHR is an authoritative guide to the state's significant archaeological and historic architectural resources. The list of these resources can be used for state and local planning purposes, the eligibility determinations can be used for state historic preservation grant funding and listing in the CRHR provides a certain measure of protection under CEQA.

California Historical Landmarks Program

The Historical Landmarks Program was instated to register buildings or landmarks of historical interest. Historical Landmarks are defined as sites, buildings, or features that have a statewide historical, cultural, anthropological, or other significance. To be designated as a Historical Landmark by the Director of California State Parks, the resource must meet set criteria, be recommended for designation by the State Historical Resources Commission and be approved by the property owners. The goals of the program include the preservation and maintenance of registered landmarks, most of which include missions, early settlements, battles, and gold rush sites (PRC Sections 5020.4, 5021, 5022, 5022.5, 5031 and 5032).

California Environmental Quality Act

ARCHAEOLOGICAL RESOURCES

CEQA requires lead agencies to consider whether projects would affect unique archaeological resources. PRC Section 21083.2(g) states that "unique archaeological resource" means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions. And there is a demonstrable public interest in that information
2. Has a special and particular quality, such as being the oldest of its type or the best available example of its type
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person

IMPACTS TO HISTORICAL RESOURCES

Section 15064.5 of the *State CEQA Guidelines* states that "a project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment." The *State CEQA Guidelines* (Section 15064.5(a)) define an "historical resource" as including the following:

- A resource listed in, or eligible for listing in, the California Register of Historical Resources
- A resource listed in a local register of historical resources (as defined at PRC Section 5020.1(k)
- A resource identified as significant in a historical resources survey meeting the requirements of PRC Section 5024.1(g)

Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. (Generally, a resource is considered by the lead agency to be "historically significant" if the resource meets the criteria for listing in the CRHR

State CEQA Guidelines (Section 15064.5(b)[1]) define "substantial adverse change" as "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired." Generally, the significance of a historical resource is "materially impaired" when a project demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its inclusion in or eligibility for the CRHR, or its inclusion in a local register of historical resources (State CEQA Guidelines Section 15064.5(b)(2)).

STANDARD MITIGATION MEASURES UNDER CEQA

Historical Resources

Mitigation measures for historical resources impacts are discussed in State CEQA Guidelines Section 15126.4. Generally, by following the Secretary of the Interior's Standards for the Treatment of Historic Properties or the Secretary of the Interior's Standards for Rehabilitation, impacts can be considered as mitigated to a level less than significant. For historical resources that are archaeological sites, according to the State CEQA Guidelines Section 15126.4(b)(3), public agencies should, whenever feasible, seek to avoid damaging effects on any historical resource of an archaeological nature.

Unique Archeological Resources

A cultural resource is also significant if it is a unique *archaeological resource*, which is defined in §21083.2(g) as an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information
2. Has a special and particular quality such as being the oldest of its type or the best available example of its type
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person

If an archaeological resource qualifies as a "historical resource," potential adverse impacts must be considered in the same manner as a historical resource *State CEQA Guidelines* Section 15064.5(c)(2)). If the archaeological site does not qualify as a historical resource but does qualify as a unique archaeological resource, then the archaeological site is treated in accordance with PRC Section 21083.2 (State CEQA Guidelines Section 15064.5(c)(3)).

California Public Resources Code Section 5024 and State-Owned Lands

Historical resources on State-owned lands are subject to the requirements of PRC Section 5024. PRC Section 5024.5(f) requires State agencies to submit to SHPO for comment documentation for any project having the potential to affect historical resources under its jurisdiction listed in or potentially eligible for inclusion in the NRHP or registered or eligible for registration as California Historical Landmarks. The SHPO has 30 days after receipt of the notice for review and comment. If the SHPO determines that a proposed action would have an adverse effect on a listed historical resource, the relevant State agency shall adopt prudent and feasible measures that will eliminate or mitigate the adverse effects.

California Native American Historical, Cultural, and Sacred Sites Act

The California Native American Historical, Cultural, and Sacred Sites Act (PRC Section 5097.9) applies to both State and private lands. The act requires, upon discovery of human remains, that construction or excavation activity cease and that the county coroner be notified. If the remains are those of a Native American, the coroner must notify the NAHC, which notifies and has the authority to designate the most likely descendant (MLD) of the deceased. The act stipulates the procedures that the descendants may follow for treating or disposing of the remains and associated grave goods.

Health and Safety Code Section 7050.5

Section 7050.5 requires that construction or excavation be stopped in the vicinity of discovered human remains until the coroner can determine whether the remains are those of a Native American. If they are determined to be Native American, the coroner must contact the NAHC.

Public Resources Code Section 5097

PRC Section 5097 specifies the procedures to be followed in the event of the unexpected discovery of human remains on nonfederal land. The disposition of Native American burial falls within the jurisdiction of the NAHC. Section 5097.5 of the PRC states the following:

> No person shall knowingly and willfully excavate upon, or remove, destroy, injure, or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.

California Health and Safety Code Sections 7050.5, 7051, and 7054

HSC Sections 7050.5, 70051, and 7051, and 7054 specify the provisions for the protection of human burial remains. Section 7050.5 of the HSC states the following:

> In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27491 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains. If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission.

Section 7051 of the HSC states the following:

> Every person who removes any part of any human remains from any place where it has been interred, or from any place where it is deposited while awaiting interment, cremation, or hydrolysis, with intent to sell it or to dissect it, without authority of law, or written permission of the person or persons having the right to control the remains under Section 7100, or with malice or wantonness, has committed a public offense that is punishable by imprisonment pursuant to subdivision (h) of Section 1170 of the Penal Code.

Section 7054 of the HSC states the following:

(a) (1) Except as authorized pursuant to the sections referred to in subdivision (b), every person who deposits or disposes of any human remains in any place, except in a cemetery, is guilty of a misdemeanor.

(2) Every licensee or registrant pursuant to Chapter 12 (commencing with Section 7600) of Division 3 of the Business and Professions Code and the agents and employees of the licensee or registrant, or any unlicensed person acting in a capacity in which a license from the Cemetery and Funeral Bureau is required, who, except as authorized pursuant to the sections referred to in subdivision (b), deposits or disposes of any human remains in any place, except in a cemetery, is guilty of a misdemeanor that shall be punishable by imprisonment in a county jail not exceeding one year, by a fine not exceeding ten thousand dollars ($10,000), or both that imprisonment and fine.

(b) Cremated remains or hydrolyzed human remains may be disposed of pursuant to Sections 7054.6, 7116, 7117, and 103060.

(c) Subdivision (a) of this section shall not apply to the reburial of Native American remains under an agreement developed pursuant to subdivision (l) of Section 5097.94 of the Public Resources Code, or implementation of a recommendation or agreement made pursuant to Section 5097.98 of the Public Resources Code.

Public Resources Code Section 5097.98

PRC Section 5097.98 addresses the disposition of Native American burials, protects such remains, and established the NAHC to resolve any related disputes. Section 5097.98 of the PRC states the following:

(a) Whenever the commission receives notification of a discovery of Native American human remains from a county coroner pursuant to subdivision (c) of Section 7050.5 of the Health and Safety Code, it shall immediately notify those persons it believes to be most likely descended from the deceased Native American. The descendants may, with the permission of the owner of the land, or his or her authorized representative, inspect the site of the discovery of the Native American human remains and may recommend to the owner or the person responsible for the excavation work means for treatment or disposition, with appropriate dignity, of the human remains and any associated grave goods. The descendants shall complete their inspection and make recommendations or preferences for treatment within 48 hours of being granted access to the site.

(b) Upon the discovery of Native American remains, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred, as prescribed in this section, with the most likely descendants regarding their recommendations, if applicable, taking into account the possibility of multiple human remains. The landowner shall discuss and confer with the descendants all reasonable options regarding the descendants' preferences for treatment.

Native American Graves Protection and Repatriation Act

Health and Safety Code Sections 8010–8011 establishes a State repatriation policy intent that is consistent with and facilitates implementation of the federal Native American Graves Protection and Repatriation Act. The act strives to ensure that all California Indian human remains and that cultural and cultural items by publicly funded agencies and museums in California. It also states the intent for the State to provide mechanisms for aiding California Indian tribes, including non-federally recognized tribes, in filing repatriation claims and getting responses to those claims.

California Health and Safety Code Sections 18950 through 18961

The State Historic Building Code (HSC; Sections 18950–18961) provide alternative building regulations and building standards for the rehabilitation, preservation, restoration (including related reconstruction), or relocation of buildings or structures designated as historic buildings. Such alternative building standards and building regulations are intended to facilitate the restoration or change of occupancy to preserve their original or restored architectural elements and features, to encourage energy conservation and a cost-effective approach to preservation, and to provide for the safety of the building occupants.

Local Laws, Regulations, and Policies

Tulare County General Plan

Chapter 8, Environmental Resources Management, of the Tulare County General Plan includes several policies related to cultural resources. These include, but are not limited to:

- **ERM-6.1 Evaluation of Cultural and Archaeological Resources**. The County shall participate in and support efforts to identify its significant cultural and archaeological resources using appropriate State and Federal standards.
- **ERM-6.2 Protection of Resources with Potential State or Federal Designations**. The County shall protect cultural and archaeological sites with demonstrated potential for placement on the National Register of Historic Places and/or inclusion in the California State Office of Historic Preservation's California Points of Interest and California Inventory of Historic Resources. Such sites may be of Statewide or local significance and have anthropological, cultural, military, political, architectural, economic, scientific, religious, or other values as determined by a qualified archaeological professional.
- **ERM-6.3 Alteration of Sites with Identified Cultural Resources**. When planning any development or alteration of a site with identified cultural or archaeological resources, consideration should be given to ways of protecting the resources. Development can be permitted in these areas only after a site-specific investigation has been conducted pursuant to CEQA to define the extent and value of resource, and mitigation measures proposed for any impacts the development may have on the resource.
- **ERM-6.4 Mitigation**. If preservation of cultural resources is not feasible, every effort shall be made to mitigate impacts, including relocation of structures, adaptive reuse, preservation of facades, and thorough documentation and archival of records.

- **ERM-6.6 Historic Structures and Sites**. The County shall support public and private efforts to preserve, rehabilitate, and continue the use of historic structures, sites, and parks. Where applicable, preservation efforts shall conform to the current Secretary of the Interior's Standards for the Treatment of Historic Properties and Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings
- **ERM-6.8 Solicit Input from Local Native Americans**. The County shall continue to solicit input from the local Native American communities in cases where development may result in disturbance to sites containing evidence of Native American activity and/or to sites of cultural importance.

City General Plans

The City of Visalia General Plan has a Historic Preservation Element that identifies known historic resources and groupings of historic structures within the City. The City also has a Historic Preservation Ordinance, adopted in 1979 and updated in 2001, established the Historic Preservation Advisory Committee (HPAC). The Committee is responsible for periodically updating the Local Register, nominating properties to the State and Federal Registers, and reviewing planning actions related to historic structures or in the Historic District. Objectives and policies promote the updating of the Historic Preservation Ordinance, historic districts, and to facilitate the conversion of older structures to new uses, with minimal alterations to building or site appearance. The City's Open Space Element identifies the need to preserve open space for the protection of Native American sites including places, features and objects of historic, cultural, or sacred significance to Native Americans.

The City of Porterville General Plan identifies the need to preserve open space for the protection of Native American sites. It has a policy to develop an agreement with Native American representatives for consultation in the cases where new development may result in disturbance to Native American sites and another policy requiring new development to analyze and avoid any potential impacts to archaeological, paleontological, and historic resources. The Land Use Element has a policy to establish an incentive program for development that includes historic preservation and enhancing their downtown that reflects local history and culture, and sensitive to and preserve historic sites.

The City of Tulare General Plan has a guiding principle to protect significant cultural and archaeological resources to ensure the preservation and maintenance of Tulare's heritage. The Land Use Element has a policy to encourage cultural and historic heritage and have development planned to ensure its compatibility with existing historic structures. Their Conservation and Open Space Element has policies to support efforts to protect and/or recover archaeological resources, evaluate and protect historic resources, and coordination with descendants of the deceased Native Americans if such remains are found.

The other cities within the TCAG region have similar policies and objectives for the preservation and protection of historic, archaeological, and Native American resources in their open space, conservation, land use, or other elements.

4.5.3 Impact Analysis

a. Methodology and Significance Thresholds

For this discussion, the term historical resource broadly includes archaeological and built environment resources. The significance of a cultural resource impact is determined by whether that resource meets the criteria discussed above. Where the significance of a site is unknown, it is presumed to be a significant resource for the purpose of identifying potential areas of disturbance associated with construction projects or development in urban infill areas near high-quality transportation corridors as outlined in the 2022 RTP/SCS. Listings of historical resources in the TCAG region were obtained from the State Office of Historic Preservation. Potential areas of disturbance associated with the 2022 RTP/SCS projects were compared to the identified historical sites listed on Table 4.5 1 and Table 4.5-2. to determine whether an impact to a known cultural resource may occur. As discussed above, Table 4.5 1 and Table 4.5-2 are based on information available online through the State Historic Preservation Office and do not reflect the complete California Historical Resources Information System, which would be consulted on a project-by-project basis.

Appendix G of the State CEQA Guidelines identifies the following criteria for determining whether implementation of the 2022 RTP/SCS' impacts would have a significant impact on cultural and historic resources:

1. Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5;
2. Cause a substantial adverse change in the significant of an archaeological resource pursuant to §15064.5; or
3. Disturb any human remains, including those interred outside of formal cemeteries.

b. Project Impacts and Mitigation Measures

The following section discusses potential impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. Section 4.5.3.c summarizes the impacts associated with capital improvement projects proposed in the 2022 RTP/SCS. Due to the programmatic nature of the 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time. In general, however, implementation of proposed transportation improvements and future projects under the land use scenario envisioned by the 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1:	Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5

Impact CR-1 TRANSPORTATION IMPROVEMENT PROJECTS AND THE LAND USE SCENARIO ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD CAUSE A SUBSTANTIAL ADVERSE CHANGE IN THE SIGNIFICANCE OF A HISTORICAL RESOURCE PURSUANT TO §15064.5. THIS IMPACT WOULD BE SIGNIFICANT AND UNAVOIDABLE.

With regard to known significant historic structures, the location and nature of the proposed 2022 RTP/SCS projects were evaluated relative to the location of the historic properties listed in Table 4.5-1and Table 4.5-2. Projects that involve bridge replacements and removal of other structures older than 50 years could generate an impact to historic structures. Furthermore, projects that are adjacent to or near historic structures would alter the integrity of those structures by changing their environmental context.

The 2022 RTP/SCS also has a future land use scenario that emphasizes infill development near transit, such as train stations and multimodal transportation hubs in existing urbanized areas and includes some development in outlying areas. There are no specific development projects pursuant to the land use scenario envisioned by the 2022 RTP/SCS identified and, thus, a project specific evaluation is not possible. However, because future infill near transit could be located near or adjacent to existing historic structures, the integrity of such structures could be indirectly or directly impacted as a result. Moreover, if future infill near transit would involve redevelopment/demolition of existing structures, it is possible that such structures could have historical significance (as determined by site specific evaluation) given the presence of structures that are over 50 years old within the TCAG region, particularly within existing urbanized areas. Redevelopment or demolition could result in the permanent loss of historic structures. Similarly, while proposed transportation projects would not impact known historic structures, it is possible that such projects may require reconstruction or demolition of transportation infrastructure or other structures that are over 50 years old, and which may be considered historically significant as determined by site specific evaluation. Such reconstruction or demolition would result in the permanent loss of historic structures.

In general, prior to commencement of any action, development, or land use changes on lands subject to federal jurisdiction or for projects involving federal funding, a cultural resource survey and an environmental analysis must be prepared, including a historic resources assessment. Historic structures are protected under the regulations of the National Historic Preservation Act and the Department of Transportation Act of 1966. TCAG-sponsored projects would be subject to local ordinance requirements within the jurisdiction in which they occur, including General Plan provisions that protect cultural resources. Nevertheless, impacts would be significant because there would be substantial adverse changes to historic structures that meet the definition of "historical resources." The following mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures where applicable for transportation projects implementing the proposed 2022 RTP/SCS that would result in impacts to historical resources. Where applicable, Cities and the County can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site specific conditions.

CR-1 Built Environment Historical Resources

Prior to individual project permit issuance, the implementing agency of a 2022 RTP/SCS project involving earth disturbance or construction of permanent above ground structures or roadways shall prepare a map defining the project area. This map shall indicate the areas of primary and secondary disturbance associated with construction and operation of the facility and will help in determining whether known and potential historical resources are located within the project area. If a structure greater than 45 years in age is within the identified impact zone, a survey and evaluation of the structure(s) to determine their eligibility for recognition under State, federal, or local historic preservation criteria shall be conducted. The evaluation shall be prepared by an architectural historian or historical architect meeting the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation, Professional Qualification Standards (PQS) as defined in 36 CFR Part 61. All buildings and structures 45 years of age or older within the project area shall be evaluated in their historic context and documented in a report meeting the State Office of Historic Preservation guidelines. All evaluated properties shall be documented on Department of Parks and Recreation Series 523 Forms. The report shall be submitted to the implementing agency for review and concurrence.

If historical resources are identified within the project area of a proposed project, efforts shall be made to the extent feasible to ensure that impacts are mitigated. Application of mitigation shall generally be overseen by a qualified architectural historian or historic architect meeting the PQS, unless unnecessary in the circumstances (e.g., preservation in place). In conjunction with any development application that may affect the historical resource, a report identifying and specifying the treatment of character-defining features and construction activities shall be provided to the implementing agency for review.

To the greatest extent possible the relocation, rehabilitation, or alteration of the resource shall be consistent with the *Secretary of the Interior's Standards for the Treatments of Historic Properties* (Standards). In accordance with CEQA, a project that has been determined to conform with the Standards generally would not cause a significant adverse direct or indirect impact to historical resources (14 CCR § 15126.4(b)(1)). Application of the Standards shall be overseen by a qualified architectural historian or historic architect meeting the PQS. In conjunction with any development application that may affect the historical resource, a report identifying and specifying the treatment of character-defining features and construction activities shall be provided to the implementing agency for review and concurrence.

If significant historical resources are identified on a development site and compliance with the Standards and or avoidance is not possible, appropriate site-specific mitigation measures shall be established and undertaken. Mitigation measures may include documentation of the historical resource in the form of a Historic American Building Survey-Like report. The report shall comply with the Secretary of the Interior's Standards for Architectural and Engineering Documentation and shall generally follow the HABS Level III requirements, including digital photographic recordation, detailed historic narrative report, and compilation of historic research. The documentation shall be completed by a qualified architectural historian or historian who meets the PQS and submitted to the implementing agency prior to issuance of any permits for demolition or alteration of the historical resource.

Implementing Agencies and Timing

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

Significance After Mitigation

Redevelopment or demolition that may be required to implement transportation improvements or land use projects may result in the permanent loss or damage to historic structures. While implementation of Mitigation Measure CR-1 would reduce impacts to the extent feasible, some project-specific impacts may be unavoidable. Therefore, this impact is significant and unavoidable. No additional mitigation measures to reduce this impact to less-than-significant levels are feasible.

Threshold 2:	Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5

Impact CR-2 CONSTRUCTION ACTIVITY ASSOCIATED WITH TRANSPORTATION IMPROVEMENT PROJECTS AND THE LAND USE SCENARIO ENVISIONED BY THE PROPOSED 2022 RTP/SCS MAY CAUSE A SUBSTANTIAL ADVERSE CHANGE IN THE SIGNIFICANCE OF AN ARCHAEOLOGICAL RESOURCE PURSUANT TO §15064.5. POTENTIAL IMPACTS TO ARCHAEOLOGICAL RESOURCES WOULD BE SIGNIFICANT AND UNAVOIDABLE.

It is known that archaeological resources are present throughout the TCAG region. Therefore, it is possible to encounter known and unknown archaeological resources during implementation of transportation improvement projects under the 2022 RTP/SCS. Many of the transportation improvements proposed under the 2022 RTP/SCS consist of minor expansions of existing facilities that would not involve construction in previously undisturbed areas. However, depending on the location and extent of the proposed improvement and ground disturbance, known and/or unknown cultural resources could be impacted. Project-specific analysis would be required as individual projects are proposed.

Representative new projects in the 2022 RTP/SCS that may disrupt previously undisturbed areas are listed in Table 4.5-3. The projects listed in this table were chosen based on potential to include new infrastructure. It is possible that some of the proposed roadway or bridge widening or extension projects, beyond those listed in Table 4.5-3 could adversely impact archaeological resources. In particular, construction activities may disturb the resources thereby exposing them to potential vandalism or causing them to be displaced from the original context and integrity by exposing them to potential vandalism or causing displacement from the original context and integrity. Project specific analysis would be required as individual projects are proposed.

The 2022 RTP/SCS considers a future land use scenario that emphasizes infill near transit and in existing urbanized areas, but also includes development in less urbanized areas. However, it is possible that archaeological resources could be located on or near future infill development sites, and in undisturbed areas that would be developed during implementation of the 2022 RTP/SCS. Project grading and excavation for development sites would disturb these known or undiscovered resources.

In general, prior to commencement of any action, development, or land use changes on lands subject to federal jurisdiction or for projects involving federal funding, a cultural resource survey and an environmental analysis must be prepared. County and city sponsored projects would be subject to local ordinance requirements, including General Plan provisions that protect cultural resources. Nevertheless, impacts to archaeological resources would be significant because there would be substantial adverse changes to the significance of archaeological resources, i.e., archaeological resources that meet the definition of "historical resources" or "unique archaeological resources." Mitigation Measure CR-2 would reduce these impacts.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures where applicable for transportation projects implementing the proposed 2022 RTP/SCS that would result in impacts to historical resources. Cities and the County can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site specific conditions.

CR-2(a) Archaeological Resources Impact Minimization

Before construction activities, implementing agencies shall, or can and should, retain a qualified archaeologist to conduct a record search at the Northwest Information Center to determine whether the project area has been previously surveyed and whether resources were identified. When recommended by the Information Center, implementing agencies shall, or can and should, retain a qualified archaeologist to conduct archaeological surveys before construction activities. Implementing agencies shall, or can and should, follow recommendations identified in the survey, which may include, but would not be limited to subsurface testing, designing and implementing a Worker Environmental Awareness Program (WEAP), construction monitoring by a qualified archaeologist, avoidance of sites and preservation in place, and/or data recovery if avoidance is not feasible. Recommended mitigation measures shall be consistent with *State CEQA Guidelines* Section 15126.4(b)(3) recommendations and may include but not be limited to preservation in place and/or data recovery. All cultural resources work shall follow accepted professional standards in recording any find including submittal of standard DPR Primary Record forms (Form DPR 523) and location information to the appropriate California Historical Resources Information System office for the project area.

Implementing Agencies and Timing

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

CR-2(b) Unanticipated Discoveries During Construction

During construction activities, implementing agencies shall, or can and should, implement the following measures. If evidence of any prehistoric or historic-era subsurface archaeological features, deposits or tribal cultural resources are discovered during construction-related earthmoving activities (e.g., ceramic shard, trash scatters, lithic scatters), all ground-disturbing activity proximate to the discovery shall be halted until a qualified archaeologist (36 CFR Section 61) can assess the significance of the find. If the find is a prehistoric archaeological site, the appropriate Native American group shall be notified. If the archaeologist determines that the find does not meet the CRHR standards of significance for cultural resources, construction may proceed. If the archaeologist determines that further information is needed to evaluate significance, a testing plan shall be prepared and implemented. If the find is determined to be significant by the qualified archaeologist (i.e., because the find is determined to constitute either an historical resource or a unique archaeological resource), the archaeologist shall work with the implementing agency to avoid disturbance to the resources, and if complete avoidance is not feasible in light of project design, economics, logistics and other factors, shall recommend additional measures such as the preparation and implementation of a data recovery plan. All cultural resources work shall follow accepted professional standards in recording any find including submittal of standard DPR Primary Record forms (Form DPR 523) and location information to the appropriate California Historical Resources Information System office for the project area. If the find is a prehistoric archaeological site, the culturally affiliated California Native American tribe shall be notified and afforded the opportunity to monitor mitigative treatment. During evaluation or mitigative treatment, ground disturbance and construction work could continue in other parts of the project area that are distant enough from the find not to impact it, as determined by the qualified archaeologist.

Implementing Agencies and Timing

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

Significance After Mitigation

Implementation of Mitigation Measures CR-2(a) and CR-2(b) would reduce potential impacts to archaeological resources to the extent feasible, but some project-specific impacts may be unavoidable. Therefore, this impact is significant and unavoidable. No additional mitigation measures to reduce this impact to less-than-significant levels are feasible.

Threshold 3:	Disturb any human remains, including those interred outside of formal cemeteries

Impact CR-3 CONSTRUCTION ACTIVITY ASSOCIATED WITH TRANSPORTATION IMPROVEMENT PROJECTS AND THE LAND USE SCENARIO ENVISIONED BY THE 2022 RTP/SCS COULD RESULT IN DISTURBANCES TO HUMAN REMAINS INCLUDING THOSE INTERRED OUTSIDE OF FORMAL CEMETERIES. POTENTIAL IMPACTS TO HUMAN REMAINS WOULD BE LESS THAN SIGNIFICANT.

Human burials outside of formal cemeteries are often associated with prehistoric archaeological contexts. Therefore, it is possible to encounter unknown human burials because of implementation of transportation improvement projects under the 2022 RTP/SCS. Excavation during construction activities in the TCAG region would have the potential to disturb these resources, including Native American burials.

In addition to being potential archaeological resources, human burials have specific provisions for treatment in PRC Section 5097, as listed under Section 4.5.2, *Regulatory Setting*. The California Health and Safety Code (Sections 7050.5, 7051 and 7054), as discussed in Section 4.5.2, Regulatory Setting, has specific provisions for the protection of human burial remains. Existing laws and regulations address the illegality of interfering with human burial remains, and protects them from disturbance, vandalism, or destruction, and establish procedures to be implemented if Native American skeletal remains are discovered. PRC Section 5097.98 also addresses the disposition of Native American burials, protects such remains, and established the NAHC to resolve any related disputes. Implementation of these regulations would ensure that 2022 RTP/SCS impacts to disturbance of human remains, including those interred outside of formal cemeteries. would be less than significant.

Mitigation Measures

No mitigation measures are required.

c. Specific 2022 RTP/SCS Projects That May Result in Impacts

Table 4.5-3 identifies transportation projects with the potential to cause or contribute to direct or indirect impacts to cultural resources such as those discussed above. These projects are representative and were selected based on their potential scope and likelihood to require disturbances in previously undisturbed areas. While many projects have the potential to impact cultural resources, those requiring substantial ground disturbance in undisturbed areas have greater potential to impact prehistoric cultural resources. Projects located in urban infill areas near transit or in previously disturbed areas, such as an existing road right-of-way, have a greater potential to impact historic built environment resources, as well as historic archaeological resources in older developed areas. Additional specific analysis would be required as individual projects are implemented to determine the project specific magnitude of impact. Mitigation measures discussed above would apply to these specific projects.

Table 4.5-3 RTP Projects that May Result in Cultural Resources Impacts

Project Jurisdiction and Location	Improvement	Potential Impact
Caltrans		
TUL12-111 – SR 99 Widen Existing Roadway - 30.6/35.2 Tulare/Tagus – Prosperity Ave. to 1.2 m S of Ave. 280.	Widen roadway from 4 to 6 lanes to relieve congestion.	CR-1, CR-2, CR-3
CT-RTP07-004 – SR 99 Widen Existing Roadway -25.4/30.5 Tulare – Avenue 200 to Prosperity Ave	Widen roadway from 4 to 6 lanes to relieve congestion.	CR-1, CR-2, CR-3
CT-RTP22-001 – SR 99 Widen Existing Roadway - 0.0/13.5 Near Earlimart, County Line Rd. to 0.7 mi north of Court Ave.	Widen roadway from 4 to 6 lanes to relieve congestion.	CR-1, CR-2, CR-3
CT-RTP07-005 – SR 99 Widen Existing Roadway - 13.5/25.4 From 0.7 mi north of Court Ave. to Avenue 200.	Widen roadway from 4 to 6 lanes to relieve congestion.	CR-1, CR-2, CR-3
TUL12-122 – SR 65 Widen Existing Roadway - 10.9/15.6 Terra Bella – Ave. 88 to Ave. 124.	10.9/15.6 Terra Bella – Ave. 88 to Ave. 124. Widen roadway from 2 to 4 lanes to relieve congestion.	CR-2, CR-3
CT-RTP11-001 – SR 65 Widen Existing Roadway - 29.5/32.3 Near Lindsay – from Hermosa Rd. to Ave. 244.	Realignment and widen from 2 to 4 lanes to relieve congestion.	CR-1, CR-2, CR-3
CT-RTP07-008 – SR 190 Widen Existing Roadway - 13.2/15.0 Porterville – Westwood to Route 65.	Widen from 2 to 4 lanes to relieve congestion.	CR-1, CR-2, CR-3
CT-RTP07-011 – SR 99 Major I/C Improvements - SR 99 at Caldwell Ave.	Reconstruct interchange and widen bridge structure to relieve congestion.	CR-1, CR-2, CR-3
CT-RTP07-013 – SR 99 Construct new I/C - SR 99 at AgriCenter (Commercial).	Construct new interchange/SR 99 aux lanes to relieve congestion.	CR-1, CR-2, CR-3

Project Jurisdiction and Location	Improvement	Potential Impact
CT-RTP07-014 – SR 99 Major I/C Improvements - SR 99 at Paige Ave.	Reconstruct interchange and widen bridge structure to relieve congestion.	CR-1, CR-2, CR-3
CT-RTP07-021 – SR 198 Construct new I/C - SR 198 at Road 148.	Construct new interchange to relieve congestion.	CR-1, CR-2, CR-3
CT-RTP07-022 – SR 190 Major I/C Improvements - SR 190 at Main Street.	Widen bridge structure, add new ramps to relieve congestion.	CR-1, CR-2, CR-3
Dinuba		
TUL17-001 – Nebraska/Alta Intersection Improvements - Nebraska at Alta.	Roundabout at intersection.	CR-1, CR-2, CR-3
TUL20-001 – Alta/Kamm Intersection Improvements - Kamm at Alta.	Roundabout at intersection.	CR-1, CR-2, CR-3
Lindsay		
TUL20-100 – SR 65 Intersection Improvements - SR 65 at Tulare Ave.	Roundabout and local street improvements.	CR-1, CR-2, CR-3
Porterville		
PO-RTP14-001 – Westwood St. Widen existing road/bridge - South of Orange Ave. to South of Tule River.	Widen from 2 to 4 lanes to relieve congestion.	CR-1, CR-2, CR-3
PO-RTP18-002 – Newcomb St. New crossing over SR190/Tule - North of Tule River to south of Poplar Ditch.	New 4 lane overcrossing to relieve congestion.	CR-1, CR-2, CR-3
PO-RTP18-005 – SR 190 Operational I/C improvements - SR 190 at Main St. and SR 65.	WB Aux lane and ramp improvements.	CR-1, CR-2, CR-3
TUL18-102 – SR 190 Intersection Improvements - SR 190 at Westwood.	Roundabout and local street improvements.	CR-1, CR-2, CR-3
TUL20-033 – SR 190 Intersection Improvements - SR 190 at Plano.	Roundabout and local street improvements.	CR-1, CR-2, CR-3
TUL20-004 – Plano/College Intersection Improvements - Plano at College.	Roundabout at intersection.	CR-1, CR-2, CR-3
Visalia		
TUL21-100 – Riggin Avenue. – Widen Existing Roadway - Akers Street to Demaree Street.	Widen from 2 to 4 lanes to relieve congestion.	CR-1, CR-2, CR-3
TUL21-101 – Riggin Avenue. – Widen Existing Roadway - Mooney Boulevard to Conyer Street.	Widen from 2 to 4 lanes to relieve congestion.	CR-1, CR-2, CR-3
TUL21-102 – Riggin Avenue. – Widen Existing Roadway - Kelsey Avenue to Shirk Avenue.	Widen from 2 to 4 lanes to relieve congestion.	CR-1, CR-2, CR-3
TUL21-103 – Riggin Avenue – Widen Existing Roadway - Shirk Avenue to Akers Street.	Widen from 2 to 4 lanes to relieve congestion.	CR-1, CR-2, CR-3
SR 198 Operational I/C improvements - SR 198 at Shirk St.	Turn lane, intersection, ramp improvements.	CR-1, CR-2, CR-3
CT-RTP07-019 – SR 198 Operational I/C improvements - SR 198 downtown corridor interchanges.	Turn lane, intersection, ramp improvements.	CR-1, CR-2, CR-3
TUL16-104 – SR 198 Operational I/C improvements - SR 198 at Lovers Lane.	Intersection, rehab, operational improvements.	CR-1, CR-2, CR-3

Project Jurisdiction and Location	Improvement	Potential Impact
Tulare County		
TUL20-101 – Caldwell Ave. (Ave. 280) – Widen Existing Roadway - Santa Fe (Visalia) to Lovers Lane (Visalia).	Widen from 2 to 4 lanes & multi-use path to relieve congestion.	CR-1, CR-2, CR-3
TUL20-102 – Avenue 280 – Widen Existing Roadway - Lovers Lane (Visalia) to Virginia (Farmersville).	Widen from 2 to 4 lanes & multi-use path to relieve congestion.	CR-2, CR-3
TUL20-103 – Avenue 280 – Widen Existing Roadway - Brundage (Farmersville) to Elberta (Exeter).	Widen from 2 to 4 lanes & multi-use path to relieve congestion.	CR-2, CR-3
CT-RTP07-015 – SR 99 Operational I/C improvements - SR 99 south county interchanges.	Turn lane, intersection, ramp improvements.	CR-1, CR-2, CR-3
TC-RTP18-001 – SR 198/SR 65 Intersection Improvements - SR 198 at SR 65.	Turn lanes, intersection improvements.	CR-1, CR-2, CR-3
TC-RTP18-002 – SR 198 Intersection Improvements - SR 198 at Spruce Road.	Turn lanes, intersection improvements.	CR-1, CR-2, CR-3

Source: Tulare County 2022 RTP/SCS Project List

4.5.4 Cumulative Impacts

The cumulative impact analysis area for cultural resources consists of the TCAG region and the adjoining counties, based on the historic, ethnographic, and prehistoric period use patterns of the region. Information regarding these adjoining counties can be found in Section 3.3.4 *Approach for Cumulative Analysis*, and Table 3-1. This is appropriate because cultural resources identified in this larger region will be similar in type and style to those that are or may be present in the TCAG region. As discussed in Section 4.5.3, the transportation projects and land use scenario envisioned in the proposed 2022 RTP/SCS could require substantial ground disturbance in undisturbed areas or in infill areas, which could impact historic built environment resources and archaeological resources.

The increase in growth in previously undisturbed areas contributes to regional impacts on existing and previously undisturbed and undiscovered historic and archaeological resources, including CEQA-defined “historical resources.” While most cultural resources are site specific, with impacts that are project specific, others may have regional significance; for example, an historic structure that represents the last known example of its kind would constitute a regional impact if it were affected by future 2022 RTP/SCS project implementation. In addition, there are historic districts or areas that can be affected by multiple or successive projects, over time, resulting in a cumulative impact to the historic resource. For such resources, cumulative impacts would be significant, and the 2022 RTP/SCS contribution to them would be cumulatively considerable, since Impacts CR-1 and CR-2 are significant. Mitigation Measures CR-1, CR-2(a), and CR-2(b) would reduce impacts associated with 2022 RTP/SCS projects through impact minimization for historical and archaeological resources. However, it cannot be guaranteed that all future project level impacts can be mitigated to a less than significant level. As such, the 2022 RTP/SCS contribution would remain cumulatively considerable after mitigation.

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4.6 Energy

This section discusses the energy impacts of implementing transportation projects in the proposed Plan, as well as the energy related consequences of land use project that consistent with the proposed 2022 RTP/SCS.

4.6.1 Setting

Energy relates directly to environmental quality. Energy use can adversely affect air quality and other natural resources. The vast majority of California's air pollution is caused by burning fossil fuels. Consumption of fossil fuels is linked to changes in global climate and depletion of stratospheric ozone. Transportation energy use is related to the fuel efficiency of cars, trucks, and public transportation; choice of different travel modes (auto, carpool, and public transit); vehicle speeds; and miles traveled by these modes. Construction and routine operation and maintenance of transportation infrastructure also consume energy. In addition, residential, commercial, and industrial land uses consume energy, typically through the use of natural gas and electricity.

a. Energy Supply

California's major sources of fuel production in 2019 comprised approximately 68.9 percent crude oil, 16.5 percent natural gas, 12.6 percent nuclear, and 1.9 percent biofuels (U.S. Energy Information Administration [EIA] 2020a). California's current electricity generation is comprised of approximately 44.5 percent non-hydroelectric renewable energy, 40.1 percent natural gas, 8.8 percent hydroelectric, 6.4 percent nuclear, and 0.2 percent coal-fired (U.S. EIA 2020a).

Petroleum fuels are regulated by the Energy, Minerals, and Compliance Division, Petroleum Unit. This includes onshore oil and gas activities within Tulare County by performing annual inspections of onshore wells, facilities, pipelines, and other pertinent equipment throughout oil production leases. The unit is also responsible for protecting the health, safety, public welfare, physical environment, and natural resources of the County by the reasonable regulation of onshore petroleum facilities and operations, including but not limited to, exploration (drilling), production, storage, processing, disposal, well plugging, and well abandonment (Tulare 2021). According to the Division of Oil, Gas, and Geothermal Resources (DOGGR), and there are several oil and gas wells of unknown status within the County including wells that are classified as orphaned, abandoned, or operating oil wells in the Porterville, Deer Creek areas (DOC 2021). Tulare County contains approximately 74, active oil wells (CalGEM 2021), which produced 33,000 barrels (bbl) of oil in 2021 (CalGEM 2019).

Table 4.6-1 2020 Oil and Natural Gas Production in TCAG region

Natural Resource	California	TCAG Region Total	TCAG Region Proportion of Statewide Production
Crude Oil (bbl)	156,449,220	8,325,724	5.32%
Natural Gas (Mcf)	165,986,427	990,477	0.60%
Source: CalGEM 2019.			

b. Energy Consumption and Sources

Total energy consumption in the U.S. in 2020 was estimated at approximately 100,266 trillion Btu (U.S. EIA 2021b). Petroleum provided approximately 36.8 percent of the energy used in 2019 in the U.S. (U.S. EIA 2021b). In the same year, coal provided approximately 11.3 percent of energy consumed, natural gas provided approximately 32.1 percent, nuclear energy provided approximately 8.4 percent and total renewable sources supplied the rest at approximately 11.3 percent (U.S. EIA 2020b). On a per-capita basis, California is ranked second lowest of the states in terms of energy use in 2019 (198 million Btu per person), or about 44.0 percent less than the U.S.'s average per-capita consumption of 354 million Btu per person (U.S. EIA 2020c).

Electricity and Natural Gas

In 2019, California used 277,704 gigawatt hours (GWh) of electricity; approximately 32 percent of California's electricity supply came from renewable energy sources, such as wind, solar photovoltaic, geothermal, and biomass (CEC 2021a). In 2019, California also consumed approximately 13,158 million U.S. therms of natural gas (CEC 2021b). Table 4.6-2 illustrates the electricity and natural gas consumption within the TCAG region and their proportion of statewide consumption in 2020. In addition, many rural areas within the TCAG region rely on wood, propane, or other liquefied petroleum gases (LPGs) as heating fuels.

Table 4.6-2 2020 Electricity and Natural Gas Consumption in the TCAG Region

County	Electricity Consumption 2020Consumption (GWh)[1]	Electricity Consumption Per-Capita Consumption (kWh)	Electricity Consumption Statewide Proportion	Natural Gas Consumption 2020 Consumption (MMthm)[2]	Natural Gas Consumption Per-Capita Consumption (thm)	Natural Gas Consumption Statewide Proportion
Tulare	4,643	9,800	.017	160	33.8	.012%

[1] Electricity consumption is quantified in Millions of Kilowatt-Hours (GWh), while per-capita electricity is quantified in Kilowatt-Hours (kWh).168.8+1276.8+692.7+16.1= 2154.4

[2] Natural Gas consumption is quantified in Millions of Therms (MMthm), while per-capita natural gas consumption is quantified in Therms (thm).

[3] Not available in the CEC database

Note: The per-capita consumption for natural gas and electricity are determined by using 2020 data from the CEC for overall county-wide consumption and divided by the 2020 county population retrieved from the United States Census Bureau database (770,082 persons). Individual entries may not add up to exact total amounts as a result of rounding to a single decimal point.

Sources: CEC 2021a; CEC 2021b; U.S. Census Bureau 2021

As shown in Table 4.6-2, Tulare County accounted for approximately 0.017 percent of the State's electricity consumption and 0.012 percent of the State's natural gas consumption in 2019. The Southern California Edison Company (SCE) provides electric service to most of Tulare County. SCE obtains its electricity from natural gas, fossil fuels, nuclear power, hydroelectric power, and renewable resources. The northern and southeastern corners of the TCAG region are served by the Pacific Gas & Electric Company (PG&E). This includes electricity to Dinuba and unincorporated communities and areas in the northern portion of Tulare County.

Petroleum

Energy consumed by the transportation sector accounts for roughly 39.4 percent of California's energy demand, amounting to approximately 3,073 trillion Btu in 2019 (U.S. EIA 2020b). California's transportation sector, including on-road and rail transportation, consumed roughly 565,056,000 bbl of petroleum fuels in 2019 (U.S. EIA 2020d). Furthermore, petroleum-based fuels are used for approximately 98.2 percent of the State's transportation activity (U.S. EIA 2020d). Most gasoline and diesel fuel sold in California for motor vehicles is refined in California to meet state-specific formulations required by the California Air Resources Board (CARB). Major petroleum refineries in California are concentrated in three counties: Contra Costa, Kern, and Los Angeles (CEC 2021c).

In 2020, Tulare County consumed 159.46 million therms of natural gas (CEC 2020). Table 4.6-3.

Table 4.6-3 Fuel Consumption in TCAG Region

Fuel	2020 Annual Fuel Use (million gallons)	2020 Annual Fuel Use (million Btu)	2020 Daily Energy Use (million Btu)	2020 Daily Per-Capita Energy Use (thousand Btu)[1]
Gasoline	151	16,358,141	44,817	0.09
Diesel	51	6,500,460	17,809	0.04
Total	**202**	**22,858,601**	**62,626**	**0.13**

[1] The per-capita consumption for fuel was determined by using 2020 data divided by the 2020 county population retrieved from the California Department of Finance.

[2] Retail Fuel Sales data aggregates sales for the County of Tulare

Note: Totals may not add up due to rounding.

Source CEC 2021b

Table 4.6-4 Daily and Annual VMT for the TCAG Region 2021

Daily VMT	Annual VMT
10,617,248	3,875,295,520

Note: individual numbers may not add up to totals due to rounding.

Source: TCAG Traffic Demand Model, Appendix E

Alternative Fuels

A variety of alternative fuels are used to reduce petroleum-based fuel demand. The use of these fuels is encouraged through various statewide regulations and plans, such as the Low Carbon Fuel Standard and Senate Bill (SB) 32. Conventional gasoline and diesel may be replaced, depending on the capability of the vehicle with transportation fuels including the following:

- **Hydrogen** is being explored for use in combustion engines and fuel cell electric vehicles. The interest in hydrogen as an alternative transportation fuel stems from its clean-burning qualities, its potential for domestic production, and the fuel cell vehicle's potential for high efficiency, which is two to three times more efficient than gasoline vehicles. Currently, 42 hydrogen refueling stations are located in California; one is located in the City of Tulare, and one in the City of Visalia (DOE 2021a).
- **Biodiesel** is a renewable alternative fuel that can be manufactured from vegetable oils, animal fats, or recycled restaurant greases. Biodiesel is biodegradable and cleaner-burning than petroleum-based diesel fuel. Biodiesel can run in any diesel engine generally without

alterations; however, fueling stations have been slow to make it available. There are currently 11 biodiesel refueling stations in California, none of which are located in the TCAG region (DOE 2020b).

- **Electricity** can be used to power electric and plug-in hybrid electric vehicles directly from the power grid. Electricity used to power vehicles is generally provided by the electricity grid and stored in the vehicle's batteries. Fuel cells are being explored as a way to use electricity generated onboard the vehicle to power electric motors. There are approximately 115 public electrical charging stations in the TCAG region (DOE 2021c).

4.6.2 Regulatory Setting

Programs and policies at the State and national levels have emerged to bolster the previous trend towards energy efficiency, as discussed below.

a. Federal Laws, Regulations, and Policies

Energy Policy Conservation Act (EPCA) and CAFE Standards

The EPCA of 1975 established nationwide fuel economy standards in order to conserve oil. Pursuant to this Act, the National Highway Traffic and Safety Administration, part of the U.S. Department of Transportation, is responsible for revising existing fuel economy standards and establishing new vehicle fuel economy standards.

The Corporate Average Fuel Economy (CAFE) program was established to determine vehicle manufacturer compliance with the government's fuel economy standards. Compliance with CAFE standards is determined based on each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the United States.

National Energy Policy Act of 1992 (EPACT92)

EPACT92 calls for programs that promote efficiency and the use of alternative fuels. EPACT92 requires certain federal, state, and local government and private fleets to purchase a percentage of light duty alternative fuel vehicles (AFVs) capable of running on alternative fuels each year. In addition, EPACT92 has financial incentives. Federal tax deductions will be allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs.

Energy Policy Act of 2005

The Energy Policy Act of 2005 provides renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

Energy Independence and Security Act of 2007 (EISA)

EISA is designed to improve vehicle fuel economy and help reduce U.S. dependence on oil. It expands the production of renewable fuels, reducing dependence on oil, and confronting global climate change. Specifically, it:

- Increases the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022, which represents a nearly five-fold increase over current levels; and
- Reduces U.S. demand for oil by setting a national fuel economy standard of 35 miles per gallon by 2020 – an increase in fuel economy standards of 40 percent.

b. State Laws, Regulations, and Policies

Warren-Alquist Act

The 1975 Warren-Alquist Act established the California Energy Resources Conservation and Development Commission, now known as CEC. The Act established a State policy to reduce wasteful, uneconomical, and unnecessary uses of energy by employing a range of measures. The CPUC regulates privately-owned utilities in the energy, rail, telecommunications, and water fields.

California Energy Plan

CEC is responsible for preparing the California Energy Plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The current (2008) California Energy Plan calls for the State to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies a number of strategies, including assistance to public agencies and fleet operators in implementing incentive programs for zero-emission vehicles and addressing their infrastructure needs; and encouragement of urban designs that reduce vehicle miles traveled (VMT) and accommodate pedestrian and bicycle access.

Assembly Bill 2076: Reducing Dependence on Petroleum

Pursuant to Assembly Bill (AB) 2076 (Chapter 936, Statutes of 2000), CEC and CARB prepared and adopted in 2003 a joint agency report, *Reducing California's Petroleum Dependence*. Included in this report are recommendations to increase the use of alternative fuels to 20 percent of on-road transportation fuel use by 2020 and 30 percent by 2030, significantly increase the efficiency of motor vehicles, and reduce per-capita VMT. Further, in response to the CEC's 2003 and 2005 *Integrated Energy Policy Reports*, the governor directed CEC to take the lead in developing a long-term plan to increase alternative fuel use.

A performance-based goal of AB 2076 was to reduce petroleum demand to 15 percent below 2003 demand.

Integrated Energy Policy Report (IEPR)

Senate Bill (SB) 1389 (Chapter 568, Statutes of 2002) required CEC to conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices. The CEC shall use these assessments and forecasts to develop energy policies that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy, and protect public health and safety.

CEC adopts an IEPR every two years and an update every other year. The 2021 IEPR, updated in 2022, provides a summary of priority energy issues currently facing the State, outlining strategies and recommendations to further the State's goal of ensuring reliable, affordable, and environmentally responsible energy sources. Energy topics covered in the report include electricity resource and supply plans; electricity and natural gas demand forecasts; natural gas outlooks; transportation energy demand forecasts; energy efficiency savings; integrated resource planning; a barriers study; climate adaptation and resilience; renewable gas; southern California energy reliability; distributed energy resources; strategic transmission investment plans; and existing power plan reliability issues.

Senate Bill 1078: California Renewables Portfolio Standard Program.

SB 1078 (Chapter 516, Statutes of 2002), as expanded under SB 2, establishes a renewable portfolio standard (RPS) for electricity supply. The RPS requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide 20 percent of their supply from renewable sources by 2017. SB 2 expanded this law and required procurement from eligible renewable energy resources to 33 percent by 2020. In addition, electricity providers subject to the RPS must increase their renewable share by at least one percent each year. The outcomes of this legislation will impact regional transportation powered by electricity.

California Renewables Portfolio Standard

Early legislation established California's renewables portfolio standard (RPS). The program sets continuously escalating renewable energy procurement requirements for the state's load-serving entities. Generation must be procured from RPS-certified facilities. SB 2 (1X) of 2011 obligated all California electricity providers to obtain at least 33 percent of their energy from renewable resources by 2020. The CPUC and CEC are jointly responsible for implementing the program.

SB 350 (Chapter 547, Statutes of 2015) requires the following by 2030: an RPS of 50 percent, and a doubling of efficiency for existing buildings. SB 100 (Chapter 312, Statutes of 2018) establishes a new RPS target of 50 percent by 2026, increases the RPS target in 2030 from 50 to 60 percent, and establishes a goal of 100 percent zero-carbon energy sources by 2045

Senate Bill 350: Clean Energy and Pollution Reduction Act of 2015

The Clean Energy and Pollution Reduction Act of 2015 (SB 350) requires the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased to 50 percent by December 31, 2030. This act also requires doubling of the energy efficiency savings in electricity and natural gas for retail customers, through energy efficiency and conservation by December 31, 2030.

Assembly Bill 1493: Reduction of Greenhouse Gas Emissions

AB 1493 (Chapter 200, Statutes of 2002), known as the "Pavley bill," amended Health and Safety Code sections 42823 and 43018.5 requiring CARB to develop and adopt regulations that achieve maximum feasible and cost-effective reduction of GHG emissions from passenger vehicles, light-duty trucks, and other vehicles used for noncommercial personal transportation in California.

Implementation of new regulations prescribed by AB 1493 required that the State of California apply for a waiver under the federal Clean Air Act. Although EPA initially denied the waiver in 2008, EPA approved a waiver in June 2009, and in September 2009, CARB approved amendments to its initially adopted regulations to apply the Pavley standards that reduce GHG emissions to new passenger vehicles in model years 2009 through 2016. According to CARB, implementation of the

Pavley regulations is expected to reduce fuel consumption while also reducing GHG emissions (CARB 2017a).

Assembly Bill 1007: State Alternative Fuels Plan

AB 1007 (Chapter 371, Statutes of 2005) required CEC to prepare a State plan to increase the use of alternative fuels in California. CEC prepared the State Alternative Fuels Plan (SAF Plan) in partnership with the ARB and in consultation with other State, federal, and local agencies. The SAF Plan presents strategies and actions California must take to increase the use of alternative non-petroleum fuels in a manner that minimizes costs to California and maximizes the economic benefits of in-state production. The SAF Plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuels use, reduce GHG emissions, and increase in-state production of biofuels without causing a significant degradation of public health and environmental quality.

Bioenergy Action Plan, Executive Order #S-06-06

Executive Order (EO) S-06-06, April 25, 2006, establishes targets for the use and production of biofuels and biopower, and directs State agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. The EO establishes the following target to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of its biofuels within California by 2010, 40 percent by 2020, and 75 percent by 2050. EO S-06-06 also calls for the State to meet a target for use of biomass electricity. The 2011 Bioenergy Action Plan identifies those barriers and recommends actions to address them so that the State can meet its clean energy, waste reduction, and climate protection goals. The 2012 Bioenergy Action Plan updates the 2011 Plan and provides a more detailed action plan to achieve the following goals:

- Increase environmentally and economically sustainable energy production from organic waste;
- Encourage development of diverse bioenergy technologies that increase local electricity generation, combined heat and power facilities, renewable natural gas, and renewable liquid fuels for transportation and fuel cell applications;
- Create jobs and stimulate economic development, especially in rural regions of the state; and
- Reduce fire danger, improve air and water quality, and reduce waste.

Title 24, California Code of Regulations

California Code of Regulations, Title 24, Part 6, is California's Energy Efficiency Standards for Residential and Non-residential Buildings. Title 24 was established by CEC in 1978 in response to a legislative mandate to create uniform building codes to reduce California's energy consumption and provide energy efficiency standards for residential and nonresidential buildings. The standards are updated on an approximately three-year cycle to allow consideration and possible incorporation of new efficient technologies and methods. In 2019, CEC updated Title 24 standards with more stringent requirements effective January 1, 2020. All buildings for which an application for a building permit is submitted on or after January 1, 2017, must follow the 2016 standards. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases GHG emissions. The CEC Impact Analysis for California's 2016 Building Energy Efficiency Standards estimates that the 2016 Standards are 28 percent more efficient than the previous 2013 standards for residential buildings and 5 percent more efficient for non-residential buildings. The building efficiency standards are enforced through the local plan check and building permit process. Local government agencies may adopt and enforce additional energy standards for new buildings as reasonably necessary due to local climatologic, geologic, or topographic conditions, provided that these standards exceed those provided in Title 24.

California Green Building Standards Code, California Code of Regulations Title 24, Part 11

California's green building code, referred to as CalGreen, was developed to provide a consistent approach to green building within the State. Having taken effect in January 2019, the most recent version of the Code lays out the minimum requirements for newly constructed residential and nonresidential buildings to reduce GHG emissions through improved efficiency and process improvements. It also includes voluntary tiers to further encourage building practices that improve public health, safety, and general welfare by promoting a more sustainable design.

c. Local Laws, Regulations, and Policies

Tulare County General Plan

The Tulare County General Plan Energy Element was adopted in August 2012. The General Plan Energy Element provides policies that guide development to ensure the efficient use of energy. The Energy Element includes the following goals and policies regarding energy consumption:

- **ERM-4.1 Energy Conservation and Efficiency Measures:** The County shall encourage the use of solar energy, solar hot water panels, and other energy conservation and efficiency features in new construction and renovation of existing structures in accordance with State law.
- **ERM-4.2 Streetscape and Parking Area Improvements for Energy Conservation**: The County shall promote the planting and maintenance of shade trees along streets and within parking areas of new urban development to reduce radiation heating.
- **ERM-4.3 Local and State Programs:** The County shall participate, to the extent feasible, in local and State programs that strive to reduce the consumption of natural or man-made energy sources.
- **ERM-4.4 Promote Energy Conservation Awareness:** The County should coordinate with local utility providers to provide public education on energy conservation programs.
- **ERM-4.5 Advance Planning:** The County shall participate with energy providers in identifying long range energy strategies and facilities.
- **ERM-4.6 Renewable Energy:** The County shall support efforts, when appropriately sited, for the development and use of alternative energy resources, including renewable energy such as wind, solar, bio-fuels and co-generation.
- **ERM-4.7 Reduce Energy Use in County Facilities:** The County Shall continue to integrate energy efficiency and conservation into all County functions.
- **ERM-4.8 Energy Efficiency Standards:** The County shall encourage renovations and new development to incorporate energy efficiency and conservation measures that exceed State Title 24 standards. When feasible, the County shall offer incentives for use of energy reduction measures such as expedited permit processing, reduced fees, and technical assistance.

Tulare County Climate Action Plan (CAP)

The Tulare Climate Action Plan adopted in 2011 addresses climate change issues for the City of Tulare community in the period to the year 2030, in accordance with directives of the Tulare General Plan and the California Global Warming Solutions Act (AB 32). The CAP also supports statewide GHG emissions reduction goals identified in SB 375. The CAP includes measures pertaining to building energy efficiency, construction equipment fuel usage, and transportation emissions.

Local General Plans

The General Plans for local city jurisdictions in the TCAG region contain initiatives to reduce overall energy consumption and improve energy efficiency. Examples at the City level include the cities of Porterville, Tulare, and Visalia. Each have policies related to energy consumption and efficiency. Other cities have similar policies.

City of Visalia General Plan Policies

- **AQ P-12:** Support the implementation of Voluntary Emissions Reduction Agreements (VERA) with the San Joaquin Valley Air Pollution Control District for individual development projects that may exceed District significance thresholds.
- **AQ P-16**: Support State efforts to reduce greenhouse gas emissions through local action that will reduce motor vehicle use, support alternative forms of transportation, require energy conservation in new construction, and energy management in public buildings, in compliance with AB 32.

City of Tulare General Plan Policies

- **COS-P6.1** The City shall require the use of energy conservation features in new construction and renovation of existing structures in accordance with State law. New features that map be applied to construction and renovation include:
  - Green building techniques (such as recycled, renewable and reused materials; efficient lighting/power sources; design orientation; building techniques, etc.);
  - Cool roofs;
  - Enhanced insulation;
  - Application of solar technologies (e.g., photovoltaic, water heating, etc.); and
  - Energy Star compliance programs.
- **COS-P7.17** When developing the regional transportation system, the City shall work with TCAG to comprehensively study methods of transportation which may contribute to a reduction in air pollution in the City of Tulare. Some possible alternatives that should be studied are:
  - Public transportation such as buses and light rail, to serve between communities of the valley, publicly subsidized if feasible.
  - Intermodal public transit such as buses provided with bicycle racks, bicycle parking at bus stations, and park and ride facilities.
  - Community bus or other public transportation systems, such as cycling or walking trails, with particular attention to high density areas.

City of Porterville General Plan Policies

- **OSC-I-66**: Adopt guidelines and incentives for using green building standards in new construction.
- **OSC-I-70**: Ensure the City codes allow for environmentally acceptable alternative forms of energy production and green building techniques.

4.6.3 Impact Analysis

a. Methodology and Significance Thresholds

Appendix G of the State CEQA Guidelines identifies the following criteria for determining whether a project's impacts would have a significant impact to energy resources. Because the RTP/SCS is a regional plan and not a specific construction project, TCAG has chosen to expand on threshold 1, below, such that energy consumption can be evaluated at a regional level rather than project level. This is consistent with the programmatic nature of the EIR. For the purposes of this EIR, implementation of the RTP/SCS would have a significant impact if it would:

1. Result in significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation (including transportation), based on whether the project would:
   a. Result in an increase in overall per-capita energy consumption relative to baseline conditions;
   b. Result in an increased reliance on fossil fuels and decreased reliance on renewable energy sources
2. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Direct and Indirect Energy Consumption

For this analysis, the calculation of total energy consumption follows the Input-Output methodology suggested by Caltrans (Caltrans Division of Engineering Services, Office of Transportation Laboratory, Energy and Transportation Systems July 1983). Caltrans methodology provides for the calculation of the cumulative energy consumption, including energy consumption that would be due to the construction of the proposed 2022 RTP/SCS projects, and energy consumption due to changes in VMT caused by socioeconomic growth (e.g., population and employment), land use policies, and the existing transportation infrastructure.

Direct Energy Consumption for Transportation Projects

Direct energy is that energy used in the daily operation of the transportation system, including the propulsion of passenger vehicles (automobiles, vans, and trucks) and transit vehicles, including buses and trains. The direct energy analysis for the project is based on baseline (2021), 2036, and 2046 vehicle miles traveled (VMT) with and without the proposed 2022 RTP/SCS (as analyzed in Section 4.12, *Transportation and Circulation*).

The 2020 gasoline and diesel fuel consumption data for the TCAG region was converted to Btu (refer to Table 4.6-3) and divided by region wide daily VMT (refer to Table 4.6-4) to derive a regional Btu/VMT conversion factor of 12,525 Btu per VMT.

It should be noted that the Btu/VMT factor is forecast to continue to decrease into the future as a result of improved fuel economy, particularly if the fleet-wide goal of 35 mpg by year 2020 proposed under the Energy Independence and Security Act is met. Applying the 2015-based factor to future year (2046) VMT therefore provides a reasonable worst-case evaluation of energy consumption as the energy efficiency of vehicles in 204 is anticipated to be higher than the fuel efficiency of current vehicles.

Indirect Energy Consumption for Transportation Projects

Indirect energy is the energy required to construct, operate, and maintain the transportation network, as well as to manufacture and maintain on-road vehicles and transit vehicles. Therefore, construction-related impacts associated with the proposed 2022 RTP/SCS are included in the indirect energy analysis. The indirect energy analysis was conducted using the Input-Output methodology developed by Caltrans (1983). This method converts VMT, lanes miles, or construction dollars into energy consumption based on data from other transportation projects in the United States. Table 4.6-5 shows the indirect energy consumption factors used in this analysis. It should be noted that indirect energy consumption due to production of fuel and transportation/transmission to the end users is not included in this analysis, as any such analysis would be speculative.

Table 4.6-5 Indirect Energy Consumption Factors

Mode	Factor
Manufacturing	
Passenger Vehicles	1,410 Btu/VMT
Transit Buses	3,470 Btu/VMT
Roadway (construction)	27,300 Btu/VMT
Maintenance	
Passenger Vehicles	1,400 Btu/VMT
Transit Buses	13,142 Btu/VMT
Rail	7,060 Btu/VMT

Source: Caltrans 1983

b. Project Impacts and Mitigation Measures

This section describes energy impacts associated with the transportation projects and land use scenario included in the proposed 2022 TCAG RTP/SCS. Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project level analysis of the specific impacts associated with individual transportation and land use projects is not possible. In general, implementation of the proposed transportation improvements and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in energy impact as described in the following sections

Threshold 1a:	Result in significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation (including transportation), based on whether the project would result in an increase in overall per-capita energy consumption relative to baseline conditions

Impact E-1 FUTURE TRANSPORTATION IMPROVEMENT PROJECTS AND IMPLEMENTATION OF THE LAND USE SCENARIO ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD NOT RESULT IN A SIGNIFICANT ENVIRONMENTAL IMPACT DUE TO WASTEFUL, INEFFICIENT, OR UNNECESSARY CONSUMPTION OF ENERGY RESOURCES. THIS IMPACT WOULD BE LESS THAN SIGNIFICANT.

Daily operation of the TCAG region's transportation system uses energy in the form of fuel consumed by propulsion of passenger vehicles (automobiles, vans, and trucks) and transit vehicles (buses and trains). Some highway and roadway improvements included in the proposed 2022 RTP/SCS would increase vehicle capacity, allowing a greater number of vehicles to use facilities in the region. Increases in motor vehicle trips are primarily a combined function of population and employment growth. As discussed in Section 4.15, *Transportation*, the expansion of highway capacity in the TCAG region, such as adding additional travel lanes to State Route 99 near Tulare, are examples of projects that may induce travel demand but also add efficiency in travel through reduced congestion and more efficient routes. As a result, energy consumption as it relates to VMT would increase beyond the 2021 baseline through a combination of growth in the region and induced travel. However, the proposed 2022 RTP/SCS transportation projects would reduce congestion in the TCAG region with improved traffic circulation and added transit and active transportation, decreasing associated per-household and per-capita energy consumption. As shown in Table 4.6-6, per-household energy consumption would be reduced by 11 percent in comparison to baseline conditions and per-capita energy consumption would be reduced by 2.2 percent in comparison to baseline conditions. This per-household and per-capita reduction demonstrates that the 2022 RTP/SCS would result in a more efficient use of energy, not a wasteful, inefficient, or unnecessary consumption of energy resources during operation. The Low Carbon Fuel Standard, encouraging the use of more efficient fuels, along with EPCA, EISA, and CAFE fuel efficiency standards, all require increased fuel efficiency in vehicles to further increase energy efficiency, further reducing wasteful and inefficient use of energy through 2046.

Construction and maintenance of proposed 2022 RTP/SCS transportation projects (including construction and maintenance of roadways and rail lines) would result in short-term consumption of energy resulting from the use of construction equipment and processes. During construction activities, energy would be needed to operate construction equipment. In addition, roadway and transit construction materials, such as asphalt, concrete, surface treatments, steel, rail ballast, as well as building materials, require energy to be produced, and would likely be used in projects that involve new construction or replacement of older materials. The CalGreen Code includes specific requirements related to recycling, construction materials, and energy efficiency standards, which would apply to construction of roadway and transit improvement projects envisioned by the proposed 2022 RTP/SCS, which would reduce waste and energy consumption. All construction and maintenance conducted pursuant to 2045 RTP/SCS, or as a result of improvements made by 2045 RTP/SCS, would be required to comply with the CalGreen Code and would thus reduce energy consumption associated with buildout of the proposed 2022 RTP/SCS.

Table 4.6-6 Direct Transportation and Per-Household Energy Use[1]

Year	Daily VMT	Direct Energy Use (Daily MMBtu)	Per-Household Energy Use (Million Btu per year)[2]	Per-Capita Energy Use Daily (MMBtu)
2021 Baseline	10,617,248	132,981	106.6	0.276
Proposed 2022 RTP/SCS in 2046	12,244,957	153,368	94.4	0.270
Change % (Baseline vs. Proposed 2022 RTP/SCS) [1]	**15%**	**15%**	**-11%**	**-2.2%**

[1] A negative percentage represents a decrease

[2] Appendix E. Energy use per-household reflects energy usage just in new development areas

As shown, in regard to operational energy use, Table 4.6-6 daily VMT and total daily energy use would increase over time as the result of regional socioeconomic (population and employment) growth and the proposed 2022 RTP/SCS energy usage would increase. However, the proposed 2022 RTP/SCS would result in a 11 percent decrease in per-household energy usage when compared to 2021 baseline conditions and a 2.2 percent decrease in per-capita energy usage when compared to 2021 baseline conditions. The per-household and per-capita reductions in energy use would be partially attributed to reduced traffic congestion, more efficient road network, alternative modes of transportation, increases in vehicle fuel efficiency over time, and more efficient transit-oriented land use patterns.

Transportation Projects

The transportation improvements under the proposed 2022 RTP/SCS would result in a more efficient transit system. The proposed 2022 RTP/SCS also would result in greater availability of public transit and other alternative modes of transportation, such as bicycling, which does not consume fuel energy and would reduce traffic congestion. As mentioned previously, improvements to State fuel efficiency standards for vehicles and State mandated increases in the supply and use of alternative transportation fuels would further reduce fuel consumption, such as implementation of an electric vehicle charging station plan.

New transportation facilities that require energy for operation, such as signal lighting, roadway or parking lot lighting, and electronic equipment would increase energy demand. New landscaping irrigation would also increase energy demand through water pumping and treatment. However, energy consumption would not be unnecessary or wasteful, as all lighting, signage and irrigation systems would comply with applicable energy efficiency requirements within the California Building Code. Therefore, the transportation improvement projects included in the proposed 2022 RTP/SCS would not result in inefficient, unnecessary, or wasteful consumption of gasoline or diesel fuel or an increased reliance on fossil fuels relative to baseline conditions.

Land Use Projects

The proposed 2022 RTP/SCS emphasizes a regional land use scenario that promotes land development in existing commercial corridors, enhanced transit corridors, express bus and improved bicycle and pedestrian infrastructure. Mixed use and infill projects would help reduce VMT and energy use because they would locate people closer to existing goods and services, thereby resulting in shorter vehicle trips and/or promoting walking or biking, and they would locate people closer to existing transportation hubs, thereby encouraging the use of alternative modes of transit (e.g., buses) resulting in fewer vehicle trips. Operation of future land use projects would be subject to policy ERM-4.6 Renewable Energy contained within the County's General Plan. Specifically, the policy states "The County shall support efforts, when appropriately sited, for the development and use of alternative energy resources, including renewable energy such as wind, solar, bio-fuels and co-generation."

Even though there would be an increased demand for energy as the TCAG region grows, such development would not require unusual, unnecessary, or wasteful amounts of energy. Future land use projects would be constructed using standard building practices subject to the CALGreen Code and Title 24 of the California Energy Code, which set forth specific energy efficiency requirements related to design, construction methods and materials.

In summary, the proposed 2022 RTP/SCS would reduce energy consumption per-capita and per-household; thus, it would not result in wasteful or inefficient energy consumption within the region relative to baseline conditions. Also, transportation and land use projects implementing the proposed 2022 RTP/SCS would incorporate renewable energy options, as explained in Impact E-2. Therefore, the proposed 2022 RTP/SCS project impacts on energy usage would be less than significant.

Mitigation Measures

No mitigation measures are required.

Threshold 1b:	Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resource, during project construction or operation (including transportation), based on whether the project would result in an increased reliance on fossil fuels and decreased reliance on renewable energy sources

Impact E-2 THE PROPOSED 2022 RTP/SCS WOULD NOT INCREASE RELIANCE ON FOSSIL FUELS OR DECREASE RELIANCE ON RENEWABLE ENERGY SOURCES. THIS IMPACT WOULD BE LESS THAN SIGNIFICANT.

The proposed 2022 RTP/SCS, resulting transportation projects, and implementation of the land use scenario envisioned by proposed 2022 RTP/SCS are required to follow State regulations, such as California's Green Building Standards and SB 350, by incorporating alternative energy use. PG&E is the utility provider for the vast majority of the TCAG region, and pursuant to CPUC regulations, utilities such as PG&E and SCE utilize a long-term planning process to plan for increased energy demand in the future with its publication of ten-year integrated resource plans. The most recent PG&E plan, titled PG&E's 2020 Integrated Resource Plan, details planned projects between 2020 and 2030 that aim to ensure compliance with North American Electric Reliability Corporation standards, improve transmission system access for renewable generation to meet Renewable Portfolio Standard (RPS) goals and targets, improve service reliability for end users and coordinate long-term plans for PG&E's transmission system (PG&E,2020; SCE 2020). Thus, renewable energy options would be incorporated in the proposed 2022 RTP/SCS projects as future transportation improvements and implementation of the land use scenario envisioned by proposed 2022 RTP/SCS rely on the aforementioned service providers, and each has integrated a reduction in reliance on fossil fuels as part of their standards and goals.

Each Integrated Resource Plan published is a ten-year planning document; thus, each utility will continue to assess the reliability and capacity of its energy facilities every ten years based on critical system conditions, growth assumptions and study years agreed upon by the California Independent System Operator Corporation (CAISO) and participating stakeholders.

Furthermore, as described under Impact E-1, construction and operation of land use development envisioned under the proposed 2022 RTP/SCS would be required to comply with relevant provisions of CALGreen and Title 24 of the California Energy Code. In addition, land use and transportation projects would be required to comply with the State's Bioenergy Action Plan, Alternative Fuels Plan, among other regulatory standards to reduce GHG and encourage alternative energy use.

Transportation Projects

As shown in Table 4.6-6 and discussed above, the proposed 2022 RTP/SCS would result in an 11 percent reduction in per-household energy usage when compared to the 2021 baseline condition and a 2.2 percent reduction in per-capita energy usage when compared to 2021 baseline conditions. Projects that would support alternative energy use and potentially decrease VMT would be roadway improvements that incorporate multi use paths along existing corridors. For instance, there are three projects planned by the proposed 2022 RTP/SCS in Visalia, Farmersville and Exeter which would construct multi-use paths concurrently with roadway improvements. These specific projects support alternative energy use by providing County residents with non-motorized transportation options, thereby lessening energy usage within the region. Also, as mentioned above, the proposed 2022 RTP/SCS includes other transportation projects which are subject to the State's Alternative Fuels Plan, thereby encouraging alternative energy use.

Land Use Projects

The proposed 2022 RTP/SCS emphasizes a regional land use scenario that promotes mixed use and infill development in existing commercial corridors in combination with high quality transit service and improved bicycle and pedestrian infrastructure, which would reduce per-capita energy use and energy use per-household by 11 percent. Operation of future infill projects would increase the overall demand for energy beyond existing demand, however, such development would not require unusual, unnecessary, or wasteful amounts of energy shown through a reduction in per-capita energy usage and energy use per-household as shown in Table 4.6-6. As mentioned above, land use projects would incorporate renewable energy options through reliance on service provider, and that have integrated a reduction in reliance on fossil fuels as part of their standards and goals. Therefore, the proposed 2022 RTP/SCS would not increase reliance on fossil fuels or decrease reliance on renewable energy sources. Impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Threshold 2:	Conflict with or obstruct a State or local plan for renewable energy or energy efficiency

Impact E-3 THE PROPOSED 2022 RTP/SCS WOULD NOT CONFLICT WITH OR OBSTRUCT A STATE OR LOCAL PLAN FOR RENEWABLE ENERGY OR ENERGY EFFICIENCY. THIS IMPACT WOULD BE LESS THAN SIGNIFICANT.

As discussed in Section 4.6.2, Regulatory Setting, several State plans, the County's adopted General Plan, city General Plans, and local Climate Action Plans include energy conservation and energy efficiency strategies intended to enable the State and the County to achieve GHG reduction and energy conservation goals. A full discussion of the proposed 2022 RTP/SCS's consistency with GHG reduction plans is included in Section 4.8, *Greenhouse Gas Emissions and Climate Change*.

Transportation Projects

As discussed in Impact E-1, the proposed 2022 RTP/SCS would result in an 11 percent decrease in per-household energy use and a 2.2 percent decrease in per-capita energy use in the region and would not result in energy used in an unnecessary or wasteful manner. Accordingly, there are no inconsistencies between the proposed 2022 RTP/SCS and adopted plans and policies related to energy conservation. The discussion below further examines consistency with adopted plans related to energy conservation.

TCAG monitors regulations related to fuel efficiency standards and alternative fuel vehicles. The proposed 2022 RTP/SCS would not conflict with such regulations (e.g., Energy Policy and Conservation Act and CAFE Standards, EPAct, Energy Independence and Security Act of 2007, AB 1493: Reduction of Greenhouse Gas Emissions, AB 1007: State Alternative Fuels.)

In addition, the 2019 Integrated Energy Policy Report (IEPR) includes a set of strategies to address California's future energy needs. Key topics covered in the report include electricity resource and supply plans; electricity and natural gas demand forecasts; natural gas outlooks; transportation energy demand forecasts; energy efficiency savings; integrated resource planning; a barriers study; climate adaptation and resilience; renewable gas; distributed energy resources; strategic transmission investment plans; and existing power plan reliability issues. The proposed 2022 RTP/SCS would not conflict with these policies. Refer to Section 4.8, *Greenhouse Gas Emissions and Climate Change,* for a discussion of greenhouse gas emissions reductions related to the proposed 2022 RTP/SCS.

Land Use Projects

Locally, the proposed 2022 RTP/SCS would be consistent with the Tulare County General Plan and city general plans that include goals and policies that encourage energy conservation and energy efficiency. The proposed 2022 RTP/SCS encourages the use of renewable energy, energy conservation and energy efficiency techniques in all new building design, orientation, construction, and support of alternative transportation and fuels. Local general plans include similar goals and policies.

The proposed 2022 RTP/SCS would be consistent with the State and local plans, as the proposed 2022 RTP/SCS's Chapter 2 Policy 1.3 Alternative Fuels and Energy would

1. Encourage the use of alternative fuels, and the application of advanced transportation and energy technologies to reduce vehicular emission production and energy consumption, and;
2. Promote renewable energy and energy conservation, consistent with applicable federal, State, and local energy programs, goals, and objectives.

Therefore, the proposed 2022 RTP/SCS would be consistent with State energy efficiency plans, the County's adopted energy conservation and efficiency strategies contained in its General Plan, and local General Plans' energy efficiency policies. Therefore, this impact would be less than significant.

Mitigation Measures

No mitigation measures are required.

c. Specific 2022 RTP/SCS Projects That May Result in Impacts

The analysis within this section discusses the potential energy related impacts associated with the proposed 2022 RTP/SCS. The transportation projects within the proposed 2022 RTP/SCS are evaluated herein in their entirety and are intended to promote energy efficient, environmentally sound modes of travel and facilities and services rather than cause adverse impacts. However, as described above, the proposed 2022 RTP/SCS would decrease per-household and per-capita energy usage associated with transportation projects in the region. These effects have been found to be less than significant, as described above. Taken separately, even if any specific of the proposed 2022 RTP/SCS projects increases energy use, those impacts would be less than significant. For example, any project that required construction equipment or lighting improvements would increase energy usage, but based on the above, the overall impacts of the totality of the proposed 2022 RTP/SCS are less than significant Thus, no specific projects are listed in this section related to the adverse impacts on energy in the TCAG region.

4.6.4 Cumulative Impacts

The cumulative impact analysis area for energy consists of the TCAG region and adjoining counties. Information regarding these adjoining counties can be found in Section 3.1 – *Environmental Setting,* Table 4.3-1. Future development in this region that could impact energy use is considered in the analysis. This cumulative extent is used to evaluate potential wasteful or inefficient use of energy resulting in an increase overall per-capita energy consumption or result in increased reliance on fossil fuels and decreased reliance on renewable energy sources or conflict with state or local plans for renewable energy or energy efficiency across the cumulative impact area.

Future development in the cumulative impact analysis area would result in short term consumption of energy resulting from construction equipment and use of fuel for vehicles. Operation of future developments would also require energy but would be subject to CalGreen and California Building Energy Efficiency Standards. Furthermore, pursuant to the California Public Utilities Commission, utilities such as Pacific Gas and Electric must utilize a long-term planning process to plan for increased energy demand in the area and would account for increased development and an increase in population. As such, growth in the cumulative impact analysis area and increased energy demand would be accounted for and would not result in the inefficient, unnecessary, or wasteful use of energy.

Demand for energy resources such as natural gas, electricity, and transportation fuels would increase as the population of the TCAG region grows. However, proposed transportation improvements and land use projects envisioned under the proposed 2022 RTP/SCS would conserve transportation energy by relieving congestion and contributing towards other transportation efficiencies such as transit and active transportation, resulting in lower per-capita transportation energy consumption in 2046 than in the 2022 baseline year. In addition, renewable energy sources steadily constitute a larger proportion of California's energy supply makeup, resulting in a trend of decreased dependency on fossil fuels and increased dependency on renewable energy sources. As a result, the proposed 2022 RTP/SCS would not contribute to significant cumulative impacts related to wasteful or inefficient use of energy resources and services because energy usage would be reduced on a per-household and per-capita basis with the proposed 2022 RTP/SCS as compared to existing 2021 conditions.

In addition, adherence to existing applicable policies and regulations, such as CalGreen, California Building Energy Efficiency Standards, and the Low Carbon Fuel Standard, would ensure the incorporation of energy efficiency measures in the design and operation of future projects facilitated by the proposed 2022 RTP/SCS and other cumulative projects. As such, the proposed 2022 RTP/SCS would not contribute to a cumulative impact to the wasteful, unnecessary, or inefficient use of energy. The proposed 2022 RTP/SCS contribution to cumulative impacts related to energy consumption would not result in the inefficient use of energy resources. As such, the incremental proposed 2022 RTP/SCS impact on wasteful, inefficient, or unnecessary energy use, or conflicts with plans for renewable energy or energy efficiency, would not be a cumulatively considerable.

4.7 Geology and Soils

This section evaluates impacts on geology and soils, paleontological resources, and mineral resources from implementation of the proposed 2022 RTP/SCS.

4.7.1 Setting

Tulare County is situated in the Great Valley and Sierra Nevada geomorphic provinces, which are two of the eleven major geomorphic provinces in California (California Geological Survey [CGS] 2002). The Great Valley is defined as an alluvial plain while the Sierra Nevada is a tilted fault block (California Geologic Survey [CGS] 2002). Existing geologic and soils conditions for the TCAG region are briefly summarized below. Figure 4.7-1 shows geologic units in the TCAG region, Figure 4.7-2 shows known fault lines within the TCAG region, and Figure 4.7-3 shows landslide risk within the TCAG region. There are 12 different generalized rock types in TCAG region, two having high sensitivity to resources and the remaining having a low to no sensitivity to paleontological resources. There are nine Mineral Resources Zones (MRZs) in the TCAG region (Taylor 1997a). Of these nine, four MRZs are classified as MRZ-2a or MRZ-2b, meaning areas underlain by mineral deposits where geologic data indicates significant measured, indicated, or inferred resources are present as shown in Figure 4.7-4.

a. Geology and Soils

Great Valley

The western portion of the TCAG region sits in the Great Valley geomorphic province (CGS 2002). The Great Valley is an elongate lowland approximately 50 miles wide and 400 miles long. It is bounded to the east by the Sierra Nevada Range and to the west by the Coast Range. A relatively undeformed basin, the Great Valley rises from about sea level to approximately 400 feet in elevation at the north and south ends. The northern portion of the valley, referred to as the Sacramento Valley, is drained by the Sacramento River, while the southern portion of the valley, referred to as the San Joaquin Valley, is drained by the San Joaquin River. Consequently, the Great Valley is predominantly alluvial, flood, and delta plains formed by these two major river systems (Weissmann 2005).

Sierra Nevada

The eastern portion of the TCAG region sits in Sierra Nevada geomorphic province (CGS 2002; Jennings et al. 2010). The Sierra is a tilted fault block nearly 400 miles long. Its east face is a high, rugged scarp, contrasting with the gentle western slope that disappears under sediments of the Great Valley. Their upper courses, especially in massive granites of the higher Sierra, are modified by glacial sculpturing, forming such scenic features as Yosemite Valley. The high crest culminates in Mount Whitney with an elevation of 14,495 feet above sea level near the eastern scarp. The northern Sierra boundary is marked where bedrock disappears under the Cenozoic volcanic cover of the Cascade Range (CGS 2002).

Geologic Units

The TCAG region was mapped at a scale of 1:750,000 by Jennings et al. (2010). These authors mapped the entire state of California, so they primarily divided geologic units based on their general lithology and age. Jennings et al. (2010) identified 13 geologic units within the TCAG region as shown in Figure 4.7-1 and described in Table 4.7-1.

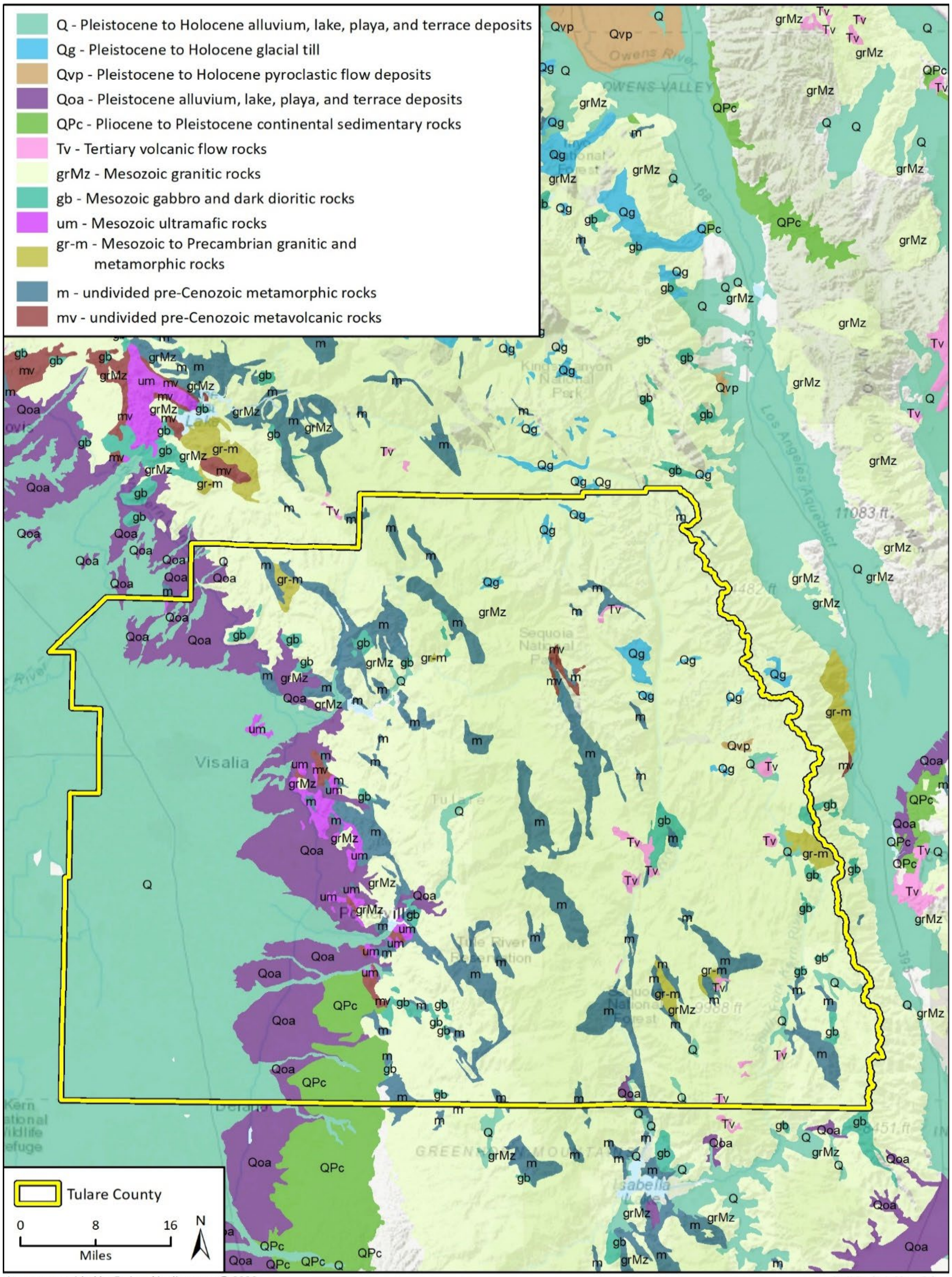
Table 4.7-1 Paleontological Sensitivity of Geologic Units in the Project Area

Geologic Unit	Abbreviation	Paleontological Sensitivity
Pleistocene to Holocene alluvium, lake, playa, and terrace deposits	Q	High
Pleistocene to Holocene glacial till	Qg	Low
Pleistocene to Holocene pyroclastic flow deposits	Qvp	Low
Pleistocene alluvium, lake, playa, and terrace deposits	Qoa	High
Pliocene to Pleistocene continental sedimentary rocks	QPc	Low
Tertiary volcanic flow rocks	Tv	None
Mesozoic gabbro and dark dioritic rocks	gb	None
Mesozoic granitic rocks	grMz	None
Mesozoic ultramafic rocks	um	None
Mesozoic to Precambrian granitic and metamorphic rocks	gr-m	None
Undivided pre-Cenozoic metamorphic rocks	m	None
Undivided pre-Cenozoic metavolcanic rocks	mv	None

Earthquake Ground-Shaking and Fault Rupture

According to the Tulare County General Plan, although a number of faults have been located along the western edge of the Sierra Nevada Mountains, none are known to be active. The Owens Valley Fault Group poses the greatest seismic threat. The center of the fault zone is thought to be able to produce a maximum probable earthquake of 7.0 on the Richter Scale at a recurrence interval of 125 years, while the central area is thought to be capable of producing an earthquake of 8.25 magnitude every 300 to 10,000 years (Tulare County 2010). The San Andreas Fault is located approximately 40 miles west of the Tulare County boundary. This fault has a long history of activity and is thus the primary focus in determining seismic activity within the county. Seismic activity along the fault varies along its span from the Gulf of California to Cape Mendocino. Just west to Tulare County lies the “Central California Active Area,” where many earthquakes have originated (Tulare County 2007). The Clovis Fault is considered to be active within the Quaternary Period (within the past two million years), although there is no historic evidence of its activity. The Clovis Fault lies approximately six miles south of the Madera County boundary in Fresno County. Activity along this fault could potentially generate more seismic activity in Tulare County than the San Andreas or Owens Valley fault system. However, because of the lack of historic activity along the Clovis Fault, inadequate evidence exists for assessing maximum earthquake impacts (Tulare County 2007). Fault lines in the TCAG region can be found on Figure 4.7-2.

Figure 4.7-1 Geologic Units within the TCAG Region



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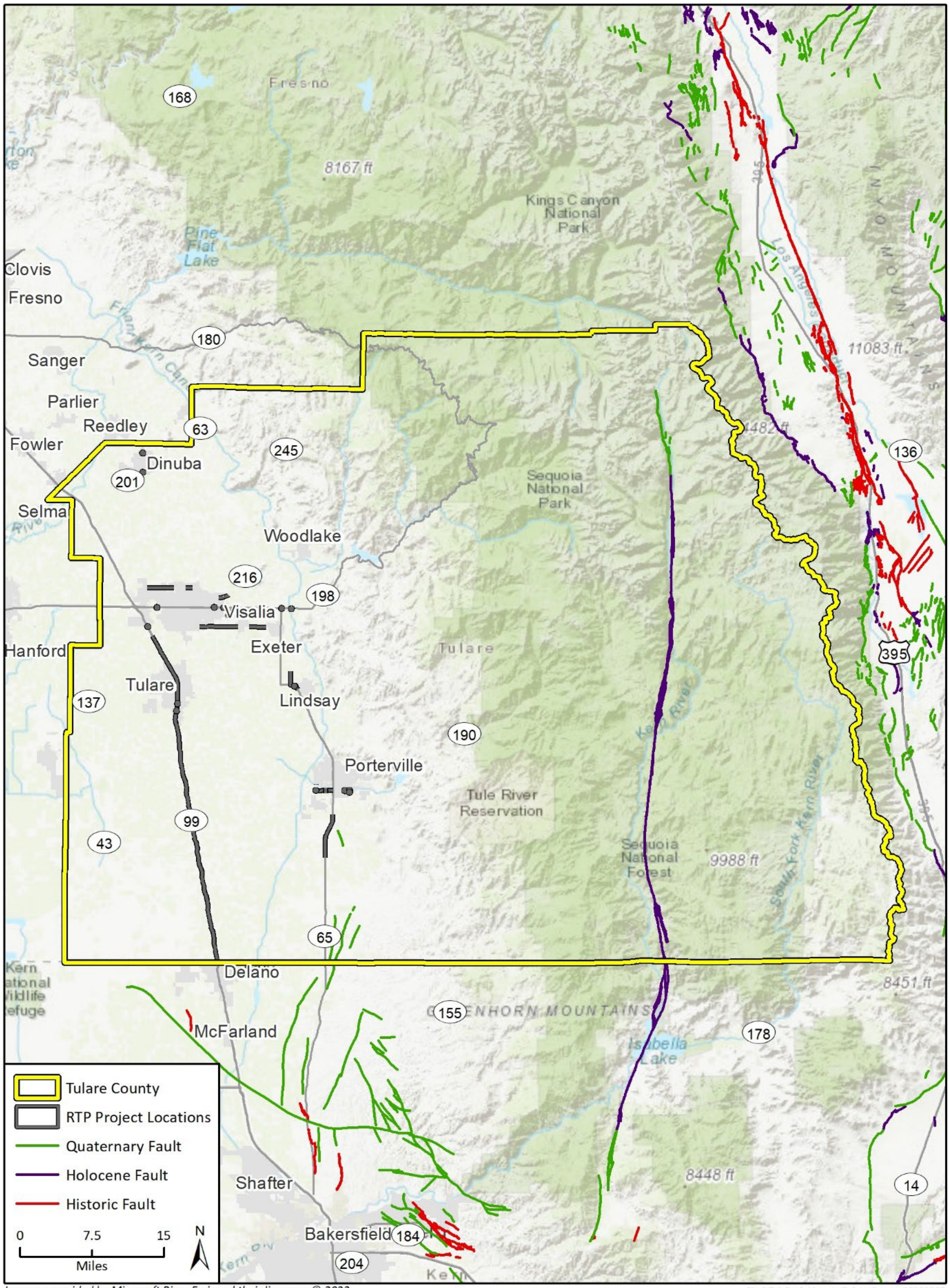
Data provided by California Department of Conservation 2010 Geologic Map of California.

Figure 4.7-2 Fault Lines in the TCAG Region



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Additional data provided by USGS, 2017.

Liquefaction and Lateral Spreading

Liquefaction, or the loss of soil bearing strength during a strong earthquake, is a potential occurrence in several areas with younger soils as well as in areas where the groundwater table is less than 50 feet deep. Specifically, in areas of loose sand and silt that is saturated with water, soils can behave like liquid during earthquakes. In addition to necessary soil conditions, ground acceleration and duration of the earthquake must be of sufficient energy to induce liquefaction. Areas where groundwater is less than 30 feet below the surface primarily occur within the valley. However, soil types in the valley are not conducive to liquefaction because they are either too coarse or too high in clay content. Areas subject to ground shaking are located in a small section of the Sierra Nevada Mountains along the Tulare-Inyo County boundary. However, the depth to groundwater in such areas is greater than in the valley, which minimizes liquefaction potential (Tulare County 2007).

Slope Stability

Landslides and surficial slope failures are most likely to occur in areas of greater than 25 percent slope (hillside areas) and along steep bluffs. Landslides also occur due to specific events, such as loss of vegetation after fires or earthquakes adding loads to barely stable slopes. The foothill and mountain areas of the TCAG region, where steep slopes are present, less consolidated or weathered soils overlie bedrock, and inadequate ground cover accelerates erosion, are more susceptible to unstable slopes and landslides. Roadways such as SR 198 and SR 190 in eastern Tulare County could be affected by landslides in the event of an earthquake or heavy rain. There is no risk of large landslides in the valley area of the county due to its relatively flat topography (Tulare County 2007). Landslide risk in the TCAG region can be found on Figure 4.7-3.

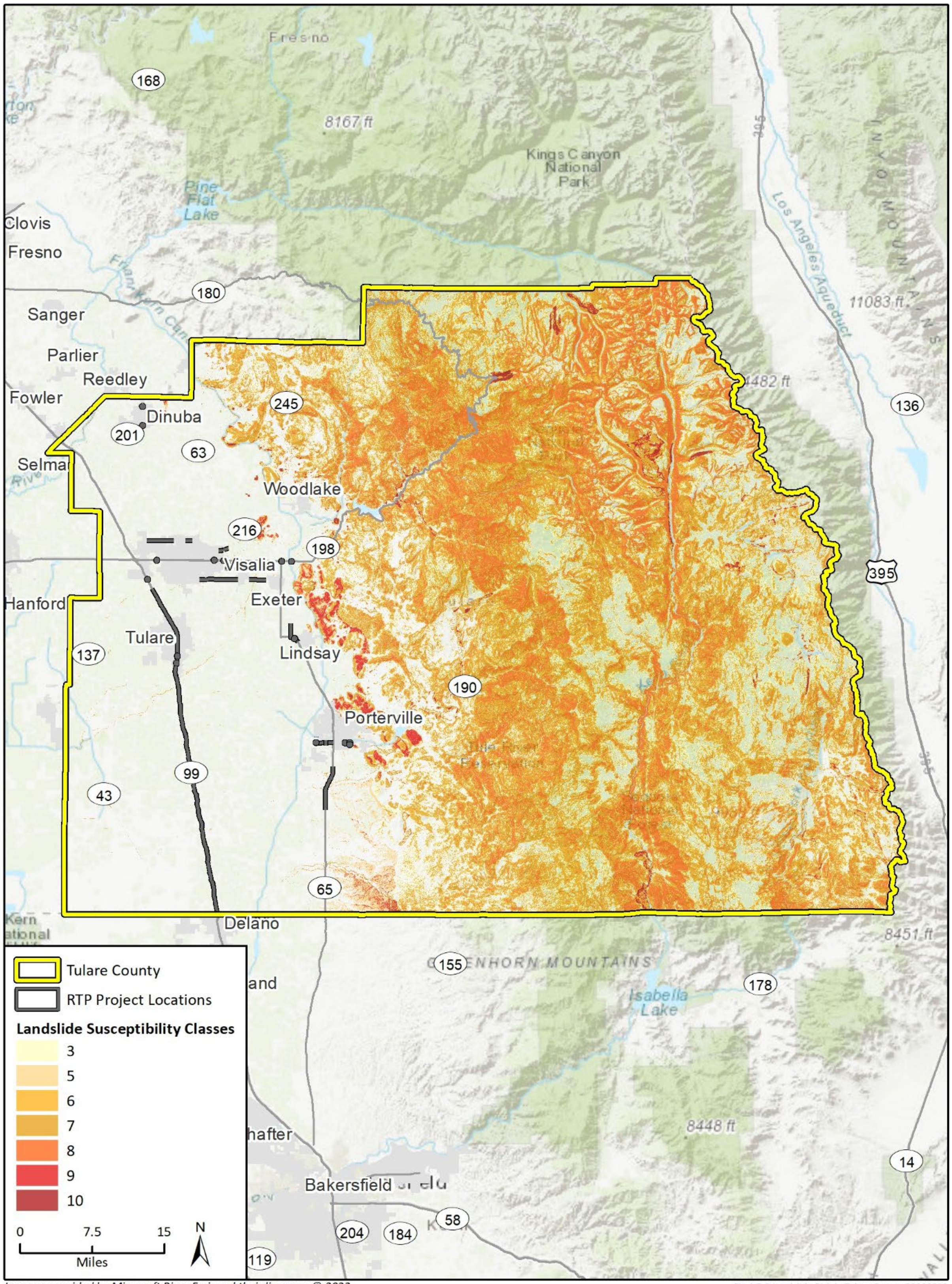
Expansive Soils

Soils with relatively high clay content are expansive due to the capacity of clay minerals to take in water and swell (expand) to greater volumes. Because the bedrock and soils contain relatively substantial amounts of clay, this can be a condition experienced along numerous roadways in the area. Western areas of the TCAG region contains soils characterized by loam, loamy sand, silty clay, and sandy loam with low shrink-swell potential (United States Bureau of Reclamation [USBR] 2015). Soils in the central-western part of the county consist of loamy sand and sandy loam and have mainly low shrink-swell potentials with some minor areas of moderate and high shrink-swell potentials (USBR 2015). In the foothill area of the central part of the TCAG region soils have mainly low shrink-swell potentials with some areas of moderate to high shrink-swell potentials (USBR 2015).

Subsidence

Subsidence is a gradual settling or sudden sinking of the Earth’s surface due to removal or displacement of subsurface earth materials. Principal causes include aquifer-system compaction associated with groundwater withdrawals; drainage of organic soils; underground mining; or natural compaction or collapse, such as with sinkholes or thawing permafrost (USGS n.d.). Some areas of the Central Valley have subsided for more than 20 feet during the past 50 years (Tulare County 2007).

Figure 4.7-3 Landslide Risk in the TCAG Region



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Additional data provided by CGS, Map Sheet 58, 2015.

Mineral Resources

The primary mineral commodities currently mined in the eastern areas of the foothills in the TCAG region are sand, gravel, crushed rock, and natural gas (Tulare County 2010). Other minerals that could be mined commercially include tungsten, chromite, copper, gold, lead, manganese, silver, zinc, barite, feldspar, limestone, and silica (Tulare County 2010). However, construction-grade aggregate (sand, gravel, and crushed rock) is the most abundant and valuable mineral resource in the region because it is a major element of Portland cement concrete and asphaltic concrete.

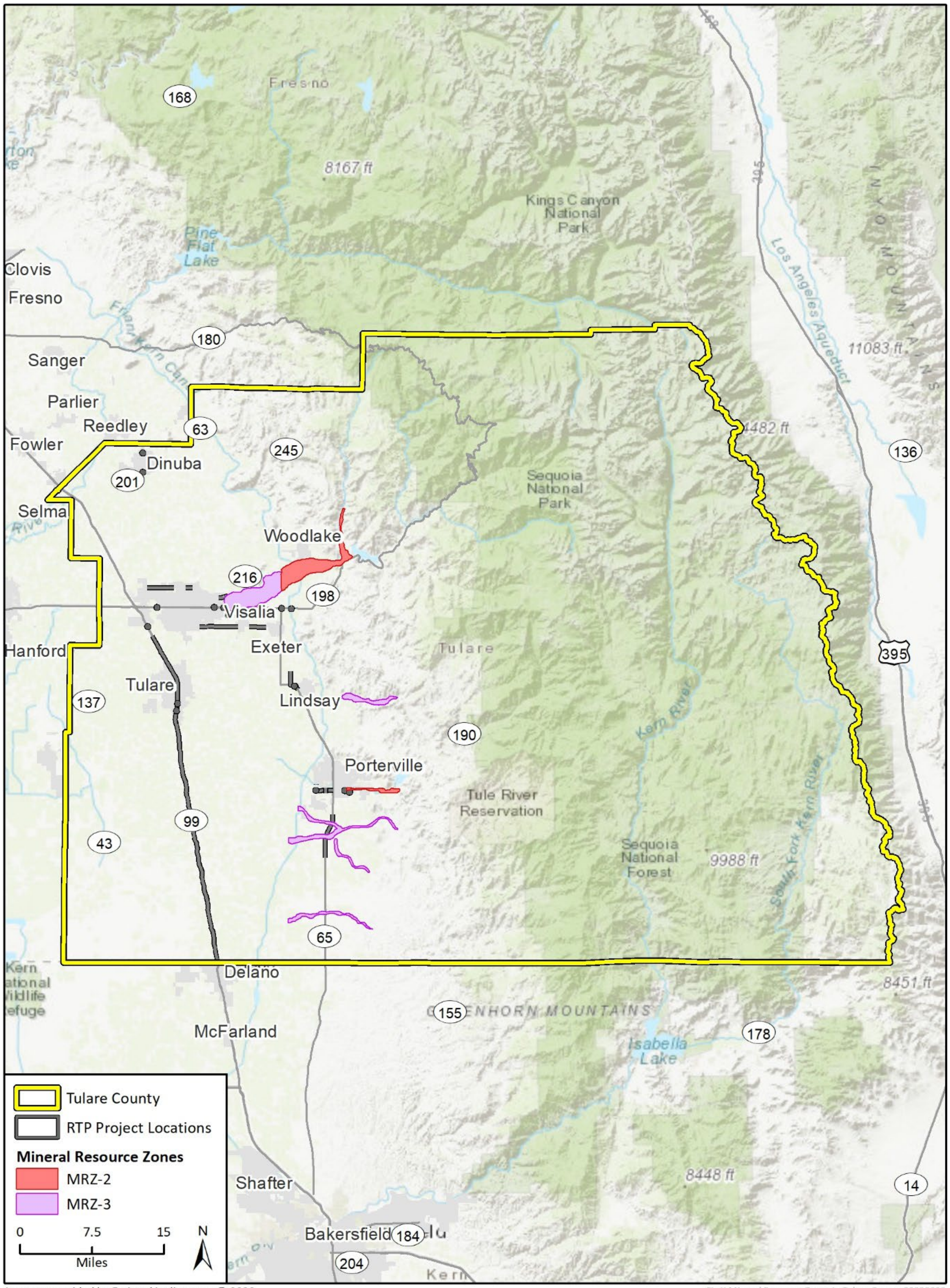
According to the Department of Conservation, Division of Mines and Geology *Mineral Land Classification of Concrete Aggregate Resources in the Tulare County Production-Consumption Region, California*, there are nine Mineral Resources Zones (MRZs) in the TCAG region (Taylor 1997a) as shown in Figure 4.7-4. Of these nine, four MRZs are classified as MRZ-2a or MRZ-2b, meaning areas underlain by mineral deposits where geologic data indicates significant measured, indicated, or inferred resources are present. These include the Kaweah-St. Johns Rivers located approximately 1.2 miles northwest of the City of Lemon Cove, the Dry Creek located approximately four miles northeast of the City of Lemon Cove, the Tule River which bisects the City of Porterville's southern boundary, and the Deer-Creek Foundation Springs Area located approximately five miles southeast of the City of Porterville. Five MRZs are classified as MRZ-3a, meaning areas of known mineral occurrences of undetermined mineral resource significance. These areas include Kaweah-St. Johns River Floodplain Deposits located approximately five miles east of the City of Visalia, the Lewis Creek Area located approximately five miles southeast of the City of Lindsay, the Deer Creek-Old Deer Creek Channel located approximately 4.6 miles southwest of the City of Porterville, Fountain Springs Gulch approximately six miles south of the City of Porterville, and the White River Area approximately 6.5 miles south of Terra Bella (Taylor 1997a; Taylor 1997b).

b. Paleontological Resources

Paleontological resources, or fossils, are the evidence of once-living organisms preserved in the rock record. They include both the fossilized remains of ancient plants and animals and the traces thereof (e.g., trackways, imprints, burrows, etc.). Paleontological resources are not found in "soil" but are contained within the geologic deposits or bedrock that underlies the soil layer. Typically, fossils are greater than 5,000 years old (i.e., older than middle Holocene in age) and are typically preserved in sedimentary rocks. Although rare, fossils can also be preserved in volcanic rocks and low-grade metamorphic rocks under certain conditions (Society of Vertebrate Paleontology [SVP] 2010). Fossils occur in a non-continuous and often unpredictable distribution within some sedimentary units, and the potential for fossils to occur within sedimentary units depends on several factors. It is possible to evaluate the potential for geologic units to contain scientifically important paleontological resources, and therefore evaluate the potential for impacts to those resources and provide mitigation for paleontological resources if they are discovered during construction of a project.

Paleontological sensitivity refers to the potential for a geologic unit to produce scientifically significant fossils. Direct impacts to paleontological resources occur when earthwork activities, such as grading or trenching, cut into the geologic deposits within which fossils are buried and physically destroy the fossils. Since fossils are the remains of prehistoric animal and plant life, they are considered to be nonrenewable. Such impacts have the potential to be significant and, under the *CEQA Guidelines*, may require mitigation. Sensitivity is determined by rock type, history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit.

Figure 4.7-4 Mineral Resources in the TCAG Region



Imagery provided by Esri and its licensors © 2022.
Additional data provided by California Department of Conservation, Division of Mines and Geology, Taylor, 1997b.

Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. Vertebrate fossils are almost always significant because they occur more rarely than invertebrates or plants. Thus, geological units having the potential to contain vertebrate fossils are considered the most sensitive

The SVP outlines in its Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources (2010) guidelines for categorizing paleontological sensitivity of geologic units within a project area. The SVP (2010) describes sedimentary rock units as having a high, low, undetermined, or no potential for containing significant nonrenewable paleontological resources. This criterion is based on rock units within which vertebrates or significant invertebrate fossils have been determined by previous studies to be present or likely to be present.

The geographic distribution, general characteristics, and paleontological sensitivities of each geologic unit in Tulare County is discussed below. Table 4.7-1 summarizes the paleontological sensitivities of each geologic unit.

Pleistocene to Holocene Alluvium, Lake, Playa, and Terrace deposits (Q)

Pleistocene to Holocene alluvium, lake, playa, and terrace deposits (Q) are mapped extensively in the San Joaquin Valley in western Tulare County (Figure 4.7-1). In Tulare County, the majority of these sediments originate from alluvial fans, but in some areas, they represent recent low-energy basin or fluvial deposition that are loose or poorly consolidated (Matthews and Burnett 1965).

Sediments classified as Q range from Pleistocene to Holocene in age. Several localities bearing taxa such as mammoths (*Mammuthus*), horses (*Equus*), mastodon (*Mammut*), and camels (*Camelops*) are known from sediments classified as Q in Tulare County (Jefferson 2010; UCMP 2022, PBDB 2022). Younger Holocene sediments (i.e., less than 5,000 years before present) are too young to preserve scientifically significant paleontological resources, but these sediments grade into older, more paleontologically sensitive sediments in the subsurface, sometimes at shallow depths, especially in eastern regions mapped as Q, closer to the foothills of the Sierra Nevada. For these sediments' fossil-producing history in Tulare County, Q is assigned a high paleontological sensitivity.

Pleistocene to Holocene Glacial Till (Qg)

Pleistocene to Holocene glacial till (Qg) is mapped in the northeastern portion of Tulare County at high elevations within the Sierra Nevada (Figure 4.7-1). Glacial till consists of sediment eroded and transported by glaciers and deposited at their toe. Glacial erosion and transportation are very high-energy processes that would very likely destroy any fossils beyond a point where they are scientifically useful. For this reason, Qg is assigned a low paleontological sensitivity.

Pleistocene to Holocene Pyroclastic Flow Deposits (Qvp)

Pleistocene to Holocene pyroclastic flow deposits (Qvp) occur in small areas of eastern Tulare County, within the Sierra Nevada (Figure 4.7-1). Pyroclastic flows are landslides or debris flows consisting of recently erupted volcanic material. The high temperatures and violent nature of this mode of deposition makes fossil preservation very rare. Therefore, Qvp is assigned a low paleontological sensitivity.

Pleistocene Alluvial, Lake, Playa, and Terrace Deposits (Qoa)

Pleistocene alluvium, lake, playa, and terrace deposits (Qoa) are found in the western foothills of the Sierra Nevada, along the edges of the San Joaquin Valley in Tulare County (Figure 4.7-1). They are derived from river transport from the Sierra Nevada mountains and deposited on the eastern edge of the Great Valley and underlie Holocene alluvium west of areas mapped as Qoa (Weissmann 2005). Tulare County has 10 recorded vertebrate localities consisting of Pleistocene alluvium (Jefferson 2010; PBDB 2022; UCMP 2022). The localities have yielded a range of mammal fossils such as horse (*Equus*), mammoth (*Mammuthus*), mastodon (*Mammut*) and camel (*Camelops*). Qoa has a prolific fossil-producing history in Tulare County, so it is assigned a high paleontological sensitivity.

Pliocene to Pleistocene Continental Sedimentary Rocks (QPc)

Pliocene to Pleistocene continental sedimentary rocks (QPc) are found in southern Tulare County along the border of the Great Valley and Sierra Nevada geomorphic provinces (Figure 4.7-1). Per the map of Bartow and Doukas (1978), these sediments are grouped as the Kern River Formation. The Kern River Formation is generally brownish with poor bedding and is loosely consolidated. The lower part of the unit consists of alternating beds of pebbly cross-bedded sandstone and gray-green mudstone, but it coarsens upward to become a coarse sandstone to conglomerate. No fossil localities are reported from this unit in Tulare County or similar sediments nearby in Kern County (Jefferson 2010; UCMP 2022, PBDB 2022); therefore, QPc is assigned a low paleontological sensitivity.

Tertiary Volcanic Flow Rocks (Tv)

Tertiary volcanic flow rocks (Tv) are mapped sporadically in eastern Tulare County within the Sierra Nevada (Figure 4.7-1). Tv in Tulare County typically consists of basaltic rocks (Ross 1995). Basaltic rocks are formed by the cooling of surficial lava, which is not conducive to fossil preservation; therefore, Tv has no paleontological sensitivity.

Mesozoic granitic rocks (grMz)

Mesozoic granitic rocks form the single largest unit in Tulare County and underlie much of the Sierra Nevada (Figure 4.7-1). Granitic rocks form by the crystallization of magma below the Earth's surface, conditions which cannot preserve fossils. Therefore, grMz has no paleontological sensitivity.

Mesozoic Gabbro and Dark Dioritic Rocks (gb)

Mesozoic gabbro and dark dioritic rocks (gb) are found sporadically in eastern Tulare County within the Sierra Nevada (Figure 4.7-1). Gabbro and dioritic rocks form by the crystallization of magma below the Earth's surface, conditions with cannot preserve fossils. Therefore, gb has no paleontological sensitivity.

Mesozoic Ultramafic Rocks (um)

Mesozoic ultramafic rocks (um) are found sporadically in Tulare County, within the interior of the Sierra Nevada and its western foothills (Figure 4.7-1). In Tulare County, um typically consists of serpentinite (Ross 1995; Sisson and Moore 2013). Ultramafic rocks are volcanic rocks formed by the cooling of molten rock that may or may not have undergone metamorphism. These conditions are not conducive to the preservation of fossils; therefore, um is assigned no paleontological sensitivity.

Undivided pre-Cenozoic Metamorphic Rocks (m)

Undivided pre-Cenozoic metamorphic rocks are found sporadically throughout Tulare County within the Sierra Nevada (Figure 4.7-1). Metamorphic rocks are produced by subjecting other rocks to intense heat and/or pressure, conditions which would destroy any fossils that may have been contained within those rocks. Therefore, m is assigned no paleontological sensitivity.

Undivided Pre-Cenozoic Metavolcanic Rock (mv)

Undivided pre-Cenozoic metavolcanic rock is mapped sporadically in the border region of the Great Valley and Sierra Nevada geomorphic provinces in Tulare County (Figure 4.7-1). Tulare County, rocks mapped as mv typically consist of metabasalt, meta-andesite, metadacite tuff, and amphibolite (Ross 1995; Sisson and Moore 2013). Volcanic rocks are formed by the cooling of molten rock, and metavolcanic rocks are the result of subjection of those rocks to intense heat and pressure. Neither of these processes is conducive to the preservation of fossils; therefore, mv is assigned no paleontological sensitivity.

4.7.2 Regulatory Setting

a. Federal Laws, Regulations, and Policies

Earthquake Hazards Reduction Act

The Earthquake Hazards Reduction Act was enacted in 1977 to "reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program." To accomplish this, the act established the National Earthquake Hazard Reduction Program (NEHRP). NEHRP's mission includes improved understanding and characterization of hazards and vulnerabilities, improvement of building codes and land use practices, risk reduction through post-earthquake investigations and education, development and improvement of design and construction techniques, improvement of mitigation capacity, development of alternative performance objectives to advance functional recovery, and accelerated application of research results. The NEHRP designates the National Institute of Standards and Technology as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities. Programs under the NEHRP help inform and guide planning and building code requirements, such as emergency preparedness responsibilities and seismic code standards.

Disaster Recovery Reform Act of 2018

The Disaster Recovery Reform Act was signed into law in 2018. The reforms acknowledge the shared responsibility for disaster response and recovery, are intended to reduce the complexity of the Federal Emergency Management Agency (FEMA), and build the nation's capacity for the next catastrophic event. The law, which amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act, contains 56 distinct provisions that require FEMA policy or regulation changes for full implementation. Examples of the provisions include expanding eligible hazard mitigation activities including the replacement of electric utility poles resilient to extreme winds (Section 1204) and earthquake early warning technology (Section 1233).

Archaeological and Paleontological Salvage (23 USC 305)

Statute 23 United States Code (USC) 305 amends the Antiquities Act of 1906. Specifically, it states:

> "Funds authorized to be appropriated to carry out this title to the extent approved as necessary, by the highway department of any State, may be used for archaeological and paleontological salvage in that state in compliance with the Act entitled "An Act for the preservation of American Antiquities," approved June 8, 1906 (Public Law [PL] 59-209; 16 USC 431-433), and State laws where applicable."

This statute allows funding for mitigation of paleontological resources recovered pursuant to federal aid highway projects, provided that "excavated objects and information are to be used for public purposes without private gain to any individual or organization" (Federal Register [FR] 46(19): 9570).

Paleontological Preservation Act

The Paleontological Resources Preservation Act (PRPA) was signed into law in 2009. It directs the Department of Agriculture and the Department of the Interior to implement comprehensive paleontological resource management programs on federal lands. The PRPA protects scientifically significant fossils on federal lands and provides a permitting system where researchers can collect and study scientifically significant fossils which will remain in the public trust. The act also allows for the collection of common plant and invertebrate fossils for personal, non-commercial use on federal lands. The PRPA requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on federal land. The PRPA furthers the protection of fossils on federal lands by criminalizing the unauthorized removal of fossils.

b. State Laws, Regulations, and Policies

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act, California's Alquist-Priolo Act (PRC 2621 et seq.), is intended to reduce the risk to life and property from surface fault rupture during earthquakes. The Alquist-Priolo Act prohibits the location of most types of structures intended for human occupancy across the traces of active faults and strictly regulates construction in the corridors along active faults (Earthquake Fault Zones). It also defines criteria for identifying active faults, giving legal weight to terms such as "active," and establishes a process for reviewing building proposals in and adjacent to Earthquake Fault Zones. Under the Alquist-Priolo Act, faults are zoned, and construction along or across them is strictly regulated if they are "sufficiently active" and "well-defined." A fault is considered sufficiently active if one or more of its segments or strands shows evidence of surface displacement during Holocene time (defined as within the last 11,000 years). A fault is considered well-defined if its trace can be clearly identified by a trained geologist at the ground surface or in the shallow subsurface, using standard professional techniques, criteria and judgment.

Seismic Hazards Mapping Act of 1990

Like the Alquist-Priolo Act, the Seismic Hazards Mapping Act of 1990 (PRC 2690–2699.6) is intended to reduce damage resulting from earthquakes. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including strong ground-shaking, liquefaction and seismically induced landslides. Its provisions are similar in concept to those of the Alquist-Priolo Act: the State is charged with identifying and mapping areas at risk of strong ground-shaking, liquefaction, landslides and other corollary hazards, and cities and counties are required to regulate development within mapped Seismic Hazard Zones.

California Building Standards Code

The California Building Code (CBC) appear in the CCR as Title 24, Part 2. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. The purpose of the CBC is to establish minimum standards to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, and general stability by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all building and structures within its jurisdiction. The 2019 CBC is based on the 2018 IBC published by the International Code Council. In addition, the CBC contains necessary California amendments, which are based on reference standards obtained from various technical committees and organizations, such as the American Society of Civil Engineers (ASCE), the American Institute of Steel Construction, and the American Concrete Institute. ASCE Minimum Design Standard 7-05 (ASCE 7-05) provides requirements for general structural design and includes means for determining earthquake loads, as well as other loads (e.g., flood, snow, wind), for inclusion into building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure, or any appurtenances connected or attached to such buildings or structures throughout California.

The earthquake design requirements consider the occupancy category of the structure, site class, soil classifications, and various seismic coefficients that are used to determine a Seismic Design Category (SDC) for a project as described in Chapter 16 of the CBC. The SDC is a classification system that combines the occupancy categories with the level of expected ground motions at the site and ranges from SDC A (very small seismic vulnerability) to SDC E (very high seismic vulnerability and near a major fault) and SDC F (hospitals, police stations, emergency control centers in areas near major active faults). Design specifications are then determined according to the SDC in accordance with Chapter 16 of the CBC. Chapter 16, Section 1613 provides earthquake loading specifications for design and construction to resist the effects of earthquake motions in accordance with ASCE 7-05.

Chapter 18 of the CBC covers the requirements of geotechnical investigations (Section 1803); excavation, grading, and fills (Section 1804); load-bearing of soils (1806); foundations (Section 1808); shallow foundations (Section 1809); and deep foundations (Section 1810). Chapter 18 also describes analysis of expansive soils and the determination of the depth to groundwater table. For SDC D, E, and F, Chapter 18 requires analysis of slope instability, liquefaction, and surface rupture attributable to faulting or lateral spreading, plus an evaluation of lateral pressures on basement and retaining walls, liquefaction and soil strength loss, and lateral movement or reduction in foundation soil-bearing capacity. It also addresses mitigation measures to be considered in structural design, which may include ground stabilization, selection of appropriate foundation type and depths, selection of appropriate structural systems to accommodate anticipated displacements, or any combination of these measures. The potential for liquefaction and soil strength loss must be evaluated for site specific peak ground acceleration magnitudes and source characteristics consistent with the design earthquake ground motions.

Specifically, Section 1803.7 of the CBC requires geologic and earthquake engineering reports for all proposed construction. The purpose of the engineering report is to identify geologic and seismic conditions that may require mitigation. The reports, which are prepared by a California certified engineering geologist in consultation with a California-registered geotechnical engineer, assess the nature of the site and potential for earthquake damage based on appropriate investigations of the regional and site geology, project foundation conditions, and potential seismic shaking at the site. These reports must consider the most recent CGS Note 48 (Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings), CGS Special Publication 42: Fault Rupture Hazard Zones in California (for project sites proposed within an Alquist-Priolo Zone), and the most recent version of CGS Special Publication 117: Guidelines for Evaluating and Mitigating Seismic Hazard in California (for project sites proposed within a Seismic Hazard Zone). All conclusions must be fully supported by satisfactory data and analysis.

The geotechnical report required by Section 1803 provides completed evaluations of the foundation conditions of the site and the potential geologic and seismic hazards. It includes site specific evaluations of design criteria related to the nature and extent of foundation materials, groundwater conditions, liquefaction potential, and settlement potential and slope stability, as well as the results of the analysis of problem areas identified in the engineering geologic report. The geotechnical report incorporates estimates of the characteristics of site ground motion provided in the engineering geologic report. The geotechnical report must be prepared by a geotechnical engineer registered in the State of California with the advice of the certified engineering geologist and other technical experts, as necessary. The approved engineering geologic report is submitted with, or as part of, the geotechnical report. Local jurisdictions in the TCAG region typically regulate construction activities through a process that requires the preparation of a site-specific geotechnical investigation, consistent with Title 24, Part 2, Chapter 18 of the CBC.

California Construction General Permit Order 2009-0009-DWQ

The California Construction General Permit Order 2009-0009-DWQ (Order) requires projects that would disturb one or more acres of soil, or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, to obtain coverage under the Order. As such, applicable projects are required to implement a Storm Water Pollution Prevention Plan (SWPPP) developed by a certified Qualified SWPPP Developer. The SWPPP includes Best Management Practices (BMPs) for erosion and sediment control.

California Department of Transportation Regulations and Seismic Design Criteria

The California Department of Transportation (Caltrans) has Seismic Design Criteria (SDC) which contain new and currently practiced seismic design and analysis methodologies for the design of new bridges in California. The SDC adopts a performance-based approach specifying minimum levels of structural system performance, component performance, analysis and design practices for ordinary standard bridges. The SDC has been developed with input from the Caltrans Offices of Structure Design, Earthquake Engineering and Design Support and Materials and Foundations. Memo 20-1 outlines the bridge category and classification, seismic performance criteria, seismic design philosophy and approach, seismic demands and capacities on structural components and seismic design practices that collectively comprise Caltrans' seismic design methodology (Caltrans 2010).

California Surface Mining and Reclamation Act (SMARA)

SMARA mandated the initiation by the State geologist of mineral land classification to help identify and protect mineral resources in areas within the State subject to urban expansion or other irreversible land uses that would preclude mineral extraction. Areas are classified into mineral resource zones based on the presence of deposits and how much evaluation of the resource has occurred.

SMARA also allowed the State Mining and Geology Board (SMGB), after receiving classification information from the State geologist, to designate lands containing mineral deposits of regional or Statewide significance. Areas designated by SMGB are incorporated by regulation into Title 14, Division 2 of the CCR. Such designations require that a lead agency's land use decisions involving designated areas be made in accordance with its mineral resource management policies and that the lead agency consider the importance of the mineral resource to the region or the State as a whole and not just the lead agency's jurisdiction. In 1979, SMGB adopted guidelines for the management of mineral resources and preparation of local plans. The guidelines require local general plans to reference the State-identified mineral deposits and sites that are identified by the State geologist for conservation and/or future mineral extraction. Subsequently, SMGB identified urbanized areas where irreversible land uses precluded mineral extraction.

California Assembly Bill 885 (2000)

AB 885 (Chapter 781, Statutes of 2000) required SWRCB to draft and implement regulations for siting, installation, operation, and maintenance of on-site wastewater treatment systems. Proposed regulations were issued in 2009 and adopted in June 2012.

c. Local Laws, Regulations, and Policies

Tulare County

The Health and Safety Element of the Tulare County General Plan (County of Tulare 2012) guides land use planning by providing pertinent data regarding geologic, soil, seismic, fire and flood hazards. HS Goal 2 would protect the community to the extent feasible from risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche and dam failure; slope instability leading to mudslides and landslides; subsidence, liquefaction and other seismic hazards pursuant to Government Code §65302(g)(1), Chapter 7.8 (commencing with Section 2690) of Division 2 of the Public Resources Code. In addition, Chapter 14 of the Tulare County Code requires all grading work to conform to the County's standards and requirements pertaining to construction plans and the recommendations of the soils engineer and engineering geologist.

The Environmental Resources Management Element of the Tulare County General Plan (County of Tulare 2012) defines paleontological resources as:

> … any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on earth, with the exception of materials associated with an archaeological resource [as defined in Section 3(1) of the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470bb[1]), or any cultural item as defined in Section 2 of the Native American Graves Protection and Repatriation Act (25 U.S.C. 3001)].

Measure 55B, "Discovery of Archaeological Resources," which implements policies ERM 6.2 and ERM 6.3, states (County of Tulare 2012):

> In the event that archaeological or paleontological resources are discovered during site excavation, the County shall require that grading and construction work on the project site be

> suspended until the significance of the features can be determined by a qualified archaeologist or paleontologist. The County will require that a qualified archeologist / paleontologist make recommendations for measures necessary to protect any site determined to contain or constitute an historical resource, a unique archaeological resource, or a unique paleontological resource or to undertake data recovery, excavation, analysis, and curation of archaeological or paleontological materials. County staff shall consider such recommendations and implement them where they are feasible in light of project design as previously approved by the County.

City of Porterville General Plan

The City of Porterville Public Health and Safety Section 7.1 contains Guiding Policy PHS-G-1 which focuses to minimize risks of property damage and personal injury posed by geologic and seismic hazards. Policies PHS-I-1 through PHS-I-4 require the City of Porterville to enforce building standards, support State agencies' investigation of geologic conditions, provide information and incentives to property owners to retrofit existing buildings to protect against seismic hazards, and amend their Zoning Ordinance to include provisions for a geologic hazards abatement district for hillside areas (City of Porterville 2008).

Article 501: Hillside Zone (HZ) Overlay District- Applied to all properties within the incorporated boundaries of the city of Porterville, and within the city's official sphere of influence, which are designated as within the hillside development zone in the Porterville 2030 General Plan, and that have an average slope equal to or greater than six percent (6%) (City of Porterville 2013).

Chapter 6: Open Space & Conservation of the Porterville 2030 General Plan addresses paleontological resources (City of Porterville 2008). Implementation Policy OSC-I-73, which implements Guiding Policy OSC-G-11, states:

> Require that new development analyze and avoid any potential impacts to archaeological, paleontological, and historic resources by:
>
> - Requiring a records review for development proposed in areas that are considered archaeologically sensitive, including hillsides and near the Tule River;
> - Studying the potential effects of development and construction (as required by CEQA);
> - Developing, where appropriate, mitigation measures to minimize potential impacts; and
> - Implementing appropriate measures to avoid the identified impacts.

City of Tulare General Plan

The City of Tulare General Plan Safety Element contains Goal SAF-4 which focuses on the protection of people and property from seismic and geotechnical hazards. To achieve this goal, Policies SAF-P4.1 through SAF-P4.7 are in place in order to evaluate earthquake risk, determine seismic standards compliance for buildings, request financial assistance to implement seismic safety measures, and ensure emergency facilities have adequate earthquake resistant capacities (City of Tulare 2014).

The Conservation and Open Space Element of the Tulare General plan addresses paleontological resources (City of Tulare 2014). Policy COS-P5.9, "Discovery of Archaeological Resources" which implements Goal COS-5, "To Manage and protect sites of cultural and archaeological importance for the benefit of present and future generations," states:

> In the event that archaeological/paleontological resources are discovered during site excavation, grading, or construction, the City shall require that work on the site be suspended

> within 100 feet of the resource until the significance of the features can be determined by a qualified archaeologist /paleontologist. If significant resources are determined to exist, an archaeologist shall make recommendations for protection or recovery of the resource. City staff shall consider such recommendations and implement them where they are feasible in light of project design as previously approved by the City.

City of Visalia General Plan

The City of Visalia General Plan Safety and Noise Section 8.1 specifically focuses on minimizing risks of property damage and personal injury posed by geologic and seismic hazards. Policies S-P-1 through S-P-7 require the City of Visalia to retrofit local ramps and freeway overpass bridges, retrofit public works and emergency response facilities, establish community awareness programs tailored to emergency preparedness, update emergency preparedness plans and zoning ordinance review criteria, develop condemnation procedures for dangerous building ordnances, and periodically review the Safety Element (City of Visalia 2014).

Chapter 6: Open Space & Conservation of the Visalia General Plan addresses paleontological resources (City of Visalia 2014). Implementation Policy OSC-I-39, which implements Objective OSC-O-11, states:

> Establish requirements to avoid potential impacts to sites suspected of being archeologically, paleontologically, or historically significant or of concern, by:
>
> - Requiring a records review for development proposed in areas that are considered archaeologically or paleontologically sensitive;
> - Determining the potential effects of development and construction on archaeological or paleontological resources (as required by CEQA);
> - Requiring pre-construction surveys and monitoring during any ground disturbance for all development in areas of historical and archaeological sensitivity; and
> - Implementing appropriate measures to avoid the identified impacts, as conditions of project approval.

In the event that previously unidentified historical, archaeological, or paleontological resources are discovered during construction, grading activity in the immediate area shall cease and materials and their surroundings shall not be altered or collected. A qualified archaeologist or paleontologist must make an immediate evaluation and avoidance measures, or appropriate mitigation should be completed, according to CEQA Guidelines. The State Office of Historic Preservation has issued recommendations for the preparation of Archaeological Resource Management Reports that will be used as guidelines. See the Historic Preservation Element for objectives and policies focused specifically on historic districts and landmarks and their preservation (City of Visalia 2014).

Other Cities

Other cities within the TCAG region include the City of Dinuba, City of Exeter, City of Farmersville, City of Lindsay, and City of Woodlake. The City of Farmersville and City of Lindsay have incorporated aforementioned geological and seismic safety measures and analysis into their own General Plans. The City of Dinuba, City of Exeter, and City of Woodlake all contain similar goals and policies mentioned in discussed General Plans.

4.7.3 Impact Analysis

a. Methodology and Significance Thresholds

Appendix G of the State CEQA Guidelines identifies the following criteria for determining whether a project's impacts would have a significant impact related to geology and soils and mineral resources:

1. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides;
2. Result in substantial soil erosion or the loss of topsoil;
3. 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;
4. 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;
5. 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 wastewater;
6. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature;
7. 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; or
8. 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.

b. Project Impacts and Mitigation Measures

The following section discusses potential impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. Section 4.7.3.d summarizes the impacts associated with capital improvement projects planned in the proposed 2022 RTP/SCS. Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time. In general, however, implementation of proposed transportation improvements and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1:	Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides

Impact GEO-1 THE TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD NOT DIRECTLY OR INDIRECTLY CAUSE POTENTIAL SUBSTANTIAL ADVERSE EFFECTS, INCLUDING THE RISK OF LOSS, INJURY, OR DEATH INVOLVING RUPTURE OF A KNOWN EARTHQUAKE FAULT, STRONG SEISMIC GROUND SHAKING, SEISMIC-RELATED GROUND FAILURE, INCLUDING LIQUEFACTION, OR LANDSLIDES. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Fault rupture can occur along or immediately adjacent to faults during an earthquake. Fault rupture is characterized by ground cracks and displacement which could endanger life and property. Damage is typically limited to areas close to the moving fault.

Ground shaking effects are also the result of an earthquake, but the impacts can be widespread. Although a function of earthquake intensity, ground shaking effects can be magnified by the underlying soils and geology, which may amplify shaking at great distances. It is difficult to predict the magnitude of ground shaking following an earthquake, as shaking can vary widely within a relatively small area.

As indicated by Figure 4.7-2, transportation projects across the TCAG region would not be vulnerable to fault rupture as none of the roadway projects for the proposed 2022 RTP/SCS are located within or near an active fault system. Land use growth envisioned under the proposed 2022 RTP/SCS includes a variety of land uses that could potentially be exposed to hazards as a result of surface fault rupture. The land use growth envisioned under the proposed 2022 RTP/SCS would neither fully nor partially intersect any earthquake faults as growth would be created within cities that are not within or near an active fault system. Any potential structural damage and the exposure of people to the risk of injury or death from structural failure would be minimized by compliance with California Building Code engineering design and construction measures reviewed in the regulatory setting section. Foundations and other structural support features would be designed to resist or absorb damaging forces from strong ground shaking.

Although a function of earthquake intensity, ground-shaking effects can be magnified by the underlying soils and geology, which may amplify shaking at great distances. It is difficult to predict the magnitude of ground-shaking following an earthquake, as shaking can vary widely within a relatively small area. The types of transportation and land use projects proposed under the proposed 2022 RTP/SCS are unlikely to exacerbate seismic activity, fault rupture, or increases in ground shaking due to the nature of the project's effects, including construction, being near or on the ground surface. Footings and pilings that could extend below the surface would be localized to the project site and require geological testing for specific impacts. The potential to directly or indirectly cause adverse impacts due to rupture of a known earthquake fault related to planned transportation improvements from implementation of the proposed 2022 RTP/SCS would be less than significant.

The land use growth envisioned under the proposed 2022 RTP/SCS would concentrate growth in cities which would are not located within or near earthquake fault zones, as shown in Figure 4.7-2. However, land use growth envisioned under the proposed 2022 RTP/SCS includes a variety of land uses that could potentially be exposed to hazards as a result of surface fault rupture.

Seismic related ground failure such as liquefaction or landslides may result from an earthquake in the TCAG region. According to the Tulare County General Plan, no specific countywide assessments to identify liquefaction hazards have been performed in Tulare County (County of Tulare 2012). Areas where groundwater is less than 30 feet below the surface occur primarily in the valley. However, soil types in the area are not conducive to liquefaction because they are either too coarse or too high in clay content. Areas subject to 0.3g acceleration or greater are located in a small section of the Sierra Nevada Mountains along the Tulare-Inyo County boundary (Tulare County 2007). However, the depth to groundwater in such areas is greater than in the valley, which would minimize any liquefaction potential. Detailed project-specific geotechnical engineering investigations would be necessary to evaluate liquefaction potential more accurately in specific areas and to identify and map the areal extent of locations subject to liquefaction (Tulare County 2007).

Projects near the foothills in the cities of Exeter, Lindsay, and Porterville are particularly susceptible to landslides. Roadway projects in mountainous areas along the 198 and the cities along the foothills or along steeply sloped streambanks are most susceptible to landslide or mudflows which may be triggered during an earthquake however no roadway projects are proposed in these areas. As shown in Figure 4.7-3, projects near the mountainous areas are classified as landslide susceptibility class of 5 or greater. Few to no land use projects envisioned in the proposed 2022 RTP/SCS would be built in these areas as most mountainous land is within national forests that strictly limit development. Projects are proposed to be concentrated within city centers in more transit-oriented areas where landslide occurrence is low. The potential to directly or indirectly cause adverse impacts due to seismic-related liquefaction or landslide from the projected land use development and planned transportation improvements from implementation of the proposed 2022 RTP/SCS would be less than significant.

All projects are required to adhere to design standards described in the CBC and all standard geotechnical investigation, design, grading, and construction practices to avoid or reduce impacts from earthquakes, ground shaking, ground failure, and landslides. These requirements would partially reduce seismic impacts. Moreover, construction within seismic zones as identified by the Alquist-Priolo Act and the Seismic Hazards Mapping Act of 1990 (PRC 2690 -2699.6) is required by the CBC to follow more stringent regulations to withstand fault ruptures and ground shaking effects from seismic activities. The CBC provides standards for various aspects of construction, including but not limited to: excavation, grading and earthwork construction; fills and embankments; expansive soils; foundation investigations; liquefaction potential; and soil strength loss. In accordance with California law and regulation, proponents of specific projects are required to comply with all provisions of the CBC for certain aspects of design and construction.

There are limited instances where the proposed land use pattern and planned transportation investments of 2022 RTP/SCS may result in growth in or near a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides prone areas, substantial geologic-related effects could still occur. The types of transportation and land use projects planned under the proposed 2022 RTP/SCS are unlikely to exacerbate seismic activity, fault rupture, or increases in ground shaking due to the nature of the project's effects, including construction, being near or on the ground surface. Footings and pilings that could extend below the surface would be localized to the project site and require geological testing for specific impacts. The proposed 2022 RTP/SCS would not have the potential to exacerbate risks related to seismic activity. Compliance with the CBC and provisions of the Alquist-Priolo Act, including the preparation of a site-specific geotechnical investigation, would reduce the potential for seismic damage to occur as a result of implementation of proposed 2022 RTP/SCS projects. Compliance with the CBC and provisions of the Alquist-Priolo Act, including the preparation of a site-specific geotechnical investigation, would minimize the potential for seismic damage to occur as a result of implementation of proposed 2022 RTP/SCS projects. Based on the above analysis, impacts would be less than significant.

Mitigation Measures

None required.

Threshold 2:	Result in substantial soil erosion or the loss of topsoil

Impact GEO-2 THE PROPOSED TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD NOT RESULT IN SUBSTANTIAL SOIL EROSION OR THE LOSS OF TOPSOIL. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Erosion and grading have the potential to create unstable slopes and significant loss of topsoil can occur for projects where excavations require off-site soil disposal. Areas within the TCAG region with high potential for soil expansion potential occur along the eastern side of cities of Porterville, Lindsay and Exeter in the foothill areas. No transportation projects are proposed in these areas.

Erosion control can be accomplished on steep slopes — those slopes that are exposed to wind, water, and other factors which may accelerate erosion — through conformance with local grading regulations and other state requirements. Projects implementing the proposed 2022 RTP/SCS would conform with Chapter 14 of the Tulare County Code for grading and erosion standards and guidelines. The City of Porterville, situated within the foothill region, requires adherence to Article 15: HZ Overlay District for building and development standards on the hillside as discussed in the Regulatory Setting. These ordinances would require the appropriate measures to prevent erosion as a result of implementation of transportation and land use projects under the proposed 2022 RTP/SCS, thus reducing erosion impacts to less than significant.

In addition, the Construction General Permit would require a project specific SWPPP to be prepared for each project that disturbs an area one acre or larger. The SWPPPs would include project specific BMPs designed to control drainage and erosion. Project BMPs to control erosion may include, but would not be limited to silt fencing, fiber rolls, slope stabilization and sandbags. These BMPs would be required as part of each individual project permit and would minimize impacts related to soil erosion and loss of topsoil as a result of construction or grading.

Adherence to the applicable ordinance codes and other local, State, and regulatory programs, as discussed above, would ensure that project-specific erosion and topsoil loss would be minimized. Because such effects would not be substantial, impacts related to erosion and loss of topsoil would be less than significant.

Mitigation Measures

No mitigation is required.

Threshold 3:	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
Threshold 4:	Be located on expansive soil, creating substantial direct or indirect risks to life or property

Impact GEO-3 IMPLEMENTATION OF TRANSPORTATION IMPROVEMENTS AND FUTURE PROJECTS INCLUDED IN THE LAND USE SCENARIO ENVISIONED IN THE PROPOSED 2022 RTP/SCS COULD BE LOCATED ON POTENTIALLY UNSTABLE SOILS, IN AREAS OF LATERAL SPREADING, SUBSIDENCE, OR HIGH LIQUEFACTION POTENTIAL, OR AREAS OF EXPANSIVE SOIL. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Implementation of proposed transportation improvements and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could be prone to slope instability, liquefaction, and other soil-related hazards.

Ground failure, including liquefaction, lateral spreading, and subsidence, caused by an earthquake could occur in the TCAG region depending on the underlying conditions including ground water level, relative size of soil particles, and density of subsurface materials within 50 feet of ground surface. Damage from earthquake-induced ground failure associated with liquefaction, lateral spreading, and subsidence could be high in buildings with foundations not properly constructed for such hazards. Areas that are exposed to liquefaction hazard may also have lateral spreading or differential settlement and subsidence concerns. Areas not at risk of liquefaction do not have lateral spreading potential. Ground failure associated with liquefaction would result in damage to transportation projects if not engineered appropriately. The foothill and mountain areas of the TCAG region are more likely to experience landslides than the Valley floor. Susceptible areas include areas where fractured and steep slopes are present or where inadequate ground cover accelerates erosion. Erosion and ground slumping of soils can also occur along bluff and banks of the Kaweah, Kings, and Tule Rivers. No proposed 2022 RTP/SCS transportation projects are set in the mountains or foothill areas susceptible to ground failure, including liquefaction, lateral spreading, and subsidence, caused by an earthquake.

The probability of soil liquefaction actually taking place in the County is considered to be a low to moderate hazard. Soil types in the area are not conducive to liquefaction because they are either too coarse or too high in clay content. However, due to the high clay content, there is potential for some subsidence to occur. Impacts related to these types of geological hazards are site specific and need to be evaluated on a project-by-project basis (Tulare County 2010).

No transportation projects are proposed in mountainous areas or along steeply sloped streambanks which are most susceptible to landslide or mudflows, especially when soils are wet and in areas adjacent to unstabilized cut or fill. However, projects involving cut slopes of over 20 feet in height or projects located in areas of bedded or jointed bedrock are more likely to result in a landslide.

New land use development and transportation projects constructed on expansive soils could be subject to damage or could become unstable when the underlying soil shrinks or swells. Soils with high clay content have the highest potential for shrink-swell. Within the TCAG region, expansive soils are more common along the Western edge of the Southern foothills (Tulare County 2010). In most developed areas, the existing layer of clay has been blended into more granular soils as a part of general site excavation, which helps to reduce the overall soil's expansiveness. No proposed transportation improvement projects in the 2022 RTP/SCS are located within known areas prone to expansive soils. However, if expansive soils are found on site this can be remediated, as structures and foundations would be engineered to withstand the forces of expansive soil to ensure compliance with the California Building Code (CBC).

The preparation of site-specific geotechnical studies prepared in accordance with requirements as set forth by the CBC, the Seismic Hazards Mapping Act, and standard industry practices would reduce impacts related to slope instability, liquefaction, soil expansion, and ground failure. Future projects under the proposed 2022 RTP/SCS would also be required to comply with local general plans and local building code requirements that contain seismic safety policies to resist ground failure through construction techniques, including structural design. Potential structural damage and the exposure of people to the risk of injury or death from structural failure would be minimized by compliance with California Building Code engineering design and construction measures. Foundations and other structural support features would be designed to resist or absorb damaging forces from expansive soils, liquefaction, or landslides. Land use and transportation projects implementing the proposed 2022 RTP/SCS would be required to comply with the CBC, and local building standards including the implementation of geotechnical practices such as ground treatments or replacing existing soils with engineered fill. Transportation projects that would involve the construction or improvements of bridge or overpass design would also be required to comply with Caltrans seismic design criteria which would reduce potential ground failure hazards. The proposed 2022 RTP/SCS would not have the potential to exacerbate risks related to ground failure.

Based on the above analysis, impacts related to ground failure hazards, including liquefaction, lateral spreading, and subsidence, and impacts related to expansive soils, would be less than significant with compliance with the CBC, local general plans and building standards, and Caltrans design criteria for transportation projects where applicable.

Mitigation Measures

No mitigation is required.

Threshold 5:	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 wastewater

Impact GEO-4 THE TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS IN RURAL AREAS MAY HAVE SOILS INCAPABLE OF ADEQUATELY SUPPORTING SEPTIC TANKS OR ALTERNATIVE WASTEWATER DISPOSAL SYSTEMS. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

The proposed 2022 RTP/SCS does not include transportation projects that would require the use of septic tanks or alternative wastewater disposal systems. The expansion and/or improvement of streets, highways, transit facilities, airports and related transportation infrastructure would not include elements that would require wastewater treatment or otherwise necessitate the development of septic systems.

Most future land use development projects implementing the proposed 2022 RTP/SCS land use scenario would connect to centralized wastewater infrastructure; the few development projects in rural areas requiring septic tanks or alternative wastewater disposal systems would be required to comply with local regulatory requirements that assure soils would adequately support these systems. Septic and alternative wastewater disposal systems would be required to comply with AB 885 and applicable County or City regulations. Septic systems in Tulare County would be required to comply with requirements as set forth by the Tulare County Division of Environmental Health, Tulare County Municipal Code 7-01-1395 Sewage Disposal: Septic Tanks. Cities within the TCAG region would further require compliance with municipal code requirements as set forth by individual jurisdictions. Therefore, impacts related to having soils incapable of adequately supporting the use of septic tanks and alternative wastewater disposal systems would be less than significant.

Mitigation Measures

No mitigation is required.

Threshold 6:	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature

Impact GEO-5 IMPLEMENTATION OF PROPOSED TRANSPORTATION IMPROVEMENTS AND THE LAND USE SCENARIO ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD DIRECTLY OR INDIRECTLY DESTROY A UNIQUE PALEONTOLOGICAL RESOURCE OR SITE OR UNIQUE GEOLOGICAL FEATURE. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.

Paleontological resources are present throughout Tulare County. Therefore, it is possible to encounter known and unknown paleontological resources as a result of implementation of transportation improvement projects pursuant to the proposed 2022 RTP/SCS.

The *State CEQA Guidelines* provide no definition to the term “unique geologic feature.” This phrase also has no common definition. However, a geologic unit could be considered unique if it is a stratotype, contributes to scientific research, or is exclusive to the region.

Many of the land use and transportation projects proposed under the proposed 2022 RTP/SCS consist of minor expansions of existing facilities that would not involve construction in previously undisturbed areas. However, depending on the location and extent of the proposed improvement and ground disturbance, paleontological resources or unique geologic features could be impacted. There are mapped areas with a higher occurrence of paleontological features, but it should be noted that any project overlying a geologic unit with high paleontological sensitivity could result in impacts, regardless of location relative to existing development. It is also possible that construction activities associated with some of the proposed roadway or bridge widening or extension projects could adversely impact paleontological resources by exposing them to potential vandalism or causing displacement from the original context and integrity. Project-specific analysis would be required as individual projects are proposed.

In addition, the proposed 2022 RTP/SCS contains a future land use scenario that emphasizes infill near transit and within existing urbanized areas, but with development still allowed in more suburban and rural areas. It is possible that paleontological resources or unique geologic features could be located on or near future infill sites, or other development sites. Project grading and excavation for land development may disturb these known or undiscovered resources. Impacts to paleontological resources or unique geologic features would therefore be significant. The following mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures developed for the proposed 2022 RTP/SCS where applicable for transportation projects that would result in impacts to paleontological resources. Cities and the County can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site specific conditions.

GEO-5 Paleontological Resources Mitigation and Monitoring Program

The implementing agency of a proposed 2022 RTP/SCS project involving ground disturbing activities (including grading, trenching, foundation work and other excavations) shall, or can and should, retain a qualified paleontologist, defined as a paleontologist who meets the Society of Vertebrate Paleontology (SVP) standards for Qualified Professional Paleontologist (SVP 2010), to conduct a Paleontological Resources Assessment (PRA). The PRA shall determine the age and paleontological sensitivity of geologic formations underlying the proposed disturbance area, consistent with SVP Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources (SVP 2010) guidelines for categorizing paleontological sensitivity of geologic units within a project area. If underlying formations are found to have a high potential (sensitivity) for paleontological resources and/or could be considered a unique geologic feature, the following measures shall apply:

- **Avoidance.** Avoid routes and project designs that would permanently alter unique paleontological and unique geological features. If avoidance practices cannot be implemented, the following measures shall apply.
- **Retention of a Qualified Paleontologist.** A Qualified Paleontologist shall be retained to create a Paleontological Resources Monitoring and Mitigation Program (PRMMP) to direct all mitigation measures related to paleontological resources. The Qualified Paleontologist shall meet the qualifications for a Qualified Professional Paleontologist, which is defined by the SVP as an individual, preferably with an M.S. or Ph.D. in paleontology or geology, who is experienced with paleontological procedures and techniques, who is knowledgeable in the geology of California, and who has worked as a paleontological mitigation project supervisor for a least two years (SVP 2010).
- **Paleontological Worker Environmental Awareness Program (WEAP).** Prior to the start of ground disturbance activity, construction personnel shall be informed on the appearance of fossils and the procedures for notifying paleontological staff should fossils be discovered by construction staff.
- **Paleontological Monitoring.** Paleontological monitoring shall be conducted by a qualified paleontological monitor, who is defined as an individual who has experience with collection and salvage of paleontological resources and meets the minimum standards of the SVP (2010) for a Paleontological Resources Monitor. The duration and timing of the monitoring will be determined by the Qualified Paleontologist based on the observation of the geologic setting from initial ground disturbance. If the Qualified Paleontologist determines that full-time monitoring is no longer warranted, based on the specific geologic conditions once the full depth of excavations has been reached, they may recommend that monitoring be reduced to periodic spot-checking or ceased entirely. Monitoring shall be reinstated if any new ground disturbances are required, and reduction or suspension shall be reconsidered by the Qualified Paleontologist at that time. In the event of a fossil discovery by the paleontological monitor or construction personnel, all work in the immediate vicinity of the find shall cease. A Qualified Paleontologist shall evaluate the find before restarting construction activity in the area. If it is determined that

the fossil(s) is (are) scientifically significant, the Qualified Paleontologist shall complete the following measures to mitigate impacts to significant fossil resources:

  - **Fossil Salvage**. If significant fossils are discovered, the implementing agency shall be notified immediately, and the qualified paleontologist (or paleontological monitor) shall recover them. Typically, fossils can be safely salvaged quickly by a single paleontologist and not disrupt construction activity. In some cases, larger fossils (such as complete skeletons or large mammal fossils) require more extensive excavation and longer salvage periods. In this case, the paleontologist shall have the authority to temporarily direct, divert or halt construction activity to ensure that the fossil(s) can be removed in a safe and timely manner.
  - **Preparation and Curation of Recovered Fossils**. Once salvaged, fossils shall be identified to the lowest possible taxonomic level, prepared to a curation-ready condition, and curated in a scientific institution with a permanent paleontological collection, such as the Natural History Museum of Los Angeles County, along with all pertinent field notes, photos, data, and maps.

- **Final Paleontological Resources Mitigation and Monitoring Report**. Upon completion of ground disturbing activity (and curation of fossils, if necessary) the Qualified Paleontologist shall prepare a final mitigation and monitoring report outlining the results of the PRMMP. The report shall include discussion of the location, duration and methods of the monitoring, stratigraphic sections, any recovered fossils, and the scientific significance of those fossils, and where fossils were curated. The report shall be submitted to the implementing agency. If the monitoring efforts recovered fossils, then a copy of the report shall also be submitted to the designated museum repository, such as the Natural History Museum of Los Angeles County.

Implementing Agencies and Timing

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

Significance After Mitigation

Implementation of the above mitigation measure would reduce impacts to paleontological resources and unique geologic features by requiring a Paleontological Resources Assessment for any projects under the proposed 2022 RTP/SCS that may impact sensitive paleontological resources. While implementation of Mitigation Measure GEO-5 would reduce impacts to the extent feasible, some project-specific impacts may be unavoidable. Therefore, this impact is significant and unavoidable. No additional mitigation measures to reduce this impact to less than significant levels are feasible.

Threshold 7:	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
Threshold 8:	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

Impact GEO-6 IMPLEMENTATION OF TRANSPORTATION IMPROVEMENTS AND FUTURE PROJECTS INCLUDED IN THE LAND USE SCENARIO ENVISIONED IN THE PROPOSED 2022 RTP/SCS WOULD NOT RESULT IN THE LOSS OF AVAILABILITY OF KNOWN MINERAL RESOURCES OF VALUE OR LOCALLY IMPORTANT RESOURCE RECOVERY SITES. THIS IMPACT WOULD BE LESS THAN SIGNIFICANT.

The proposed 2022 RTP/SCS primarily involves modifications to existing roadways, including improvements related to safety and widening, intersection improvements, roadway expansions, and on and off-ramp modifications. In addition, most future land use development facilitated by the proposed 2022 RTP/SCS would be infill and TOD would be located within exiting urbanized areas. Areas within and near Porterville and Exeter have MRZ-2 designations, as shown in Figure 4.7-4. These cities have policies that manage mineral resource recovery areas designated as MRZ-2 locations under SMARA (Taylor 1997). The MRZ-2 designation is an area where significant mineral deposits are present, or where it is judged that a high likelihood for their presence exists. In accordance with the Tulare County General Plan Policy ERM-2.10, proposed land uses incompatible with mineral extraction in unincorporated Tulare County shall not be on lands containing or adjacent to identified mineral deposits unless adequate mitigation measures to reduce the conflict or a statement of overriding considerations is adopted. As such, development would avoid known mineral resources that would be of value to the region and residents of the State, to the extent feasible. Consistent with General Plan Policy ERM-2.10, any projects located within MRZ-2 areas are required to identify and mitigate impacts during the environmental review for project-specific impacts pertaining to mineral resources to allow for the recovery of identified minerals. There are no proposed transportation projects within any identified MRZ-2 zone.

There are no projects implementing the proposed 2022 RTP/SCS that would directly result in the extraction, exploration, or digging for mineral resources, or prevent such activities. Therefore, the proposed 2022 RTP/SCS would not result in the loss of a known mineral resource that would be of value to the region and the residents of the State, or result in the loss of availability of a locally important mineral resource recovery site. Impacts pertaining to mineral resources would therefore be less than significant.

Mitigation Measures

No mitigation is required.

c. Specific RTP/SCS Projects that May Result in Impacts

Table 4.7-2 identifies proposed 2022 RTP/SCS projects that may result in geology and soils, or minerals impacts as discussed above. Given the large number of projects envisioned across the TCAG region in the proposed 2022 RTP/SCS, the table shows a representative rather than comprehensive list of projects that would generate these impacts. Listed projects are representative of the types of impacts and the types of projects that could be affected in different localities. Additional site-specific analysis would to conducted as the individual projects are proposed in order to determine the project-specific magnitude of impact. Mitigation measures discussed above would apply to these specific projects as well as any other proposed 2022 RTP/SCS projects that would result geology and soils-related impacts.

While some geologic units are known to have higher paleontological sensitivities than others, unknown paleontological resources may be encountered at all proposed 2022 RTP/SCS project sites. While additional site-specific paleontological studies could determine the sensitivity of site-specific underlying geologic units, it is impossible to accurately account for the existence of all paleontological resources prior to ground-disturbing activities. Therefore, due to the potential for any proposed 2022 RTP/SCS project to encounter paleontological resources, Impact GEO-5 is not included within Table 4.7-2.

Table 4.7-2 Proposed 2022 RTP/SCS Projects That May Result in Impacts

Agency	Project Location	Project Scope	Impact
Caltrans	SR 65 near Terra Bella – Avenue 88 to Avenue 124	Widen from two to four lanes	GEO 1; GEO 6
Visalia	SR 198 at Shirk Street	Turn lane, intersection, ramp improvements	GEO 6
Porterville	SR 190 at Westwood	Roundabout and intersection improvements	GEO 6
Porterville	SR 190 at Plano	Roundabout and intersection improvements	GEO 6

4.7.4 Cumulative Impacts

The cumulative impact analysis area for geology and soils, paleontological resources, and mineral resources consists of the TCAG region and adjoining counties. Information regarding these adjoining counties can be found in Section 3.1, *Environmental Setting*. Future development in this region that could impact geology and soils, and mineral resources is considered in the analysis. This cumulative extent is used to evaluate potential direct and indirect, permanent and temporary impacts to increased exposure to seismic hazards, increased erosion and/or loss of topsoil, the presence of unstable or expansive soils, the presence of paleontological resource or unique geologic features, and impacts to loss of availability of known and/or local important mineral resources within the context of the cumulative impact analysis area.

Geology and soils impacts may be related to increased exposure to seismic hazards, increased erosion and/or loss of topsoil, the presence of unstable/expansive soils and alternative waste disposal or septic systems. Individual projects and developments in the cumulative impacts analysis area would be subject to geologic hazards based on site-specific conditions and project design. These effects occur independently of one another and are caused by site specific and project specific characteristics and conditions. In addition, existing regulations, such as the California Building Code, specify mandatory actions that must occur during project development which would minimize effects from construction and operation of projects related to geology, soils, and seismicity as discussed above. Cumulative impacts related to geology, soils and seismicity would therefore be less than significant.

While projects envisioned under the proposed 2022 RTP/SCS may be subject to seismic hazards, including fault rupture, ground-shaking, liquefaction, and landslides, compliance with applicable requirements would reduce impacts. Future development envisioned under the proposed 2022 RTP/SCS would be required to comply with the California Building Code, Seismic Hazards Mapping Act, Alquist Priolo Act, local building codes, and general plan goals and policies. Furthermore, geology and soils impacts are site specific by nature and would not result in cumulative impacts to the surrounding area. The proposed 2022 RTP/SCS would not have a cumulatively considerable contribution to significant cumulative impacts related to geology, soils and seismicity.

Development and construction in the cumulative impacts analysis area would require excavation and ground disturbance. Excavation and ground disturbance could encounter and damage or destroy subsurface paleontological resources, depending on underlying geologic units and soils. While most paleontological resources are typically site specific, with impacts that are project specific, others may have regional significance. For example, fossils may capture a particular type of organism that was endemic to a region and therefore have regional significance. Due to the potential for a fossil of regional significance to be uncovered during excavation and ground disturbing activities of projects in the cumulative impact analysis area, cumulative impacts would be significant.

The proposed 2022 RTP/SCS could cause a substantial adverse change in or disturb known and unknown paleontological resources and would therefore result in a cumulatively considerable contribution to the significant impact. Mitigation measures outlined in Impact GEO-5, would reduce paleontological resource impacts associated with implementing proposed 2022 RTP/SCS projects. However, the proposed 2022 RTP/SCS contribution would remain cumulatively considerable after mitigation because it cannot be guaranteed that all future project level impacts can be mitigated to a less than significant level. As such, the proposed 2022 RTP/SCS contribution to cumulative impacts to paleontological resources would remain cumulatively considerable after mitigation.

Mineral resources impacts would occur if there were loss of availability of a known or locally important mineral. This would occur if an individual project were to directly result in the extraction, exploration, or digging for mineral resources, or prevent such activities. Existing state and local regulations, such as SMARA and the General Plans, require specific actions in the cumulative impacts analysis area to conserve mineral deposits. Therefore, cumulative impacts to mineral resources would be less than significant and the 2022 RTP/SCS contribution would not be cumulatively considerable.

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4.8 Greenhouse Gas Emissions and Climate Change

This section evaluates potential impacts related to greenhouse gas (GHG) emissions and climate change facilitated by the proposed 2022 RTP/SCS. Air quality impacts are discussed in Section 4.3, *Air Quality.*

4.8.1 Setting

a. Climate Change and Greenhouse Gases

Climate change is the observed increase in the average temperature of Earth's atmosphere and oceans along with other substantial changes in climate (such as wind patterns, precipitation, and storms) over an extended period. The term "climate change" is often used interchangeably with the term "global warming," but "climate change" is preferred to "global warming" because it helps convey other changes in addition to rising temperatures. The baseline against which these changes are measured originates in historical records identifying temperature changes that have occurred in the past, such as during previous ice ages. The global climate changes continuously, as evidenced by repeated episodes of substantial warming and cooling documented in the geologic record. The rate of change has typically been incremental, with warming or cooling trends occurring over the course of thousands of years. The past 10,000 years have been marked by a period of incremental warming, as glaciers have steadily retreated across the globe. However, scientists have observed substantial acceleration in the rate of warming during the past 150 years. The United Nations Intergovernmental Panel on Climate Change (IPCC) expressed that the rise and continued growth of atmospheric carbon dioxide (CO_2) concentrations is unequivocally due to human activities in the IPCC's Sixth Assessment Report (2021). Human influence has warmed the atmosphere, ocean, and land, which has led the climate to warm at an unprecedented rate in the last 2,000 years. It is estimated that between the period of 1850 through 2019, that a total of 2,390 gigatonnes of anthropogenic CO_2 was emitted. It is likely that anthropogenic activities have increased the global surface temperature by approximately 1.07 degrees Celsius between the years 2010 through 2019 (IPCC 2021). Furthermore, since the late 1700s, estimated concentrations of CO_2, methane, and nitrous oxide in the atmosphere have increased by over 43 percent, 156 percent, and 17 percent, respectively, primarily due to human activity (United States Environmental Protection Agency [U.S. EPA] 2021a). Emissions resulting from human activities are thereby contributing to an average increase in Earth's temperature.

Gases that absorb and re-emit infrared radiation in the atmosphere are called GHGs. The gases widely seen as the principal contributors to human-induced climate change include CO_2, methane (CH_4), nitrous oxides (N_2O), fluorinated gases such as hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Water vapor is excluded from the list of GHGs because it is short-lived in the atmosphere, and natural processes, such as oceanic evaporation, largely determine its atmospheric concentrations.

GHGs are emitted by natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Emissions of CO_2 are usually by-products of fossil fuel combustion, and CH_4 results from off-gassing associated with agricultural practices and landfills. Human-made GHGs, many of which have greater heat-absorption potential than CO_2, include fluorinated gases and SF_6 (U.S. EPA 2021b).

Different types of GHGs have varying global warming potentials (GWP). The GWP of a GHG is the potential of a gas or aerosol to trap heat in the atmosphere over a specified timescale (generally, 100 years). Because GHGs absorb different amounts of heat, a common reference gas (CO_2) is used to relate the amount of heat absorbed to the amount of the gas emitted, referred to as "carbon dioxide equivalent" (CO_2e), which is the amount of GHG emitted multiplied by its GWP. Carbon dioxide has a 100-year GWP of one. By contrast, methane has a GWP of 30, meaning its global warming effect is 30 times greater than CO_2 on a molecule per molecule basis (IPCC 2021).[1]

The accumulation of GHGs in the atmosphere regulates the earth's temperature. Without the natural heat-trapping effect of GHGs, the earth's surface would be about 33 degrees Celsius (°C) cooler (World Meteorological Organization 2020). However, since 1750, estimated concentrations of CO_2, CH_4, and N_2O in the atmosphere have increased by 36 percent, 148 percent, and 18 percent, respectively, primarily due to human activity (Forster et al. 2007). GHG emissions from human activities, particularly the consumption of fossil fuels for electricity production and transportation, are believed to have elevated the concentration of these gases in the atmosphere beyond the level of concentrations that occur naturally.

b. Greenhouse Gas Emissions Inventories

United States Emissions Inventory

Total U.S. GHG emissions were 6,558 MMT of CO_2e in 2019. Emissions decreased by 1.7 percent from 2018 to 2019; since 1990, total U.S. emissions have increased by an average annual rate of 0.06 percent for a total increase of 1.8 percent between 1990 and 2019. The decrease from 2018 to 2019 reflects the combined influences of several long-term trends, including population changes, economic growth, energy market shifts, technological changes such as improvements in energy efficiency, and decrease carbon intensity of energy fuel choices. In 2019, the industrial and transportation end-use sectors accounted for 30 percent and 29 percent, respectively, of nationwide GHG emissions while the commercial and residential end-use sectors accounted for 16 percent and 15 percent of nationwide GHG emissions, respectively, with electricity emissions distributed among the various sectors (U.S. EPA 2021b).

California Emissions Inventory

Based on the California Air Resources Board (CARB) California GHG Inventory for 2000-2019, California produced 418.2 MMT CO_2e in 2019 (CARB 2021a). The largest single source of GHG in California is transportation, contributing 40 percent of the State's total GHG emissions. Industrial sources are the second-largest source of the state's GHG emissions, contributing 21 percent of the State's GHG emissions (CARB 2021a). The magnitude of California's total GHG emissions is due in part to its large size and large population compared to other states. However, a factor that reduces California's per capita fuel use and GHG emissions as compared to other states is its relatively mild climate. In 2016, the State of California achieved its 2020 GHG emission reduction target of reducing emissions to 1990 levels as emissions fell below 431 MMT of CO_2e (CARB 2021a). The annual 2030 statewide target emissions level is 260 MMT of CO_2e (CARB 2017).

[1] The Intergovernmental Panel on Climate Change's (2021) *Sixth Assessment Report* determined that methane has a GWP of 30. However, the 2017 Climate Change Scoping Plan published by the California Air Resources Board uses a GWP of 25 for methane, consistent with the Intergovernmental Panel on Climate Change's (2007) *Fourth Assessment Report*. Therefore, this analysis utilizes a GWP of 25.

c. Potential Effects of Climate Change

Globally, climate change has the potential to affect numerous environmental resources through potential impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. Long-term trends have found that each of the past four decades has been warmer than all the previous decades in the instrumental record and the decade from 2011 through 2020 has been the warmest. The observed global mean surface temperature (GMST) for the decade from 2011 to 2020 was approximately 1.09°C (0.95°C to 1.20°C) higher than the average GMST over the period from 1850 to 1900. Due to past and current activities, anthropogenic GHG emissions are increasing global mean surface temperature at a rate of 0.2°C per decade. In addition to these findings, the latest IPCC report states that "human-induced climate change is already affecting many weather and climate extremes in every region across the globe" (IPCC 2021). These climate change impacts include climate change sea level rise, increased weather extremes, and substantial ice loss in the Arctic over the past three decades.

According to *California's Fourth Climate Change Assessment*, statewide temperatures from 1986 to 2016 were approximately 0.6 to 1.1°C higher than those recorded from 1901 to 1960. Potential impacts of climate change in California may include reduced water supply from snowpack, sea level rise, more extreme heat days per year, more large forest fires, and more drought years (State of California 2018). In addition to statewide projections, *California's Fourth Climate Change Assessment* includes regional reports that summarize climate impacts and adaptation solutions for nine regions of the state and regionally specific climate change case studies (State of California 2018). However, while there is growing scientific consensus about the possible effects of climate change at a global and statewide level, current scientific modeling tools are unable to predict what local impacts may occur with a similar degree of accuracy. A summary follows of some of the potential effects that could be experienced in California and the TCAG region as a result of climate change.

Public Health

Climate change is expected to cause a number of impacts which could negatively affect public health in the TCAG region. As temperatures increase, the Central Valley is set to experience an increased number of extreme heat days, which may lead to increases in the number of heat-related deaths and illnesses (State of California 2018). An increase in the frequency and severity of wildfires may contribute to worsening air quality and cause additional illnesses such as asthma. Higher temperatures could also lead to increased air pollution formation and potentially accelerate the spread of certain diseases and pests. These adverse impacts may also disproportionately burden vulnerable populations.

Air Quality

Scientists project that the annual average maximum daily temperatures in California could rise by 2.4 to 3.2°C in the next 50 years and by 3.1 to 4.9°C in the next century (State of California 2018). Higher temperatures are conducive to air pollution formation, and rising temperatures could therefore result in worsened air quality in California. As a result, climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. In addition, as temperatures have increased in recent years, the area burned by wildfires throughout the state has increased, and wildfires have occurred at higher elevations in the Sierra Nevada Mountains (State of California 2018). If higher temperatures continue to be accompanied by an increase in the incidence and extent of large wildfires, air quality could worsen. Severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the state.

Air quality effects for the TCAG region would be similar to those expected statewide. Temperature increases are expected to facilitate smog production, with the potential for adverse effects on public health. Increased risk of drought and wildfires could also lead to higher particulate matter levels (County of Tulare 2018).

Water Supply

Analysis of paleoclimatic data (such as tree-ring reconstructions of stream flow and precipitation) indicates a history of naturally and widely varying hydrologic conditions in California and the west, including a pattern of recurring and extended droughts. Uncertainty remains with respect to the overall impact of climate change on future precipitation trends and water supplies in California. Year-to-year variability in statewide precipitation levels has increased since 1980, meaning that wet and dry precipitation extremes have become more common (California Department of Water Resources 2018). This uncertainty regarding future precipitation trends complicates the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood. The average early spring snowpack in the western U.S., including the Sierra Nevada Mountains, decreased by about 10 percent during the last century. During the same period, sea level rose over 0.15 meter along the central and southern California coasts (State of California 2018). The Sierra snowpack provides the majority of California's water supply as snow that accumulates during wet winters is released slowly during the dry months of spring and summer. A warmer climate is predicted to reduce the fraction of precipitation that falls as snow and the amount of snowfall at lower elevations, thereby reducing the total snowpack (State of California 2018). Projections indicate that average spring snowpack in the Sierra Nevada and other mountain catchments in central and northern California will decline by approximately 66 percent from its historical average by 2050 (State of California 2018).It is expected that increased amounts of winter runoff resulting from rainfall in Tulare County could be accompanied by increases in flood event severity and warrant additional dedication of wet season storage space for flood control instead of using the water for supply conservation, as is the standard practice. This change in water management could lead, in turn, to more frequent water shortages during periods of high water demand. Many regional studies have shown that only small changes in inflows into reservoirs could result in large changes in the reliability of water yields from those reservoirs (County of Tulare 2018). Sudden and unexpected changes in precipitation could leave water managers unprepared, which, in extreme situations could have significant implications for California's water supplies (County of Tulare 2018).

Agriculture

California has a roughly $49 billion annual agricultural industry that produces nearly a third of the country's vegetables and over half of the country's fruits and nuts (California Department of Food and Agriculture 2021). Higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, certain regions of agricultural production could experience water shortages of up to 16 percent, which would increase water demand as hotter conditions lead to the loss of soil moisture. In addition, crop yield could be threatened by water-induced stress and extreme heat waves, and plants may be susceptible to new and changing pest and disease outbreaks (State of California 2018). Temperature increases could also change the time of year certain crops, such as wine grapes, bloom or ripen, and thereby affect their quality (California Climate Change Center 2006).

In the TCAG region, higher temperatures, including extreme temperatures, may negatively affect crop growth during various stages of their development, as well as cattle and poultry health and reproduction. More intense downpours and fewer chill hours may also have negative impacts on vegetable, fruit and nut crops (County of Tulare 2018).

Ecosystems and Wildlife

Climate change and the potential resultant changes in weather patterns could have ecological effects at the global and local scale. Rising temperatures could have four major impacts on plants and animals: timing of ecological events; geographic distribution and range of species; species composition and the incidence of nonnative species within communities; and ecosystem processes, such as carbon cycling and storage (Parmesan 2006; State of California 2018).

As temperatures rise in the TCAG region, species are moving north in California or to higher elevations. This change in migration disrupts the food chain and prevents some plant species from being pollinated. Water and food supplies are expected to be more variable and to shift as the seasons change on different timeframes. With vegetation, reduction in soil moisture will result in early die-back of many plants, potentially leading to conflicts with animal breeding seasons and other natural processes (County of Tulare 2018).

4.8.2 Regulatory Setting

The following regulations address both climate change and GHG emissions.

a. Federal Laws, Regulations, and Policies

Clean Air Act

The U.S. Supreme Court determined in *Massachusetts et al. v. Environmental Protection Agency et al.* ([2007] 549 U.S. 05-1120) that the U.S. EPA has the authority to regulate motor-vehicle GHG emissions under the federal Clean Air Act. The U.S. EPA issued a Final Rule for mandatory reporting of GHG emissions in October 2009. This Final Rule applies to fossil fuel suppliers, industrial gas suppliers, direct GHG emitters, and manufacturers of heavy-duty and off-road vehicles and vehicle engines and requires annual reporting of emissions. In 2012, the U.S. EPA issued a Final Rule that established the GHG permitting thresholds that determine when Clean Air Act permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.

In *Utility Air Regulatory Group v. Environmental Protection Agency* (134 S. Ct. 2427 [2014]), the U.S. Supreme Court held the U.S. EPA may not treat GHGs as an air pollutant for purposes of determining whether a source can be considered a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits otherwise required based on emissions of other pollutants, may continue to require limitations on GHG emissions based on the application of Best Available Control Technology.

Corporate Average Fuel Economy Standards

The Energy Policy and Conservation Act in 1975 established the Corporate Average Fuel Economy Standards (CAFE standards). The CAFE standards are Federal rules established by the National Highway Traffic Safety Administration (NHTSA) that set fuel economy standards for all new passenger cars and light trucks sold in the United States. The CAFE standards become more stringent each year, reaching an estimated 38.3 miles per gallon for the combined industry-wide fleet for model year 2020 (77 Federal Register 62624 et seq. [October 15, 2012, Table I-1).

In September 2019, U.S. EPA and the National Highway Traffic Safety Administration issued the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule. Part One, "One National Program" (84 FR 51310), revokes a waiver granted by U.S. EPA to the State of California under Section 209 of the CAA to enforce more stringent emission standards for motor vehicles than those required by U.S. EPA for the explicit purpose of GHG reduction, and indirectly, criteria air pollutants and ozone precursor emission reduction. This revocation became effective on November 26, 2019 and could have restricted the ability of CARB to enforce more stringent GHG emission standards for new vehicles and set zero emission vehicle mandates in California. However, on December 21, 2021, the National Highway NHTSA published its Corporate Average Fuel Economy (CAFE) Preemption rule, which finalizes its repeal of 2019's SAFE Rule Part One.

Part Two addresses CAFE standards for passenger cars and light trucks for model years 2021 to 2026. This rulemaking proposes new CAFE standards for model years 2022 through 2026 and would amend existing CAFE standards for model year 2021. The proposal would retain the model year 2020 standards (specifically, the footprint target curves for passenger cars and light trucks) through model year 2026. The proposal addressing CAFE standards was jointly developed by NHTSA and U.S. EPA, with U.S. EPA simultaneously proposing tailpipe CO_2 standards for the same vehicles covered by the same model years. However, at the time of Draft EIR publication, EPA was currently in the process of developing new CAFE standards that would significantly increase federal CAFE standards compared to the SAFE Rule Part Two.

b. State Laws, Regulations, and Policies

CARB is responsible for the coordination and oversight of state and regional GHG emissions reduction programs in California. There are numerous regulations aimed at reducing the state's GHG emissions. These initiatives are summarized below.

California Advanced Clean Cars Program

Assembly Bill (AB) 1493 (2002), California's Advanced Clean Cars program (referred to as "Pavley"), requires CARB to develop and adopt regulations to achieve "the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles." On June 30, 2009, U.S. EPA granted the waiver of Clean Air Act preemption to California for its GHG emission standards for motor vehicles, beginning with the 2009 model year, which allows California to implement more stringent vehicle emission standards than those promulgated by the U.S. EPA. Pavley I regulates model years from 2009 to 2016 and Pavley II, now referred to as "LEV (Low Emission Vehicle) III GHG," regulates model years from 2017 to 2025. The Advanced Clean Cars program coordinates the goals of the LEV, Zero Emissions Vehicles (ZEV), and Clean Fuels Outlet programs, and would provide major reductions in GHG emissions. If fully implemented, new automobiles would emit 34 percent fewer GHGs and 75 percent fewer smog-forming emissions from their model year 2016 levels by 2025 (CARB 2011). Unless the current administration moves to withdraw Part One of the SAFE Rule discussed above, fuel economy and GHG emission standards for new vehicles will increase by approximately 1.5 percent each year through model year 2026 as compared to the 2012 standards which required an approximately five percent annual increase.

Executive Order S-3-05

Executive Order (EO) S-3-05, among other things, established the following GHG emission reduction goals for California: reduction to 2000 levels by 2010; to 1990 levels by 2020; and to 80 percent below 1990 levels by 2050.

California Global Warming Solutions Act of 2006 (Assembly Bill 32 and Senate Bill 32)

The "California Global Warming Solutions Act of 2006," AB 32, outlines California's major legislative initiative for reducing GHG emissions (Chapter 488, Statutes of 2006). AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020 and requires CARB to prepare a Scoping Plan that outlines the main State strategies for reducing GHGs to meet the 2020 deadline. In addition, AB 32 requires CARB to adopt regulations to require reporting and verification of statewide GHG emissions. Based on this guidance, CARB approved a 1990 statewide GHG level and 2020 target of 431 MMT of CO_2e. CARB approved the Scoping Plan on December 11, 2008, and the Plan included measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among others (CARB 2008). Many of the GHG reduction measures included in the Scoping Plan (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards, and Cap-and-Trade) have been adopted since the Plan's approval.

CARB approved the 2013 Scoping Plan update in May 2014. The update defined CARB's climate change priorities for the next five years and set the groundwork to reach post-2020 statewide goals. The update highlighted California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluated how to align the State's longer term GHG reduction strategies with other State policy priorities, including those for water, waste, natural resources, clean energy, transportation, and land use (CARB 2014).

On September 8, 2016, the governor signed Senate Bill (SB) 32 into law (Chapter 429, Statutes of 2016), extending the California Global Warming Solutions Act of 2006 by requiring the State to further reduce GHG emissions to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged). SB 32 became effective on January 1, 2017 and codifies the 2030 goal set in EO B-30-15. On December 14, 2017, CARB adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 target. The 2017 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, and implementation of recently adopted policies and legislation, such as SB 1383 (see below). The 2017 Scoping Plan also puts an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2013 Scoping Plan Update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends that local governments adopt policies and locally appropriate quantitative thresholds consistent with statewide per capita goals of six MT of CO_2e by 2030 and two MT of CO_2e by 2050 (CARB 2017). As stated in the 2017 Scoping Plan, these goals may be appropriate for plan-level analyses (city, county, sub-regional, or regional level), but not for specific individual projects because they include all emissions sectors in the state (CARB 2017).

Executive Order S-01-07 (Low Carbon Fuel Standard)

EO S-01-07 (17 California Code of Regulations 95480 et seq.) requires the state to achieve a 10 percent or greater reduction by 2020 in the average fuel carbon intensity for transportation fuels in California regulated by CARB. CARB identified the Low Carbon Fuel Standard (LCFS) as a discrete early action item under AB 32.

In 2018, CARB approved amendments to the LCFS regulation, which included strengthening and smoothing the carbon intensity benchmarks through 2030 in line with California's 2030 GHG emission reduction target enacted through SB 32, adding new crediting opportunities to promote zero emission vehicle adoption, alternative jet fuel, carbon capture and sequestration, and advanced technologies to achieve deep decarbonization in the transportation sector.

Senate Bill 375

SB 375, signed in August 2008, enhances the State’s ability to reach AB 32 goals by directing CARB to develop regional GHG emission reduction targets to be achieved from passenger vehicles by 2020 and 2035. SB 375 aligns regional transportation planning efforts, regional GHG reduction targets, and affordable housing allocations. Metropolitan Planning Organizations (MPOs) are required to adopt a Sustainable Communities Strategy (SCS), which allocates land uses in the MPO’s Regional Transportation Plan (RTP). TCAG was assigned targets of a 13 percent reduction in GHG emissions from per capita passenger vehicles by 2020 and a 16 percent reduction in GHG emissions from per capita passenger vehicles by 2035, relative to 2005 emission levels (CARB 2020c). However, the proposed 2022 RTP/SCS cannot influence the achievement of target year 2020 GHG emissions. Therefore, TCAG will report on meeting 2035 goals with submittal of this SCS for review by CARB.

Executive Order B-16-12

EO B-16-12 orders State entities under the direction of the Governor including CARB, the California Energy Commission, and the California Public Utilities Commission to support the rapid commercialization of zero emission vehicles (ZEVs). It directs these entities to achieve various benchmarks related to zero emission vehicles, including:

- Infrastructure to support up to one million ZEVs by 2020,
- Widespread use of ZEVs for public transportation and freight transport by 2020,
- Over 1.5 million ZEVs on California roads by 2025,
- Annual displacement of at least 1.5 billion gallons of petroleum fuels by 2025, and
- A reduction of GHG emissions from the transportation sector equaling 80 percent less than 1990 levels by 2050.

AB 197

AB 197 of 2016 (Chapter 250, Statutes of 2016) expands CARB membership to include two nonvoting members from the Legislature; creates a Joint Legislative Committee on Climate Change Policies to make recommendations to the Legislature concerning climate change policies; provides for annual reporting of GHG emissions from sectors covered by the AB 32 Scoping Plan as well as evaluations of regulatory requirements and other programs that may affect GHG emissions trends; and specifies that the adoption of GHG emissions reduction rules and regulations shall consider the social costs. In addition, Scoping Plan updates are required to identify the range of potential GHG emissions reductions and the cost-effectiveness for each emissions reduction measure, compliance mechanism and incentive.

Senate Bill 1383

Adopted in September 2016, SB 1383 requires CARB to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants (Chapter 395, Statutes of 2016). SB 1383 requires the strategy to achieve the following reduction targets by 2030:

- Methane – 40 percent below 2013 levels
- Hydrofluorocarbons – 40 percent below 2013 levels
- Anthropogenic black carbon – 50 percent below 2013 levels

SB 1383 also requires the California Department of Resources Recycling and Recovery, in consultation with CARB, to adopt regulations that achieve specified targets for reducing organic waste in landfills. In addition, SB 1383 requires CARB to adopt regulations to be implemented on or after January 1, 2024 specific to the dairy and livestock industry, requiring a 40 percent reduction in methane emissions below 2013 levels by 2030, if certain conditions are met.

Senate Bill 100

Adopted on September 10, 2018, SB 100 supports the reduction of GHG emissions from the electricity sector by accelerating the State's Renewables Portfolio Standard Program, which was last updated by SB 350 in 2015. SB 100 requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045.

Executive Order B-55-18

On September 10, 2018, the former Governor Brown issued Executive Order (EO) B-55-18, which established a new statewide goal of achieving carbon neutrality by 2045 and maintaining net negative emissions thereafter. This goal is in addition to the existing statewide GHG reduction goals established by SB 375, SB 32, SB 1383, and SB 100. The 2022 Scoping Plan Update will assess progress towards achieving the SB 32 target and layout out a path to achieve carbon neutrality (CARB 2021b).

Executive Order N-19-19

EO N-19-19 was signed on September 20, 2019 and is intended to require a redoubling of the State's efforts to reduce GHG emissions and mitigate the impacts of climate change while building a sustainable, inclusive economy. This EO includes four main directives which include investment, transportation, state buildings and operations, and zero-emissions vehicles.

Senate Bill 391

The California Transportation Plan Act requires the California Department of Transportation (Caltrans) to prepare a statewide plan that addresses how the state will achieve maximum feasible emissions reductions to attain a statewide reduction of GHG emissions to 1990 levels by 2020 and 80 percent below 1990 levels by 2050. Caltrans prepared the original California Transportation Plan in June 2016 and a released an update of the plan in February 2021 (Caltrans 2021).

As EO B-55-18 establishes a goal of achieving economy-wide carbon neutrality in California by 2045, the plan establishes policies and strategies to move toward a carbon-neutral transportation system. However, current trends to due not indicate the state will achieve carbon neutrality. The statewide strategy has not been developed to achieve carbon neutrality and regional targets do not require any Metropolitan Planning Organization's RTP to achieve carbon neutrality over the current planning horizon.

Executive Order N-79-20

EO N-79-20 established a statewide goal that 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035 and that 100 percent of medium- and heavy-duty vehicles in the state be zero-emission by 2035 for drayage trucks and by 2045 for all operations where feasible.

Executive Order N-82-20

EO N-82-20 established a goal of conserving at least 30 percent of California's lands and coastal waters by 2030 and directed state agencies to create a Natural and Working Lands Climate Smart Strategy to advance the State's carbon neutrality goal and builds climate resilience.

California Building Standards Code

The California Code of Regulations (CCR) Title 24 is referred to as the California Building Code, or CBC. It consists of a compilation of several distinct standards and codes related to building construction including plumbing, electrical, interior acoustics, energy efficiency, and handicap accessibility for persons with physical and sensory disabilities. The CBC's energy-efficiency and green building standards are outlined below. The 2019 Title 24 standards are currently in effect. However, at the time of this EIR, the 2022 Title 24 standards have been adopted and will go into effect on January 1, 2023.

Part 6 – Building Energy Efficiency Standards/Energy Code

California Code of Regulations Title 24, Part 6 is the Building Energy Efficiency Standards or California Energy Code. This code, originally enacted in 1978, establishes energy-efficiency standards for residential and non-residential buildings in order to reduce California's energy demand. The Energy Code is updated periodically to incorporate and consider new energy-efficiency technologies and methodologies as they become available. New construction and major renovations must demonstrate their compliance with the current Energy Code through submittal and approval of a Title 24 Compliance Report to the local building permit review authority and the California Energy Commission. The 2019 Title 24 standards are the latest iteration of the statewide building energy efficiency standards because they became effective on January 1, 2020. All buildings for which an application for a building permit is submitted on or after January 1, 2020, must follow the 2019 standards. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases GHG emissions. The CEC Impact Analysis estimates that nonresidential buildings will be 30 percent more energy efficient compared to buildings built consistent with 2016 Building Energy Efficiency Standards, and single-family homes will be 7 percent more energy efficient (CEC 2018). Due to the solar requirement for all new homes, the CEC also estimates that the 2019 standards will cut energy demand from grid electricity in new homes by more than 50 percent (CEC 2018). The building efficiency standards are enforced through the local plan check and building permit process. Local government agencies may adopt and enforce additional energy standards for new buildings as reasonably necessary due to local climatologic, geologic, or topographic conditions, provided that these standards exceed those provided in Title 24.

Part 11 – California Green Building Standards/CALGreen

The California Green Building Standards Code, referred to as CALGreen, was added to Title 24 as Part 11, first in 2009 as a voluntary code, which then became mandatory effective January 1, 2011 (as part of the 2010 California Building Standards Code). The 2019 CALGreen includes mandatory minimum environmental performance standards for all ground-up new construction of residential and non-residential structures. It also includes voluntary tiers (Tiers I and II) with stricter environmental performance standards for these same categories of residential and non-residential buildings. Local jurisdictions must enforce the minimum mandatory CALGreen standards and may adopt additional amendments for stricter requirements.

The mandatory standards require:

- 20 percent reduction in indoor water use relative to specified baseline levels;[2]
- 65 percent construction/demolition waste diverted from landfills;
- Inspections of energy systems to ensure optimal working efficiency;
- Low-pollutant emitting exterior and interior finish materials such as paints, carpets, vinyl flooring, and particleboards;
- Dedicated circuitry to facilitate installation of electric vehicle charging stations for certain land uses; and
- Installation of electric vehicle charging stations for certain land uses.

The voluntary standards require:

- **Tier I:** stricter energy efficiency requirements, stricter water conservation requirements for specific fixtures, 65 percent reduction in construction waste with third-party verification, 10 percent recycled content for building materials, 20 percent permeable paving, 20 percent cement reduction, and cool/solar reflective roof; and
- **Tier II:** stricter energy efficiency requirements, stricter water conservation requirements for specific fixtures, 75 percent reduction in construction waste with third-party verification, 15 percent recycled content for building materials, 30 percent permeable paving, 25 percent cement reduction, and cool/solar reflective roof.

California State Transportation Agency (CalSTA) Climate Action Plan for Transportation Infrastructure (CAPTI)

Adopted in July 2021, the Climate Action Plan for Transportation Infrastructure (CAPTI) details how the State recommends investing billions of discretionary transportation dollars annually to aggressively combat and adapt to climate change while supporting public health, safety and equity (CalSTA 2021). CAPTI builds on EOs signed by Governor Gavin Newsom in 2019 and 2020 targeted at reducing GHG emissions in transportation, which account for more than 40 percent of all emissions, to reach the State's ambitious climate goals. The CAPTI provides investment strategies that focuses

[2] Similar to the compliance reporting procedure for demonstrating Energy Code compliance in new buildings and major renovations, compliance with the CALGreen water-reduction requirements must be demonstrated through completion of water use reporting forms. Buildings must demonstrate a 20 percent reduction in indoor water use by either showing a 20 percent reduction in the overall baseline water use as identified in CALGreen or a reduced per-plumbing-fixture water use rate.

on expanding travel options in California and ensuring said investments also prioritize advancing equity and climate priorities in the State.

c. Local Laws, Regulations, and Policies

Three of TCAG's member jurisdictions have climate action plans (CAPs) that set goals and targets for the reduction of GHG emissions and outline policies to help achieve those goals. The cities of Visalia and Tulare, as well as the County of Tulare have conducted baseline emissions inventories, which establish a reference point for GHG emissions reduction. The City of Visalia CAP (2013), City of Tulare CAP (2011), and County of Tulare CAP (2018) also establish GHG reduction targets and reduction measures to meet those targets. The City of Exeter's Net Zero 2030 Plan (2021) contains similar GHG reduction targets and measures but does not include an emissions inventory. To date, no other cities in the TCAG region have adopted CAPs. Baseline and projected 2030 business as usual GHG emissions from the respective CAPs and jurisdiction are shown in Table 4.8-1 below and include emissions produced by transportation, electricity and natural gas consumptions, water supply and conveyance, wastewater treatment, agriculture, and solid waste disposal.

Table 4.8-1 GHG Emissions Inventories for TCAG Member Jurisdictions

	Baseline		Projected Business-as-Usual	
Jurisdiction	Year	Emissions (MT of CO_2e/year)	Year	Emissions (MT of CO_2e/year)
Visalia	2005	906,337	2030	1,394,323
Tulare	2006	820,291	2030	1,835,455
Tulare County	2015	9,626,950	2030	11,411,087

Sources: City of Visalia, 2013; City of Tulare, 2011; County of Tulare, 2018

The types and quantity of emissions produced in the TCAG region vary among jurisdictional boundaries. However, for most jurisdictions, transportation and energy consumption are responsible for the majority of GHG emissions. To address these emissions, policies included in local CAPs in the region establish a framework for improved circulation networks and energy conservation. Transportation policies aim to reduce vehicle miles traveled (VMT) by offering more opportunities for alternative transportation modes, such as bicycling and transit use. In addition, many of the CAPs include policies to promote transit-oriented (TOD) development. In order to reduce emissions produced by energy usage, jurisdictions have established policies that will facilitate and encourage energy efficiency for both residential and commercial land uses along with programs to improve energy efficiencies in old and new buildings and decrease the use of fossil fuels by providing incentives for use of renewable energy.

4.8.3 Impact Analysis

a. Methodology and Significance Thresholds

Significance Thresholds

Appendix G of the State CEQA Guidelines identifies the following two general criteria for determining whether a project's impacts would have a significant impact related to GHG emissions. Specific criteria under each general criterion have been developed for this EIR.

1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment. An increase that exceeds the following threshold would be considered a significant impact:
   a. A net increase in GHG emissions by 2046 compared to existing baseline conditions.

2. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. Any conflict with the following thresholds would be considered a significant impact:
   a. Conflict with regional SB 375 per capita passenger vehicle CO_2 emission reduction targets of 16 percent by 2035 from 2005 levels;
   b. Conflict with state's ability to achieve SB 32 GHG reduction target, which aims to reduce statewide emissions to 40 percent below 1990 levels by 2030;
   c. Conflict with state's ability to achieve EO B-55-18 carbon neutrality goal by 2045 or EO S-3-05 GHG reduction 2050 goal, which aims to reduce statewide emissions to 80 percent below 1990 levels by 2050; or
   d. Conflict with applicable local GHG emission reduction plans.

The San Joaquin Valley Air Pollution Control District (SJVCAPCD) has not adopted GHG significance thresholds that are applicable to evaluating the impacts of the proposed 2022 RTP/SCS in light of the State's post-2020 GHG emission reduction targets. In the absence of applicable SJVAPCD-adopted thresholds, this section uses the project-specific thresholds of significance listed above for each GHG impact criterion in Appendix G.

Methodology

Mobile Source Emissions Modeling

GHG emissions from on-road mobile sources were calculated using the emission factors, fleet mix, and vehicle trip and population estimates from CARB's EMFAC2021 model and regional VMT from TCAG's Regional Travel Demand Model (as further described in Section 4.14, *Transportation*), shown in Table 4.8-2. Detailed calculations are available in Appendix A.

Table 4.8-2 Proposed 2022 RTP/SCS Total Daily VMT Data

Year	Daily Regional VMT	Daily SB 743 VMT[1]
2005 Baseline	10,153,707	n/a
2021 Baseline	10,617,248	14,566,292
2030 with Proposed 2022 RTP/SCS	11,310,884[1]	n/a
2046 No Project	12,465,620	17,128,558
2046 with Proposed 2022 RTP/SCS	12,241,939	16,892,980

[1]SB 743 VMT includes vehicle trips that travel outside of the TCAG region, whereas Regional VMT only includes vehicle miles traveled within the TCAG region.
[2] In the absence of specific VMT data for year 2030, regional VMT for year 2030 was calculated via linear interpolation of regional VMT for years 2021 and 2035.
VMT = vehicle miles traveled
Source: Appendix A

EMFAC2021 emission factors are established by CARB and incorporate mobility assumptions (e.g., vehicle fleets, speed, delay times, average trip lengths, time of day and total travel time) and socioeconomic growth projections based on data from sources including the Bureau of Automotive Repair, Caltrans, the California Household Travel Survey, the University of California Riverside College of Engineering-Center for Environmental Research and Technology, the UCLA Anderson Forecast, California Department of Finance, California Board of Equalization, California Energy Commission, and U.S. Department of Energy - Energy Information Administration. EMFAC2021 accounts for updated fleet characterization, vehicle activity profile, and socio-econometric forecasting data; new vehicle testing data for emission rates; updated assumptions on the Advanced Clean Truck regulation and Innovative Clean Transit regulation; and implementation of new regulations and policies including the SAFE Vehicles Rule. Projected emissions from all vehicle types on the TCAG transportation network for the year 2046 under proposed 2022 RTP/SCS conditions were compared with emissions estimated for baseline year 2021. The proposed 2022 RTP/SCS scenario was also compared with emissions estimated for year 2046 without implementation of the proposed 2022 RTP/SCS for informational purposes.

Total transportation related GHG emissions were evaluated using the SB 743 VMT with emissions reported in terms of CO_2e because the SB 743 VMT captures vehicle miles traveled on trips that travel outside the TCAG region into other regions. However, for the purposes of evaluating consistency with the SB 32 target, daily regional VMT was utilized due to a lack of SB 743 VMT data for year 2005. This is needed to back-calculate estimated 1990 emissions levels pursuant to CARB's guidance to assume 1990 emissions levels are roughly equivalent to a 15 percent reduction from baseline 2005 emissions levels (CARB 2008). In addition, for the SB 32 consistency analysis, emissions were calculated in terms of CO_2, which was used as a proxy to indicate the estimated percent change in GHG emissions levels between 1990 and 2030.

SB 375 Analysis

To determine whether the proposed 2022 RTP/SCS would allow TCAG to meet its SB 375 reduction targets, per capita CO_2 emissions were calculated by multiplying the emission factors by the VMT from passenger vehicles and dividing by the region's population. For the purposes of this analysis, the year 2005 is used as the baseline year per the requirements of SB 375. In accordance with CARB guidance, EMFAC2014 was utilized for SB 375 modeling for the proposed 2022 RTP/SCS to provide a consistent comparison of per capita CO_2 emissions with the SB 375 targets (CARB 2019). Furthermore, per CARB guidance, off-model adjustment factors related to the SAFE Rule were not applied in the SB375 analysis because EMFAC2014 does not account for the impact of light duty ZEV and GHG emissions standards when used in SB 375 mode (CARB 2020a).

The EMFAC model generates an output of CO_2 emissions, which were used as the overall indicator of GHG emissions associated with passenger vehicles. The CO_2 emissions associated with vehicle starts are accounted for in the EMFAC model based on the distribution of vehicle starts by vehicle classification, vehicle technology class, and operating mode. EMFAC adds these vehicle starts to the running emissions to compute total on-road mobile source emissions.

Consistency with SB 32, the 2017 Scoping Plan, EO S-3-05, and EO B-55-18

Meeting the goals of SB 375 does not guarantee consistency with SB 32 and the 2017 Scoping Plan. To determine that a project would not conflict with the State's ability to achieve the SB 32 target and its associated 2017 Scoping Plan, the proposed 2022 RTP/SCS would need to achieve substantial progress toward achieving the reduction target. Mobile source emissions were calculated to determine regionwide GHG emissions with implementation of the proposed 2022 RTP/SCS. If implementation of the proposed 2022 RTP/SCS would achieve substantial progress toward the emissions reduction targets established by SB 32, then impacts related to consistency with SB 32 would not be considered significant.

At this time, the State Legislature has codified a target of reducing emissions to 40 percent below 1990 emissions levels by 2030 (SB 32) and has developed the 2017 Scoping Plan to demonstrate how the State will achieve the 2030 target and make substantial progress toward the 2050 goal of an 80 percent reduction in 1990 GHG emission levels set by EO S-3-05. In EO B-55-18, which identifies a new goal of carbon neutrality by 2045, CARB has been tasked with including a pathway toward the EO B-55-18 carbon neutrality goal in the next Scoping Plan update. While state and regional regulators of energy and transportation systems, along with the State's Cap-and-Trade program, are designed to be set at limits to achieve most of the reductions needed to attain the State's long-term targets, local governments can do their fair share toward meeting the State's targets by siting and approving projects that accommodate planned population growth and projects that are GHG-efficient. At this time, CARB has not adopted a plan that establishes a pathway to achieving the State's long-term targets under EO S-3-05 and EO B-55-18; therefore, these targets are not used as thresholds of significance in this analysis.

Instead, the Association of Environmental Professionals (AEP) Climate Change Committee recommends that CEQA GHG analyses evaluate project emissions in light of the trajectory of state climate change legislation and assess their "substantial progress" toward achieving long-term reduction targets identified in available plans, legislation, or Eos (AEP 2016). Consistent with AEP Climate Change Committee recommendations, GHG impacts are analyzed using a threshold based on the State's 2030 target, which evaluates whether the project would impede "substantial progress" toward meeting the reduction goals identified in SB 32, EO S-3-05, and EO B-55-18. Because SB 32 is considered an interim target toward meeting the 2045 and 2050 State goals, consistency with SB 32 is considered to be contributing substantial progress toward meeting the State's long-term 2045 and 2050 goals. Avoiding interference with, and making substantial progress toward, these long-term State targets is important because these targets have been set at levels that achieve California's share of international emissions reduction targets that will stabilize global climate change effects and avoid the adverse environmental consequences of climate change (EO B-55-18). Furthermore, these targets will depend on substantial technological innovation in GHG emission reduction measures and changes in legislation and regulations that will need to occur over the next 25 to 30 years as have occurred over the past 14 years to meet the 2020 target set by AB 32. Therefore, if the proposed 2022 RTP/SCS is consistent with the SB 32 target, the proposed 2022 RTP/SCS would also achieve substantial progress toward climate-stabilizing targets set forth by EOs S-3-05 and B-55-18 and would be consistent with these long-term goals.

b. Project Impacts and Mitigation Measures

The following section discusses impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. Section 4.8.3.c summarizes the impacts associated with capital improvement projects in the proposed 2022 RTP/SCS. Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time. In general, however, implementation of proposed transportation improvement projects and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1:	Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. An increase that exceeds the following threshold would be considered a significant impact: a. A net increase in GHG emissions by 2046 compared to existing baseline conditions

Impact GHG-1 CONSTRUCTION OF THE TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD GENERATE GHG EMISSIONS THAT MAY HAVE A SIGNIFICANT IMPACT ON THE ENVIRONMENT. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.

Construction activities associated with transportation improvement projects and future land use projects envisioned by the proposed 2022 RTP/SCS would generate temporary short-term GHG emissions primarily due to the operation of construction equipment and truck trips. GHG emissions from construction can vary depending on the level of activity, the specific operations taking place, the equipment being operated and other factors. However, because such emissions are dependent on the characteristics of individual development projects, construction-related emissions are speculative at the RTP/SCS level. At the program-level of analysis, it is not feasible to quantify the amount of emissions expected from implementation of the proposed 2022 RTP/SCS. This is due to the variability in the extent of construction based on site conditions throughout the TCAG region and the lack of project details needed to conduct such an analysis. Therefore, this analysis includes a qualitative analysis of potential GHG emissions from construction activity associated with projected land use development and proposed transportation projects.

Construction activity tends to be temporary in nature and would be expected to occur throughout the planning period of the proposed 2022 RTP/SCS. During construction activities, GHG emissions would be emitted from vehicular travel to and from the worksites and the operation of construction equipment such as graders, backhoes, and generators. Site preparation and grading typically generate the greatest amount of emissions due to the intensive use of grading equipment and soil hauling. The level of GHG emissions from the construction of any one project or of all projects combined would be primarily dependent on the particular type, size, quantity, engine type, fuel type, and fuel efficiency of the equipment and the duration of their operation at the construction site or in the region. Construction activities generally result in annual GHG emissions that represent a small proportion of total annual GHG emissions from operational sources such as transportation and land use emissions. For example, the Southern California Association of Governments (SCAG) noted in their 2020-2045 RTP/SCS PEIR that total construction-related emissions typically account for less than 0.3 percent of total GHG emissions for the entire SCAG region (SCAG 2020).

Construction activities generally result in annual GHG emissions that represent a small proportion of total annual GHG emissions, and implementation of the proposed 2022 RTP/SCS would result in an overall net reduction in long-term transportation-related GHG emissions in 2046 when compared to existing 2021 conditions (refer to Impact GHG-2). Nonetheless, construction activities would still result in GHG emissions would result in GHG emissions exceeding the 2021 baseline, a significant impact. Therefore, this analysis identifies the mitigation measures that should be implemented for individual construction projects to reduce impacts related to GHG emissions. <u>The following mitigation measures would reduce this impact.</u>

Mitigation Measures

For all transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures developed for the proposed 2022 RTP/SCS where applicable for transportation projects generating construction-related GHG emissions. Cities and the County can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions.

GHG-1 Construction GHG Reduction Measures

The project sponsor shall incorporate the most recent GHG emission reduction measures for off-road construction vehicles during construction. The measures shall be noted on all construction plans, and the implementing agency shall perform periodic site inspections. Current GHG-reducing measures include the following:

- Use of diesel construction equipment meeting CARB's Tier 4 certified engines wherever feasible for off-road heavy-duty diesel engines and comply with the State Off-Road Regulation. Where the use of Tier 4 engines is not feasible, Tier 3 certified engines shall be used; where the use of Tier 3 engines are not feasible, Tier 2 certified engines shall be used;
- Use of on-road heavy-duty trucks that meet CARB's 2007 or cleaner certification standard for on-road heavy-duty diesel engines, and comply with the State On-Road Regulation;
- Minimizing idling time (e.g., five-minute maximum). Signs shall be posted in the designated queuing areas and or job sites to remind drivers and operators of the five-minute idling limit;
- Use of electric-powered equipment in place of diesel-powered equipment when feasible;
- Use of alternatively fueled or catalyst-equipped diesel construction equipment when feasible, to the extent electric powered equipment is not feasible;
- Substitute gasoline-powered in place of diesel-powered equipment, when neither electric-powered equipment or alternatively fueled or catalyst-equipped diesel equipment is feasible; and
- Project proponents shall incentivize that construction workers carpool, and/or use electric vehicles to commute to and from the project site.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

Significance After Mitigation

Implementation of Mitigation Measure GHG-1 would reduce short-term construction emissions from individual projects and thus reduce the severity of impacts by requiring best practices for exhaust emissions via readily available, lower-emitting diesel equipment, and/or equipment powered by alternative cleaner fuels (e.g., propane) or electricity, as well as on-road trucks using particulate exhaust filters. Implementation of Mitigation Measures AQ-2(b) and AQ-2(c) would also reduce GHG emissions from the proposed 2022 RTP/SCS. However, these mitigation measure may not be feasible or effective for all projects. Therefore, this impact would remain significant and unavoidable. No additional mitigation measures to reduce this impact to less than significant levels are feasible.

Threshold 1:	Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. An increase that exceeds the following threshold would be considered a significant impact: a. A net increase in GHG emissions by 2046 compared to existing baseline conditions

Impact GHG-2 **PROPOSED TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD RESULT IN A NET INCREASE IN GHG EMISSIONS BY 2046 COMPARED TO THE EXISTING BASELINE CONDITIONS AND WOULD THEREFORE HAVE A SIGNIFICANT IMPACT ON THE ENVIRONMENT. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.**

Transportation-Related Emissions

Table 4.8-3 compares the total transportation-related emissions from all vehicle classes for existing (2021) conditions and with implementation of the proposed 2022 RTP/SCS. Emissions under the 2046 “No Project” scenario are included for informational purposes. As presented in Table 4.8-3, implementation of the proposed 2022 RTP/SCS would result in a net reduction in per capita emissions of 2.49 MT of CO_2e per person per year and a net reduction in total emissions of 509,996 MT of CO_2e per year, compared to existing (2021) conditions. The estimated reduction in total mobile source emissions is primarily due to stricter fuel efficiency and vehicle emissions standards such as the CAFE standards that will phase in over the planning period as reflected in EMFAC2021 emission factors. In addition, the estimated reduction in per capita mobile source emissions is also the result of slower growth in VMT as compared to forecast population growth, due to the improved circulation networks and multimodal transportation initiatives outlined in the proposed 2022 RTP/SCS, which would reduce per capita VMT. The proposed 2022 RTP/SCS would also result in a net reduction in VMT and associated emissions as compared to the future “No Project” scenario due to implementation of strategies and proposed RTP/SCS projects.

Because the proposed 2022 RTP/SCS would result in a net decrease in overall transportation-related emissions in the TCAG region, operational activities under the plan would not generate GHG emissions that may have a significant impact on the environment, and impacts would be less than significant.

Table 4.8-3 Proposed 2022 RTP/SCS Net Change in Transportation-Related Emissions (2021-2046)

Scenario	Total Emissions (MT of CO_2e/year)	Per Capita Emissions (MT of CO_2e/person/year)[1]
Existing (2021)	2,539,741	5.27
2046 No Project	2,058,050	3.63
2046 with Proposed 2022 RTP/SCS	2,029,745	3.58
Net Change from Existing (2021)	**(509,996)**	**(1.70)**
Net Change from 2046 No Project	**(28,305)**	**(<0.05)**
Threshold of Significance	> 0	> 0
Threshold Exceeded?	No	No

( ) denotes a negative number.
MT = metric tons; CO_2e = carbon dioxide equivalent
[1] The existing (2021) population of the TCAG region is 418,649 persons, and the future (2046) population is forecast to be 567,383 persons (proposed 2022 RTP/SCS).
Source: Appendix C

Other Land Use Development Emissions

In addition to the transportation-related GHG emissions shown in Table 4.8-3, land use projects envisioned by the land use scenario in the proposed 2022 RTP/SCS would also result in GHG emissions due to sources such as electricity and natural gas consumption. Residential, commercial, agricultural, and other land uses would result in GHG emissions, however data is not available to quantify impacts from such sources. For instance, agricultural machinery and processes have unique emission factors, and GHG emissions must be calculated using precise information regarding specific processes. Furthermore, emissions from land use projects cannot be feasibly quantified at this time because details about future land use projects and their timing are unknown at this time. Therefore, because future land use projects would represent new sources of GHG emissions, it can be conservatively estimated that total GHG emissions from the land use scenario envisioned by the proposed 2022 RTP/SCS would increase over the planning period. Although per capita emissions associated with electricity and natural gas consumption, water and wastewater conveyance and treatment, and solid waste disposal are anticipated to decline, primarily as a result of increasingly stringent iterations of State building code standards (specifically, the California Energy Code and the California Green Building Standards Code), total emissions may increase due to population growth and future land use projects. As a result, impacts of land use projects implementing the proposed 2022 RTP/SCS would be significant.

Mitigation Measures

Cities and the County can and should implement the following mitigation measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions.

GHG-2 Land Use Project Energy Consumption and Water Use Reduction Measures

For land use projects under their jurisdiction, cities and the County can and should implement measures to reduce energy consumption, water use, solid waste generation, and VMT, all of which contribute to GHG emissions. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions. These measures include, but are not limited to:

- Require new residential and commercial construction to install solar energy systems or be solar-ready
- Require new residential and commercial development to install low flow water fixtures
- Require new residential and commercial development to install water-efficient drought-tolerant landscaping, including the use of compost and mulch
- Require new development to exceed the applicable Title 24 energy-efficiency requirements
- Require new development to be fully electric
- Require new residential and commercial development to offer information on recycling, composting, and disposal of household hazardous waste and e-waste
- Require new development to implement circulation design elements in parking lots for no-residential uses to reduce vehicle queuing and improve the pedestrian environment

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for land use projects are cities and counties. This mitigation measure can and should be applied during project permitting and environmental review and implemented during project operation, as applicable.

Significance After Mitigation

If implementing agencies adopt and require the mitigation described above, impacts would be reduced because energy, water use, solid waste generation, and VMT related GHG emissions from land use projects would be reduced. However, implementation of project-level GHG-reducing measures may not be feasible and cannot be guaranteed on a project-by-project basis. Therefore, this impact would remain significant and unavoidable. No additional feasible mitigation measures are available that would ensure no net increase in GHG emissions compared to existing baseline conditions.

Threshold 2:	Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. Any conflict with the following thresholds would be considered a significant impact: a. Conflict with regional SB 375 per capita passenger vehicle CO_2 emission reduction targets of 16 percent by 2035 from 2005 levels

Impact GHG-3 THE TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD NOT CONFLICT WITH REGIONAL SB 375 PER CAPITA PASSENGER VEHICLE CO_2 EMISSION REDUCTION TARGETS OF 16 PERCENT BY 2035 FROM 2005 LEVELS. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

One of the goals of SB 375 is to reach the per capita GHG emissions reduction targets for passenger vehicles set by CARB through an integrated land use, transportation, and housing plan. Achievement of this goal is an objective of the proposed 2022 RTP/SCS. The target from CARB, analyzed in this EIR, is identified as a 16 percent reduction in per capita passenger vehicle emissions from 2005 levels by 2035.[3] Table 4.8-4 presents per capita passenger vehicle emissions for 2035 as compared to the 2005 baseline. The per capita transportation-related emissions from passenger vehicles include off-model adjustments that represent a reasonable level effect of the transportation programs included in the proposed 2022 RTP/SCS.

Table 4.8-4 Per Capita Passenger Vehicle CO_2 Emissions Comparison

	Per Capita CO_2 Emissions (lbs/day)		
	2005 Baseline (per SB 375)	2035	2046
Per Capita Passenger Vehicle Emissions	17.02	14.34	14.21
Percent Change from in Per Capita GHG Emissions from 2005		-16.2%	-17.6%
SB 375 Target		-16%	n/a[1]
SB 375 Target Met?		Yes	n/a[1]

CO_2 = carbon dioxide; lbs = pounds; SB = Senate Bill
Source: Appendix D
[1]SB 375 targets have not been adopted for post-2035 years.

As shown in Table 4.8-4, implementation of the proposed 2022 RTP/SCS in the year 2035 would result in a decrease of per capita passenger vehicle CO_2 emissions by 16.2 percent compared to 2005 levels. Therefore, implementation of the proposed 2022 RTP/SCS would achieve the SB 375 GHG reduction target for TCAG of 16 percent by 2035, and the proposed 2022 RTP/SCS would therefore be consistent with SB 375. Impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

[3] The SB 375 target for 2020 is not utilized herein as a threshold of significance because the 2022 RTP/SCS would apply only to future transportation and land use planning from the year of adoption (anticipated to be 2022) forward.

Threshold 3:	Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. Any conflict with the following thresholds would be considered a significant impact: a. Conflict with state's ability to achieve SB 32 GHG reduction target, which aims to reduce statewide emissions to 40 percent below 1990 levels by 2030 b. Conflict with state's ability to achieve EO S-3-05 GHG reduction 2050 goal, which aims to reduce statewide emissions to 80 percent below 1990 levels by 2050 and EO B-55-18; or c. Conflict with applicable local GHG reduction plans

Impact GHG-4 IMPLEMENTATION OF THE PROPOSED 2022 RTP/SCS WOULD CONFLICT WITH THE STATE'S ABILITY TO ACHIEVE SB 32, EOS S-3-05 AND B-55-18, AND APPLICABLE LOCAL GHG REDUCTION PLAN TARGETS AND GOALS. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.

2017 Scoping Plan

The proposed 2022 RTP/SCS would implement a suite of transportation improvement projects and facilitate a land use scenario that is consistent with the transportation sustainability goals of the 2017 Scoping Plan. The land use scenario envisioned by the proposed 2022 RTP/SCS concentrates the forecasted growth in population and employment in already urbanized areas in an effort to reduce VMT. Active transportation projects would implement design policies that prioritize transit, biking, and walking throughout the TCAG region including but not limited to the cities of Visalia, Dinuba, Farmersville, Porterville, and Woodlake. Active Transportation projects would increase the number, safety, and connectivity, and attractiveness of biking and walking facilities by adding sidewalks, trails, bike lanes, crosswalks, intersection improvements, and signage throughout the TCAG region. Furthermore, the proposed 2022 RTP/SCS includes transit projects designed to maintain, enhance, and expand transit services offered by agencies in the TCAG region, including, but not limited to, Tulare County Area Transit (TCaT), Tulare Intermodal Express (TIME), and municipal transit agencies such as Porterville Transit and Dinuba Transit. Proposed 2022 RTP/SCS projects include electric bus procurement by Porterville Transit and Visalia Transit, Student Transit Pass Program continuation, Compressed Natural Gas Station expansion, Visalia Transit System technology advancements, and new transit lines added to systems regionwide. Transit projects would increase the availability of low carbon mobility options in the region, thereby contributing to the 2017 Scoping Plan's goals of increasing the penetration of zero emission vehicles in non-light-duty sectors and electrifying the transportation sector. Therefore, the proposed 2022 RTP/SCS is consistent with the goals and strategies of the 2017 Scoping Plan.

SB 32

The SB 375 targets are a key element of CARB's 2017 Scoping Plan. However, the 2017 Scoping Plan states, "Stronger SB 375 GHG reduction targets [adopted in 2018] will enable the State to make significant progress toward this goal, but alone will not provide all of the VMT growth reductions that will be needed. There is a gap between what SB 375 can provide and what is needed to meet the State's 2030 and 2050 goals" (CARB 2017). Therefore, consistency with the SB 375 target does not necessarily equate to consistency with SB 32 and the 2017 Scoping Plan. This analysis hypothetically assumes that the proposed 2022 RTP/SCS would be required to achieve the same proportional GHG reductions as the state by the year 2030 (i.e., a 40 percent reduction in GHG emissions below 1990 levels). Although transportation related GHG emissions would decrease over the planning period, the reduction would not be sufficient to achieve the 2030 target of a 40 percent reduction below 1990 levels. As shown in Table 4.8-5, per capita transportation-related emissions would also decrease.

Table 4.8-5 Per Capita Transportation-Related Emissions (All Vehicle Classes) Compared to 1990 Levels

	Per Capita CO_2 Emissions (lbs/day)	
Scenario	Vehicle Emissions	% Change in Emissions Compared to 1990 Baseline
1990 Baseline[1, 2]	25.2	--
2005 Baseline[2]	29.6	--
Existing (2021)	22.3	-11%
2030 with proposed 2022 RTP/SCS[3]	18.1	-28%
2046 with proposed 2022 RTP/SCS	15.2	-40%

Note: Regional VMT was used in this analysis rather than SB 743 VMT because SB 743 VMT data was unavailable for 2005.

[1] Actual 1990 emissions are unknown but are generally assumed to be 15% below 2005 levels (CARB 2008).

[3] In the absence of specific population data for year 2030, per capita emissions for year 2030 were calculated via linear interpolation of population for years 2021 and 2035.

Source: Appendix D

As discussed in Impact GHG-2, per capita land use emissions associated with electricity and natural gas consumption, water and wastewater conveyance and treatment, and solid waste disposal are anticipated to decline over the planning period, primarily as a result of increasingly stringent iterations of State building code standards. However, it cannot be feasibly determined that reductions in land use emissions would achieve the SB 32 target.

Therefore, although the policies, transportations projects, and land use scenario identified in the proposed 2022 RTP/SCS are designed to align transportation and land use planning to reduce transportation related GHG emissions, the proposed 2022 RTP/SCS would conflict with the State's ability to achieve the SB 32 GHG emissions reduction target, assuming that the proposed 2022 RTP/SCS is required to achieve the same proportional Statewide GHG reductions.

EOs S-3-05 and B-55-18

Because the plan would conflict with the State's ability to achieve the SB 32 GHG reduction target, it would also impede "substantial progress" toward meeting the reduction goals identified in EO S-3-05 and EO B-55-18.

Based on the above analysis, impacts related to consistency with SB 32, the 2017 Scoping Plan, and EOs S-3-05 and B-55-18 would be significant.

Local Climate Action Plans

Three of TCAG's member jurisdictions (Tulare County and the Cities of Visalia and Tulare) have adopted CAPs that set goals and targets for the reduction of GHG emissions, and outline policies to help achieve those goals (County of Tulare 2018; City of Visalia 2013; City of Tulare 2011).

The CAPs developed by the Cities of Visalia and Tulare had been adopted prior to enaction of SB 32, and thus present strategies intended to comply with the GHG emissions reduction goals recommended for local governments in the AB 32 Scoping Plan, which was aimed at reducing GHG emissions to 1990 levels by 2020 in accordance with AB 32. These CAPs are also intended to make progress toward the State's 2030 target of reducing GHG emissions by 40 percent below 1990 levels, as first set forth in EO S-3-05 in 2005 and later codified by SB 32 in 2017. In addition, the County of Tulare presents strategies explicitly addressing the GHG reduction goals set forth in SB 32. As discussed previously, the proposed 2022 RTP/SCS was determined to be inconsistent with the SB 32 target and EO S-3-05 and B-55-18 goals. Therefore, it would also conflict with the goals of local CAPs designed to meet the same State goals, and impacts would be significant.

The following mitigation measures would reduce this impact.

Mitigation Measures

For all transportation projects under their jurisdiction, implementing agencies shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures developed for the proposed 2022 RTP/SCS where applicable for transportation projects generating construction GHG emissions. The County of Tulare and cities in the TCAG region can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions.

Implementation of Mitigation Measure GHG-2 would also reduce GHG emission from land use projects. Implementation of Mitigation Measures T-2(a) and T-2(b) in Section 4.15, *Transportation*, would also reduce GHG emissions from the proposed 2022 RTP/SCS.

GHG-4 Transportation-Related GHG Reduction Measures

The implementing agency shall incorporate the most recent GHG emission reduction measures and/or technologies for reducing VMT and associated transportation related GHG emissions. Current GHG-reducing measures include the following:

- Installation of electric vehicle charging stations beyond those required by State and local codes
- Utilization of electric vehicles and/or alternatively fueled vehicles in company fleet
- Provision of dedicated parking for carpools, vanpool, and clean air vehicles
- Provision of vanpool and/or shuttle service for employees
- Implementation of reduced parking minimum requirements
- Implementation of maximum parking limits
- Provision of bicycle parking facilities beyond those required by State and local codes
- Provision of a bicycle-share program
- Expansion of bicycle routes/lanes along the project site frontage
- Provision of new or improved transit amenities (e.g., covered turnouts, bicycle racks, covered benches, signage, lighting) if project site is located along an existing transit route
- Expansion of existing transit routes
- Provision of transit subsidies
- Expansion of sidewalk infrastructure along the project site frontage
- Provision of safe, pedestrian-friendly, and interconnected sidewalks and streetscapes

- Provision of employee lockers and showers
- Provision of on-site services that reduce the need for off-site travel (e.g., childcare facilities, automatic teller machines, postal machines, food services)
- Provision of alternative work schedule options, such as telework or reduced schedule (e.g., 9/80 or 10/40 schedules), for employees
- Implementation of transportation demand management programs to educate and incentivize residents and/or employees to use transit, smart commute, and alternative transportation options

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and counties. This mitigation measure shall, or can and should, be applied during project permitting and environmental review and implemented during project operation, as applicable.

Significance After Mitigation

If implementing agencies adopt and require the mitigation described above, impacts would be reduced because transportation related GHG emissions from transportation and land use projects would be reduced. However, implementation of project-level GHG-reducing measures may not be feasible and cannot be guaranteed on a project-by-project basis. Additionally, it is speculative at this time to forecast whether project-level GHG emission reductions would be sufficient to achieve a countywide reduction in GHG emissions of 40 percent below 1990 levels by 2030. Therefore, this impact would remain significant and unavoidable. No additional feasible mitigation measures are available that would reduce emissions to trajectories consistent with SB 32, EO S-3-05, and EO B-55-18 GHG reduction targets and goals.

c. Specific Projects that May Result in Impacts

The analysis within this section discusses the potential GHG related impacts associated with the proposed 2022 RTP/SCS. The transportation projects within the proposed 2022 RTP/SCS are evaluated herein in their entirety and are intended to improve circulation rather than cause adverse impacts. However, as described above, the proposed 2022 RTP/SCS would increase GHG emissions as a result of project construction and/or operation. These effects have been found to be significant, as described above. Any number of the proposed 2022 RTP/SCS projects that require construction equipment or include transportation improvement would presumably increase GHG emissions. Thus, no specific projects are listed in this section related to the adverse impacts on GHG emissions in the TCAG region.

4.8.4 Cumulative Impacts

The impacts of GHG emissions are, by definition, cumulative impacts, as they add to the global accumulation of greenhouse gases in the atmosphere. The cumulative impact analysis area for GHG emissions consists of the TCAG region, adjoining counties, and the entire State of California. The entire state is included in the analysis area because GHG emissions from the TCAG region and adjoining counties would influence the ability for the State to achieve its GHG reduction targets. The analysis presented in Section 4.8.3, *Impact Analysis*, evaluates both plan-level impacts as well as the contribution of the proposed 2022 RTP/SCS to the existing cumulative impact related to GHG emissions, the effects of which are outlined in Section 4.8.1(c), *Potential Effects of Climate Change*.

As discussed under Impact GHG-1, construction activities associated with transportation improvement projects and future land use projects envisioned by the proposed 2022 RTP/SCS would generate temporary GHG emissions. The temporary construction GHG emissions would occur concurrent with ongoing GHG emissions in the cumulative impact analysis area, such as GHG emissions ongoing agricultural activities in surrounding Valley counties such as Fresno County, Kern County, and Kings County. As described under Impact GHG-1, construction-related GHG emissions associated with buildout under the proposed 2022 RTP/SCS would be significant even after implementation of Mitigation Measure GHG-1. Therefore, the contribution of the proposed 2022 RTP/SCS construction emissions to the cumulative impact of total GHG emissions would be cumulatively considerable, pre- and post-mitigation.

As discussed under Impacts GHG-2 through GHG-4, the transportation projects and land use scenario envisioned in the proposed 2022 RTP/SCS would also generate operational GHG emissions. Overall, implementation of the proposed 2022 RTP/SCS would reduce total regionwide mobile emissions, however land use emissions may increase compared to existing conditions. Implementation of Mitigation Measure GHG-2 would reduce GHG emissions from land use projects, however impacts would remain significant and unavoidable. Therefore, the contribution of land use project emissions to the cumulative impact of total GHG emissions would be cumulatively considerable, pre- and post-mitigation.

The proposed 2022 RTP/SCS would not conflict with SB 375 because per capita emissions reductions would exceed the regional target of a 16 percent reduction by 2035 compared to 2005 levels. However, reductions achieved by the proposed 2022 RTP/SCS would not be sufficient to achieve the 2030 target of a 40 percent reduction in overall emissions set forth by SB 32, and therefore would also be inconsistent with EO S-3-05 and B-55-18 goals. Other ongoing land uses and operation of future development in the cumulative impact analysis area would also generate GHG emissions. Implementation of Mitigation Measures GHG-2 and GHG-4 would reduce the proposed 2022 RTP/SCS impacts related to consistency with state GHG reduction targets and goals; however, emissions would remain in exceedance of applicable significance thresholds. Therefore, the proposed 2022 RTP/SCS would have a cumulatively considerable contribution to the cumulative impact of inconsistency with state GHG reduction targets and goals, both pre- and post- mitigation.

4.9 Hazards and Hazardous Materials

This section analyzes impacts related to hazardous materials and airport safety hazards in the TCAG region. Impacts related to exposure to excessive aviation related noise are discussed in detail in Section 4.12, *Noise*, and impacts related to impairment or interference of emergency response or evacuation plans are discussed in Section 4.15, *Transportation*. Impacts related to wildfire hazards are discussed in Section 4.18, *Wildfire*.

4.9.1 Setting

a. Physical Setting

Hazardous Materials and Waste

The term "hazardous material" is defined in the State of California's Health and Safety Code (HSC), Chapter 6.95, Section 25501(o) as:

> Any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous waste and any material that a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

Hazardous waste is hazardous material generated, intentionally or unintentionally, as a byproduct of some process or condition. Hazardous wastes are defined in California HSC Section 25141(b) as wastes that:

> …because of their quantity, concentration, or physical, chemical, or infectious characteristics, [may either] cause, or significantly contribute to an increase in mortality or an increase in serious illness [or] pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

According to the U.S. Environmental Protection Agency (USEPA), waste may be considered hazardous if it is specifically listed as known hazardous waste or if it meets the one or more of the following characteristics of a hazardous waste:

- **Toxicity.** Poisonous, harmful when ingested or absorbed.
- **Ignitability.** Capable of being ignited by open flame, liquids with flash points[1] below 60 degrees Celsius.
- **Corrosivity.** Capable of corroding other materials, aqueous wastes with a pH of 2 or less or greater than or equal to 12.5.
- **Reactivity.** May be unstable under normal conditions, may react with water, may give off toxic gases or may be capable of detonation or explosion under normal conditions or when heated.

[1] Flash point is the lowest temperature at which the vapors of a volatile combustible substance ignite in the air when exposed to flame.

Generation and Disposal of Hazardous Materials and Waste

Many chemicals used in household cleaning, construction, light and heavy industry, dry cleaning, film processing, landscaping and automotive maintenance and repair are considered to generate hazardous materials and waste. Additionally, in some cases, past industrial or commercial uses on a site may have resulted in spills or leaks of hazardous materials and petroleum that have caused contamination of the underlying soil and groundwater. Federal and state laws require that soils and groundwater having concentrations of contaminants that are higher than certain acceptable levels are handled and disposed as hazardous waste during excavation, transportation, and disposal. The California Code of Regulations (CCR), Title 22, Sections 66261.20-24 contains technical descriptions of characteristics that would cause a soil to be classified as a hazardous waste. Hazardous materials require special methods of disposal, storage and treatment, and the release of hazardous materials requires an immediate response to protect human health and safety and the environment. Improper disposal can harm the environment and people who work in the waste management industry.

Businesses that handle or generate hazardous materials within the TCAG region are monitored by U.S. EPA; the Central Valley Regional Water Quality Control Board (RWQCB); the Tulare County Environmental Health Department; Local Enforcement Agency (LEA) programs; and the San Joaquin Valley Air Pollution Control District (SJVAPCD). Generators of hazardous waste fall into two categories: large-quantity generators (LQG) and small-quantity generators (SQG). An LQG is defined as a person or facility generating more than 2,200 pounds of hazardous waste per month. An SQG is defined as generating greater than 100 kilograms (kg) and less than 1,000 kg (2,200 pounds) of hazardous waste per month. LQGs include industrial and commercial facilities, such as manufacturing companies, petroleum refining facilities and other heavy industrial businesses.

LQGs must comply with federal and state requirements for managing hazardous waste. LQGs need an U.S. EPA identification number that is used to monitor and track hazardous waste activities. SQGs include facilities such as service stations, automotive repair, dry cleaners, and medical offices. The regulatory requirements for SQGs are less stringent than the requirements for LQGs; however, SQGs must also obtain an U.S. EPA identification number, which must be used for traceability on all hazardous waste documentation. Pursuant to federal law (40 CFR 262.41-43), all such generators must register with U.S. EPA for record-keeping and reporting.

Transportation of Hazardous Materials and Waste

Hazardous materials, hazardous wastes, medical waste, and petroleum products are a subset of the goods routinely shipped along the transportation corridors in the TCAG region. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by the Department of Toxic Substances Control (DTSC). The DTSC maintains a list of active registered hazardous waste transporters throughout California and the California Department of Public Health regulates the haulers of hazardous waste. There are three registered hazardous waste transporters in Tulare County (DTSC 2022a).

Transportation of hazardous materials and wastes in the TCAG region occurs through a variety of modes: truck, rail, and pipeline. Transportation of hazardous materials by truck is regulated by the DOT. The DOT, Federal Motor Carrier Safety Administration, identifies two state route sections in the TCAG region as a Hazardous Materials Route in its National Hazardous Materials Route Registry (FMCSA 2022). These routes include:

- SR 245 from SR 201 [Elderwood] to SR 198 [Exeter].
- SR 198 from SR 65 [Visalia] to the Sequoia National Park.

According to the U.S. DOT Pipeline and Hazardous Materials Safety Administration and Office of Hazardous Materials Safety, hazardous materials traffic in the U.S. now exceeds 800,000 shipments per day and results in more than 3.1 billion tons of hazardous materials annually (FHWA 2021). Considering the primary use of roads compared to rail and pipelines in the TCAG region, trucks are likely responsible for transporting most hazardous materials within the TCAG region. According to the DOT (2022b), truck transport consistently accounts for the largest share of reportable incidents each year. For example, in 2020, truck transport accounted for approximately 1,270 reportable incidents in the State, while rail and air transport accounted for 51 and 103 incidents, respectively. While hazardous waste incidents account for a small percentage of overall highway incidents, the impact of these incidents can be more severe due to the nature of the material(s) involved.

The transport of hazardous materials by rail is also regulated by DOT. Freight railroads have employee safety training requirements and operating procedures that govern the handling and movement of hazardous goods, including crude oil. Federal regulations and self-imposed safety practices dictate train speeds, equipment and infrastructure inspections and procedures for how to handle and secure trains carrying hazardous materials. The freight rail industry provides instruction to local public safety officials at the Transportation Technology Center's Security and Emergency Response Training Center and individual railroads conduct additional local training for first responders (Association of American Railroads 2021). Freight railroads also work with State emergency planning committees and local first responders to develop emergency response plans. In accordance with a February 2014 agreement between the DOT and Association of American Railroads, railroads have developed an inventory of emergency response resources and provided the DOT with information on the deployment of those resources. This information is available upon request to appropriate emergency responders (Association of American Railroads 2021). A discussion of the rail facilities in the TCAG region is provided in Section 4.12, *Noise*.

Pipelines, primarily underground, are used to transport a variety of potentially hazardous substances throughout the TCAG region. For example, Kinder Morgan maintains and operates a petroleum pipeline that is roughly parallel to State Route 99 (DOT 2022a). The American Petroleum Institute recommends setbacks of 50 feet from petroleum and hazardous liquids lines for new homes, businesses, and places of public assembly. It also recommends 25 feet for garden sheds, septic tanks, and water wells; and 10 feet for mailboxes and yard lights (Transportation Research Board 2004). The Transportation Research Board (2004) encourages the use of zoning regulations to minimize casualties in the event of a catastrophic pipeline rupture. Possible land use techniques include, for example, establishing setbacks; regulating or prohibiting certain types of structures and uses near transmission pipelines; and encouraging, through site and community planning, other types of activities and facilities, such as mini-storage businesses, linear parks and recreational paths, within or in the vicinity of pipeline rights-of-way.

There are no major shipping ports or marine oil terminals in the TCAG region. Transport by ship on the open sea or rivers is not a mode of hazardous materials or waste transport in the region. However, the TCAG region does contain lake marinas, boat storage facilities and other similar boat-based service businesses where petroleum products, paints, cleaning solvents and other substances used in the daily operation and maintenance of boats may be stored and handled.

Potential for Hazardous Materials and Hazardous Materials Sites

Many activities in the TCAG region involve the use of hazardous materials. The use of hazardous materials is commonplace in commercial, industrial, and manufacturing activities, and many businesses within the TCAG region are permitted to handle and transport hazardous materials. There are historic and existing land uses that have generated hazardous waste as part of daily business operations. LQGs and SQGs include such commercial uses as painters, dry cleaners and photographers, and industrial uses such as automotive service stations, sheet metal works, metal scrap yards, truck yards, cement and lime warehouses, coal yards, battery manufacture and Pacific Gas & Electric substations. In addition, older structures may contain building materials that are considered hazardous, such as asbestos and lead-based paint. In general, these historic and current uses and building materials are located throughout the TCAG region.

California Government Code Section 65962.5 requires the California Environmental Protection Agency (CalEPA) to prepare an annual Hazardous Waste and Substances List, commonly referred to as the Cortese List. The addition or inclusion of a site on the Cortese List has bearing on the local permitting process and compliance with CEQA. For example, projects proposed at a site on the Cortese List are not eligible for categorical exemptions to CEQA per Section 15300.2(e) of the *State CEQA Guidelines*. The Cortese List is not maintained as a centralized list, however, and a variety of governmental data sources identify sites where hazardous substances may have been released or may have created a hazardous condition on-site. These include:

- DTSC Active Transporter County Search Report (2022a);
- DTSC EnviroStor database (DTSC 2022b) (Cortese List) for tracking hazardous waste facilities and site with known contamination or sites where there may be reasons to investigate further;
- State Water Resources Control Board's (SWRCB) GeoTracker database (SWRCB 2021) of records for sites that require cleanup, such as leaking underground storage tank (UST) sites, Department of Defense sites, landfill sites and Cleanup Program sites;
- The DOT's Hazardous Materials Incident Report System database (DOT 2022b), which is maintained by the U.S. EPA and contains data on hazardous material spill incidents;
- California Department of Resources Recycling and Recovery's (CalRecycle) Solid Waste Inventory System database (CalRecycle 2022) of active and closed solid waste sites;
- The U.S. EPA Envirofacts database (USEPA 2022) of Resource Conservation and Recovery Act (RCRA) sites, as well as other hazardous sites, such as superfund and brownfield sites; and
- The USACE list of Formerly Used Defense Sites for California (USACE 2022).

All databases listed above have identified sites within the TCAG region. The DTSC Active Transporter County Search Report identifies three registered hazardous waste transporters in Tulare County: Tulare County Environmental Health, Valley Cleaning and Restoration Inc., and Robles Transport LLC. (DTSC 2022a). The DOT's Hazardous Materials Incident Report System database identified 18 hazardous materials spill incidents in Tulare County between January 1, 2021, and December 31, 2021, all of these incidents were highway transportation related in the City of Visalia. Two sites in the TCAG region are identified on the USACE list of Formerly Used Defense Sites for California. According to CalRecycle's Solid Waste Inventory System database, there are 26 active landfill sites in Tulare County and an additional 14 landfill sites that have been closed (CalRecycle 2022).

For some databases, such as the DTSC's EnviroStor database and the U.S. EPA Envirofacts database, the list of identified sites is too exhaustive to provide in its entirety for purposes of this EIR because it is not necessary for programmatic impact analysis. For example, the EnviroStor identifies hundreds of sites in the TCAG region, including closed sites that have been fully remediated; sites where contamination is contained but land use restrictions are in place; and sites under evaluation, active remediation, and monitoring. Among these sites are superfund sites, state response hazardous sites, contaminated soil sites, and school cleanup sites and leaking UST sites. The U.S. EPA Envirofacts database also identifies hundreds of RCRA sites in the region, including some that are also listed in the EnviroStor database. Examples of some of the RCRA sites identified in the region include gas stations, dry cleaners, automotive repair shops, pharmacies, automobile dealerships, paint stores, trucking companies, agricultural operations, and heavy industrial sites (USEPA 2022). The SWRCB GeoTracker database also identifies many leaking UST sites, some have been which remediated and cleaned, and some of which have yet to be cleaned. For purposes of this EIR, it is more important to note that many sites on the Cortese list exist throughout the TCAG region, typically within proximity to the transportation network and more densely populated areas in the region.

To address the potential for documented and undocumented hazards on a site, the American Society for Testing and Materials has developed widely accepted practice standards for the preliminary evaluation of site hazards (E-1527-21) (ASTM 2021). Phase I Environmental Site Assessments (ESAs) include an on-site visit to determine current conditions; an evaluation of possible risks posed by neighboring properties; interviews with persons knowledgeable about the site's history; an examination of local planning files to check prior land uses and permits granted; file searches with appropriate agencies having oversight authority relative to water quality and/or soil contamination; examination of historic aerial photography of the site and adjacent properties; a review of current topographic maps to determine drainage patterns; and an examination of chain-of-title for environmental lines and/or activity and land use limitations. If a Phase I ESA indicates the presence, or potential presence of contamination, a site-specific Phase II ESA is generally conducted to test soil and/or groundwater. Based on the outcome of a Phase II ESA, remediation of contaminated sites under federal and state regulations may be required prior to development. Phase I ESAs can also be used to identify the potential for presence of hazardous building materials in situations where older structures intended for demolition could contain lead-based paint, asbestos containing materials, mercury, or polychlorinated biphenyls.

Naturally Occurring Asbestos

Asbestos is not a formal mineralogical term, but rather a commercial and industrial term historically applied to a group of silica-containing minerals that form long, very thin mineral fibers (termed amphiboles), which generally form in bundles, that were once widely used in commercial products. Naturally occurring asbestos includes minerals in their natural state, such as in bedrock or soils. Naturally occurring asbestos, which was identified as a toxic air contaminant by CARB in 1986, is of concern due to potential exposures to the tiny fibers that can become airborne if asbestos-bearing rocks are disturbed by natural erosion or human activities, such as road building, excavations, and other ground-disturbing activities. Once disturbed, microscopic fibers can become lodged in the lungs, which can potentially lead to serious health problems. Tulare County contains one former asbestos exploration prospect site and ultramafic rocks, such as serpentinite, which can contain asbestos fibers. Naturally occurring asbestos sites are most concentrated in the central/western area of the County (USGS 2011). In general, naturally occurring asbestos fibers do not pose a threat unless disturbed and introduced into the air as fugitive dust.

Schools

Children are particularly susceptible to long-term effects from emissions of hazardous materials. Therefore, locations where children spend extended periods of time, such as schools, are particularly sensitive to hazardous air emissions and accidental release associated with the handling of extremely hazardous materials, substances, or wastes. There are over 100,000 students enrolled in 234 public schools county-wide in school districts (TCOE 2021).

Airports

Potential hazards in relationship to airport operations are generally regulated by the Federal Aviation Administration (FAA), with local planning and evaluation of proposed projects (in terms of a proposed project's compatibility in relationship to air and ground operations and the safety of the public) under the authority of the applicable airport land use commission (ALUC) through an airport land use compatibility plan (ALUCP). The ALUC with authority in the TCAG region is the Tulare County Airport Land Use Commission and the applicable ALUCP in the TCAG region is discussed in Section 4.9.2, *Regulatory Setting*, below.

Tulare County's airports primarily serve hobbyists, pilots who own aircraft, the agricultural industry, police, and medical services. The airports provide mobility options for the County's residents and businesses, which include seven public-use airports (Mefford Field, Sequoia, Porterville, Visalia Municipal, Eckert, Exeter/Thunderhawk, and Woodlake), and sixteen personal-use or special-use airports.

Both the Mefford Field and Visalia Municipal airports have commercial and general aviation activities. Because of the level of activity at these airports, noise generated at these airports is audible in the surrounding communities. Therefore, land uses in the surrounding areas have been planned to ensure that noise levels remain at acceptable levels for the various uses. The Potterville, Woodlake, and Sequoia Field Ynez airports are general aviation airports, with little commercial traffic and no jet operations. While these general aviation airports do not generate as much noise as Mefford Field or Visalia, flight operations have also had impacts on the nearby residential areas because of their location.

The Eckert Field and Thunderhawk Field airports are privately owned and managed facilities. General aviation aircraft operations occur during daytime hours. The 60 dB CNEL contour for annual average operations at most regional airports is located relatively close to the runway due to relatively low numbers of operations and an aircraft fleet consisting primarily of smaller propeller aircraft. However, it should be noted that maximum noise levels from individual operations by high performance single and twin-engine aircraft, aerial application aircraft, fire suppression aircraft and some corporate jets may be expected to result in significant short term noise impacts for persons located near the approach, departure or local training patterns of an airport (County of Tulare 2010).

4.9.2 Regulatory Setting

a. Federal Laws, Regulations, and Policies

The U.S. EPA is the lead agency responsible for enforcing federal regulations that affect public health or the environment. The primary federal laws and regulations include the RCRA of 1976 and the Hazardous and Solid Waste Amendments enacted in 1984; the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA); and the Superfund Act and

Reauthorization Act of 1986 (SARA). Federal statutes pertaining to hazardous materials and wastes are contained in the CFR Title 40 - Protection of the Environment.

Toxic Substances Control Act

The Toxic Substances Control Act of 1976 (15 U.S. Code Section 2601 et seq.) grants EPA the authority to develop reporting, record-keeping, and testing requirements for, as well as restrictions on, the manufacture, use, and sale of chemical substances. Pursuant to Title II of the Toxic Substances Control Act, the EPA adopted the Asbestos Model Accreditation Plan in 1994. The Model Accreditation Plan requires that all persons who inspect for asbestos-containing materials or design or conduct response actions with respect to friable asbestos obtain accreditation by completing a prescribed training course and passing an exam. Section 403 of the Toxic Substances Act establishes standards for lead-based paint hazards in paint, dust, and soil.

Resource Conservation and Recovery Act

RCRA Subtitle C regulates the generation, transportation, treatment, storage and disposal of hazardous waste by LQGs (1,000 kilograms per month or more) through comprehensive life cycle or “cradle to grave” tracking requirements. The requirements include maintaining inspection logs of hazardous waste storage locations, records of quantities being generated and stored, and manifests of pick-ups and deliveries to licensed treatment/storage/disposal facilities. RCRA also identifies standards for treatment, storage, and disposal, which is codified in 40 CFR 260.

Comprehensive Environmental Response Compensation and Liability Act

Congress enacted CERCLA, setting up what has become known as the Superfund program, in 1980 to establish prohibitions and requirements concerning closed and abandoned hazardous waste sites; provide for liability of persons responsible for releases of hazardous waste at these sites; and establish a trust fund to provide for cleanup when no responsible party can be identified. Generally, CERCLA authorizes two kinds of response actions:

- Short-term removals, where actions may be taken to address releases or threatened releases requiring prompt response.
- Long-term remedial response actions that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening.

Superfund Amendments and Reauthorization Act

SARA amended the CERCLA in 1986, emphasizing the importance of permanent remedies and innovative treatment technologies to clean up hazardous waste sites; requiring Superfund actions to consider the standards and requirements found in other state and federal environmental laws and regulations; providing new enforcement authorities and settlement tools; increasing involvement of the states in every phase of the Superfund program; increasing the focus on human health problems posed by hazardous waste sites; encouraging greater citizen participation in making decisions on how sites should be cleaned up; and increasing the size of the trust fund to $8.5 billion.

Hazardous Materials Transportation Act

The transportation of hazardous materials is regulated by the Hazardous Materials Transportation Act (49 CFR § 101 et seq.), which is administered by the Research and Special Programs Administration of U.S. DOT. The Hazardous Materials Transportation Act governs the safe transportation of hazardous materials by all modes. The DOT regulations that govern the transportation of hazardous materials are applicable to any person who transports, ships, causes to be transported or shipped, or who is involved in any way with the manufacture or testing of hazardous materials packaging or containers. The DOT regulations govern every aspect of the movement, including packaging, handling, labeling, marking, placarding, operational standards, and highway routing.

Emergency Planning Community Right-to-Know Act

The Emergency Planning Community Right-to-Know Act (EPCRA), or SARA Title III, was enacted in October 1986. SARA Title III requires any infrastructure at the State and local levels to plan for chemical emergencies, including identifying potential chemical threats. Reported information is then made publicly available so that interested parties may become informed about potentially dangerous chemicals in their community. EPCRA Sections 301–312 are administered by EPA's Office of Emergency Management. EPA's Office of Information Analysis and Access implements EPCRA's Section 313 program. In California, SARA Title III is implemented through the California Accidental Release Prevention Program (CalARP).

Federal Disaster Mitigation Act

The Disaster Mitigation Act of 2000 provided a new set of mitigation plan requirements that encourage state and local jurisdictions to coordinate disaster mitigation planning and implementation. States are encouraged to complete a "Standard" or an "Enhanced" Natural Mitigation Plan. "Enhanced" plans demonstrate increased coordination of mitigation activities at the state level and, if completed and approved, increase the amount of funding through the Hazard Mitigation Grant Program.

FAA Regulations

The primary role of the FAA is to promote aviation safety and control the use of airspace. Public use airports that are subject to the FAA's grant assurances must comply with specific FAA design criteria, standards, and regulations. Land use safety compatibility guidance from the FAA is limited to the immediate vicinity of the runway, the runway protection zones at each end of the runway, and the protection of navigable airspace.

14 CFR 77, *Safe Efficient Use and Preservation of the Navigable Airspace*, establishes the federal review process for determining whether proposed development activities in the vicinity of an airport have the potential to result in a hazard to air navigation. 14 CFR Part 77 identifies standards for determining whether a proposed project would represent an obstruction "that may affect safe and efficient use of navigable airspace and the operation of planned or existing air navigation and communication facilities." Objects that are identified as obstructions based on these standards are presumed to be hazards until an aeronautical study conducted by the FAA determines otherwise.

b. State Laws, Regulations, and Policies

California Asbestos Regulations

In 1990, CARB issued an Airborne Toxic Control Measure (ATCM), which prohibited the use of serpentine aggregate for surfacing if the asbestos content was 5 percent or more. In July 2000, CARB adopted amendments to the existing ATCM prohibiting the use or application of serpentine, serpentine-bearing materials, and asbestos-containing ultramafic rock for covering unpaved surfaces unless it has been tested using an approved asbestos bulk test method and determined to have an asbestos content that is less than 0.25 percent. In July 2001, CARB adopted a new ATCM for construction, grading, quarrying, and surface mining operations in areas with serpentine or ultramafic rocks. These regulations are codified in Title 17, Section 93105 of the CCR. The regulations require preparation and implementation of an Asbestos Dust Mitigation Plan for construction or grading activities on sites greater than 1 acre in size with known NOA soils. The air districts enforce this regulation. In October 2000, the Governor's Office of Planning and Research issued a memorandum providing guidance to lead agencies in analyzing the impacts of NOA on the environment through the CEQA review process. In November 2000, the California Department of Real Estate added a section to subdivision forms that includes questions related to NOA on property proposed for development. In 2004, as part of its school-site review program, DTSC's School Property Evaluation and Cleanup Division released interim guidance on evaluating NOA at school sites. In addition, California Health and Safety Code Section 19827.5 prohibits issuance of demolition permits by local and State agencies without assessment of the potential for the structure to contain asbestos.

Lead Regulations

The California Division of Occupational Safety and Health Administration (Cal/OSHA) lead standard for construction activities is implemented under Title 8 of the CCR. The standard applies to any construction activity that may release lead dust or fumes, including, but not limited to, manual scraping, manual sanding, heat gun applications, power tool cleaning, rivet busting, abrasive blasting, welding, cutting, or torch burning of lead-based coatings. Unless otherwise determined by approved testing methods, all paints and other surface coatings are assumed to contain lead at prescribed concentrations, depending on the application date of the paint or coating.

California Fire Code

The California Fire Code is Chapter 9 of CCR Title 24. It is the primary means for authorizing and enforcing procedures and mechanisms to ensure the safe handling and storage of any substance that may pose a threat to public health and safety. The California Fire Code regulates the use, handling, and storage requirements for hazardous materials at fixed facilities. The California Fire Code and the California Building Code use a hazard classification system to determine what protective measures are required to protect fire and life safety. These measures may include construction standards, separations from property lines and specialized equipment. To ensure that these safety measures are met, the California Fire Code employs a permit system based on hazard classification.

California Accidental Release Prevention Program

The CalARP Program addresses facilities that contain specified hazardous materials, known as "regulated substances," that, if involved in an accidental release, could result in adverse off-site consequences. The CalARP Program defines regulated substances as chemicals that pose a threat to public health and safety or the environment because they are highly toxic, flammable, or explosive.

California Unified Program Administration

The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections and enforcement activities of six environmental and emergency response programs, as listed below:

- Hazardous Materials Release Response Plans and Inventories (Business Plans);
- CalARP Program;
- Underground Storage Tank Program;
- Aboveground Petroleum Storage Act Program;
- Hazardous Waste Generator and Onsite Hazardous Waste Treatment (tiered permitting) Programs; and
- California Uniform Fire Code: Hazardous Material Management Plans and Hazardous Material Inventory Statements.

The state agency partners involved in the Unified Program have the responsibility of setting program element standards, working with CalEPA on ensuring program consistency and providing technical assistance to the Certified Unified Program Agencies (CUPA). The following state agencies are involved with the Unified Program:

- CalEPA is directly responsible for coordinating the administration of the Unified Program. The Secretary of the CalEPA certifies CUPAs
- DTSC provides technical assistance and evaluation for the hazardous waste generator program including onsite treatment (tiered permitting)
- OES is responsible for providing technical assistance and evaluation of the Hazardous Material Release Response Plan (Business Plan) Program and the CalARP Programs
- The Office of the State Fire Marshal is responsible for ensuring the implementation of the Hazardous Material Management Plans and the Hazardous Material Inventory Statement Programs. These programs tie in closely with the Business Plan Program
- SWRCB provides technical assistance and evaluation for the UST program in addition to handling the oversight and enforcement for the aboveground storage tank program

The TCAG region CUPA is the Tulare County Environmental Health Department, who is responsible for implementing the federal and state laws and regulations for all jurisdictions within Tulare County.

California Land Environmental Restoration and Reuse Act of 2001

The California Land Environmental Restoration and Reuse Act of 2001 established California Human Health Screening Levels (CHHSLs) as a tool to assist in the evaluation of contaminated sites for potential adverse threats to human health. The CHHSLs were developed by the Office of Environmental Health Hazard Assessment, an agency under the umbrella of CalEPA. The thresholds of concern used to develop the CHHSLs are an excess lifetime cancer risk of one in 1 million and a hazard quotient of 1.0 for non-cancer health effects. The CHHSLs were developed using standard exposure assumptions and chemical toxicity values published by EPA and CalEPA. The CHHSLs can be used to screen sites for potential human health concerns where releases of hazardous chemicals to soils have occurred. Under most circumstances, the presence of a chemical in soil, soil gas, or indoor air at concentrations below the corresponding CHHSLs can be assumed to not pose a significant health risk to people who may live (residential CHHSLs) or work (commercial/ industrial CHHSLs) at the site.

California Multi-Hazard Mitigation Plan

The State Hazard Mitigation Plan (SHMP) represents the state's primary hazard mitigation guidance document - providing an updated analysis of the state's historical and current hazards, hazard mitigation goals and objectives, and hazard mitigation strategies and actions. The plan represents the state's overall commitment to supporting a comprehensive mitigation strategy to reduce or eliminate potential risks and impacts of disasters in order to promote faster recovery after disasters and, overall, a more resilient state. State Hazard Mitigation Plans are required to meet the Elements outlined in FEMA's State Mitigation Plan Review Guide (revised March 2015, effective March 2016).

OES is responsible for the development and maintenance of the State's plan for hazard mitigation. The State's multi-hazard mitigation plan was last approved by the Federal Emergency Management Agency (FEMA) as an Enhanced State Mitigation Plan in 2018 (CalOES 2018). The plan is designed to reduce the effects of disasters caused by natural, technological, accidental, and adversarial/human-caused hazards. The SHMP sets the mitigation priorities, strategies, and actions for the state. The plan also describes how risk assessment and mitigation strategy information is coordinated and linked from local mitigation plans into the SHMP and provides a resource for local planners of risk information that may affect their planning area. The State of California is required to review and revise its mitigation plan and resubmit for FEMA approval at least every five years to ensure continued funding eligibility for certain federal grant programs.

California Public Resources Code 21151.4

Pursuant to Public Resources Code Section 21151.4, projects that can be reasonably anticipated to produce hazardous air emissions or handle extremely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school must consult with the potentially affected school district and provide written notification not less than 30 days prior to the proposed certification or adoption of an environmental document. Where a school district proposes property acquisition or the construction of a school, the environmental document must address existing environmental hazards, and written findings must be prepared regarding existing pollutant sources.

California Education Code

Sections 17071.13, 17072.13, 17210, 17210.1, 17213.1-3 and 17268 of the California Education Code became effective January 1, 2000. Together, they establish requirements for assessments and approvals regarding toxic and hazardous materials that school districts must follow before receiving final site approval from the DOE and funds under the School Facilities Program. These requirements are consistent with those described above for certification or adoption of an environmental document under Public Resources Code Section 21151.4.

California Education Code Section 17213(b) establishes requirements for assessments and approvals that address the potential for existing contamination on the site, and whether nearby land uses might reasonably be anticipated to emit hazardous air emissions or handle hazardous materials. Assessment of existing contamination is conducted in coordination with DTSC's School Property Evaluation and Cleanup Division, which is responsible for assessing, investigating, and cleaning up proposed school sites. This Division ensures that selected properties are free of contamination or, if the properties were previously contaminated, that they have been cleaned up to a level that protects the students and staff who will occupy a new school.

Carpenter-Presley-Tanner Hazardous Substances Account Act

The Carpenter-Presley-Tanner Hazardous Substance Account Act imposes liability for hazardous substances removal or remedial actions and requires the State Attorney General to recover from the liable person, as defined, certain costs incurred by the DTSC or any of the state's nine RWCQBs, upon the request of the DTSC or RWQCB. The act authorizes, except as specified, a party found liable for any costs or expenditures recoverable under the act for those actions to establish, as specified, that only a portion of those costs or expenditures are attributable to the party and requires the party to pay only for that portion. If each party does not establish its liability, the act requires a court to apportion those costs or expenditures, as specified, among the defendants and the remaining portion of the judgment is required to be paid from the Toxic Substances Control Account. Existing law authorizes the money deposited in the Toxic Substances Control Account in the General Fund to be appropriated to the DTSC for specified purposes, including the payment of the costs incurred by the state for those actions.

Lempert-Keene-Seastrand Oil Spill Prevention and Response Act

The Lempert-Keene-Seastrand Oil Spill Prevention and Response Act of 1990 granted the Office of Spill Prevention and Response the authority to direct prevention, removal, abatement, response, containment, and cleanup efforts regarding all aspects of any oil spill in marine waters of California. The Office of Spill Prevention and Response implements the California Oil Spill Contingency Plan, consistent with the National Contingency Plan, which pays special attention to marine oil spills and impacts to environmentally- and ecologically sensitive areas. In 2014, the Office of Spill Prevention and Response program was expanded to cover all statewide surface waters at risk of oil spills from any source, including pipelines and the increasing shipments of oil transported by railroads.

Local Community Rail Security Act

The Local Community Rail Security Act of 2006 (Public Utilities Code Sections 7665-7667) requires all rail operators to provide security risk assessments to California Public Utilities Commission, the Director of Homeland Security and the Catastrophic Event Memorandum Account that describe the following:

- Location and function of each rail facility;
- Types of cargo stored at or typically moved through the facility;
- Hazardous cargo stored at or moved through the facility;
- Frequency of hazardous movements or storage;
- Description of sabotage-terrorism countermeasures;
- Employee training programs;
- Emergency response procedures; and
- Emergency response communication protocols.

c. Regional and Local Laws, Regulations, and Policies

San Joaquin Valley Air Pollution Control District

The San Joaquin Valley Air Pollution Control District (SJVAPCD) attains and maintains air quality conditions in the San Joaquin Valley Air Basin (SJVAB), which comprises the San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and western Kern County counties. SJVAPCD is responsible for air monitoring, permitting, enforcement, long-range air quality planning, regulatory development, education, and public information activities related to air pollution, as required by the Clean Air Act and California Clean Air Act. Projects in the SJVAB are subject to SJVAPCD's rules and regulations, including rules pertaining to asbestos and toxic air contaminants. SJVAPCD Rule 4002, National Emission Standards for Hazardous Air Pollutants, sets emissions standards for stationary source emissions, including asbestos emission from building demolition.

City and County General Plans

Local planning policies related to hazards and hazardous materials are established in each jurisdiction's general plan, generally in the Safety Element or equivalent chapter. Safety Elements are required to address geologic hazards, fire hazards, dam failure, evacuation routes, flooding, and emergency response among other issues. For emergency services, some of the relevant policies may include coordinating with other agencies that are responsible for planning medical facilities to meet the health care needs of residents in the region, retaining hospitals, evaluating medical facility proposals, providing emergency response services, and participating in mutual-aid agreements.

The Tulare County general plan and examples of city general plans in the TCAG region are discussed below.

Tulare County General Plan

The Tulare County General Plan (2012) contains several policies related to hazardous material exposure, storage, and remediation (listed below), and goal HS-4 of the General Plan is to protect residents, visitors, and property from hazardous materials through their safe use, storage, transport, and disposal.

- **Policy HS-4.1: Hazardous Materials.** The County shall strive to ensure hazardous materials are used, stored, transported, and disposed of in a safe manner, in compliance with local, State, and Federal safety standards, including the Hazardous Waste Management Plan, Emergency Operations Plan, and Area Plan.
- **Policy HS-4.2: Establishment of Procedures to Transport Hazardous Wastes.** The County shall continue to cooperate with the California Highway Patrol (CHP) to establish procedures for the movement of hazardous wastes and explosives within the County.
- **Policy HS-4.3: Incompatible Land Uses.** The County shall prevent incompatible land uses near properties that produce or store hazardous waste.
- **Policy HS-4.4: Contamination Prevention.** The County shall review new development proposals to protect soils, air quality, surface water, and groundwater from hazardous materials contamination.
- **Policy HS-4.5: Increase Public Awareness.** The County shall work to educate the public about household hazardous waste and the proper method of disposal.

- **Policy HS-4.6: Pesticide Control.** The County shall monitor studies of pesticide use and the effects of pesticide on residents and wildlife and require mitigation of the effects wherever feasible and appropriate.
- **Policy HS-4.7: Coordination of Materials on Public Lands.** The County shall work jointly with State and Federal land managers to coordinate the handling and disposal of hazardous materials on public lands.
- **Policy HS-4.8: Hazardous Materials Studies.** The County shall ensure that the proponents of new development projects address hazardous materials concerns through the preparation of Phase I or Phase II hazardous materials studies for each identified site as part of the design phase for each project. Recommendations required to satisfy federal or State cleanup standards outlined in the studies will be implemented as part of the construction phase for each project.

City of Tulare General Plan

Goal SAF-1 from the City of Tulare General Plan is to regulate future development to ensure the protection of public health and safety from hazards and hazardous materials and the adequate provision of emergency services. Policies SAF-P5.1, SAF-P5.2, and SAF-P5.3 relate to designating hazardous material routes, requiring hazardous material studies during project design, and striving to ensure hazardous materials are used, stored, transported, and disposed of in a safe manner, in compliance with local, State, and federal safety standards. Goals and policies in other applicable City General Plans in the TCAG region are similar in nature in how they address hazardous materials within their jurisdiction.

City of Visalia General Plan

The City of Visalia's General Plan contains Objective S-O-3 which is to protect soils, surface water, and groundwater from contamination from hazardous materials. Through its General Plan, the City requires the project applicant to undertake remediation procedures prior to grading and development under the supervision of appropriate agencies, such as Tulare County Department of Environmental Heath, Department of Toxic Substances Control, or Regional Water Quality Control Board.

Local Hazard Mitigation Plan

Local jurisdictions develop, adopt, and update hazard mitigation plans to establish guiding principles for reducing hazard risk, as well as specific mitigation actions to eliminate or reduce identified vulnerabilities. The applicable hazard mitigation plan for the TCAG region is the Tulare County Multi-Jurisdictional Local Hazard Mitigation Plan (Tulare County 2018). This plan serves to reduce or eliminate long-term risk to people and property from hazards and their effects, such as, but not limited to, civil disturbances, climate change, dam failure, drought, earthquake, energy emergency, hazardous materials and oil spills, fire, floods, and landslides/mudflows/debris.

Airport Land Use Compatibility Plan

The Tulare County Comprehensive Airport Land Use Plan addresses aviation related matters such as safety, noise, overflight, and height policies and safety zones (Tulare County Airport Land Use Commission 2012). The Countywide plan affects Visalia, Tulare, Exeter, Woodlake, Sequoia, Eckert, and Porterville Airports and their surrounding communities. The goals of the ALUCPs are to protect residents from the negative environmental noise, safety and traffic impacts that can potentially be induced by airports.

4.9.3 Impact Analysis

a. Methodology and Significance Thresholds

Appendix G of the State CEQA Guidelines identifies the following criteria for determining whether a project's impacts would have a significant impact related to hazards and hazardous materials:

1. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
2. 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;
3. Emit hazardous emissions or handles hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school;
4. Be located on a site which is included on a list of hazardous materials compiled by the Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;
5. 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, result in a safety hazard or excessive noise for people residing or working in the project area; or
6. Impair implementation or physically interfere with an adopted emergency response plan or emergency evacuation plan.
7. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

Impacts related to exposure to excessive aviation related noise (Criterion 5) are discussed in Section 4.12, *Noise*, under Impact N-5. Impacts related to impairment or interference of emergency response or evacuation plans (Criterion 6) are discussed in Section 4.15, *Transportation*, under Impact T-4. Impacts related to exposure to wildland fires (Criterion 7), are discussed Section 4.18, *Wildfire,* under Impact WF-1.

The methodology used for the following evaluation is based on a review of documents and publicly available information about hazardous and potentially hazardous conditions in the TCAG region to determine the potential for implementation of the proposed 2022 RTP/SCS to result in an increased health or safety hazard to people or the environment. This includes city and county planning documents, and hazardous materials database information maintained by various state and federal agencies, such as DTSC and SWRCB. Due to the large area of the TCAG region and the programmatic nature of impact analyses, known sites of current or former contamination were not evaluated in detail, and physical surveys were not conducted. Rather, this program-level analysis is based on hazards typically associated with certain transportation projects and land use projects, and an overall understanding of the key safety concerns that could result from implementation of the proposed 2022 RTP/SCS.

The evaluation of hazards and hazardous materials impacts reasonably assumes that the construction and development under the proposed 2022 RTP/SCS would adhere to the latest federal, state, and local regulations, and conform to the latest required standards in the industry, as appropriate for individual projects.

b. Project Impacts and Mitigation Measures

The following section discusses potential impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. Section 4.9.3.c summarizes the impacts associated with capital improvement projects in the proposed 2022 RTP/SCS. Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time. In general, however, implementation of proposed transportation improvement projects and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1:	Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials
Threshold 2:	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

Impact HAZ-1 TRANSPORTATION IMPROVEMENT PROJECTS AND THE LAND USE SCENARIO ENVISIONED BY THE PROPOSED 2022 RTP/SCS MAY FACILITATE THE ROUTINE TRANSPORT, USE, OR DISPOSAL OF HAZARDOUS MATERIAL, AND MAY RESULT IN REASONABLY FORESEEABLE UPSET AND ACCIDENT CONDITIONS INVOLVING THE RELEASE OF HAZARDOUS MATERIALS INTO THE ENVIRONMENT. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Land use and transportation projects associated with implementation of the proposed 2022 RTP/SCS would temporarily increase the regional transport, use, storage and disposal of hazardous materials and petroleum products commonly used at construction sites, such as diesel fuel, lubricants, paints and solvents and asphalt and cement products containing strong basic or acidic chemicals. Hazardous waste generated during construction may consist of welding materials, fuel and lubricant containers, paint and solvent containers and discarded asphalt and cement products.

Construction associated with implementation of the proposed 2022 RTP/SCS could result in impacts related to use of hazardous materials and disturbance of potentially hazardous materials, including asbestos. However, the most likely incidents involving construction-related hazardous materials are generally associated with minor spills or drips. Small fuel or oil spills are possible but would have a negligible impact on public health. All hazardous materials would be stored, handled, and disposed of according to the manufacturers' recommendations and spills would be cleaned up in accordance with applicable regulations, as described in Title 49 CFR 171–180 and the Hazardous Materials Transportation Act. Hazardous materials spills or releases, including petroleum products such as gasoline, diesel, and hydraulic fluid, regardless of quantity spilled, must be immediately reported if the spill has entered or threatens to enter a water of the State, including a stream, lake, wetland, or storm drain, or has caused injury to a person or threatens injury to public health. Immediate notification must be made to the local emergency response agency, or 911, and the OES Warning Center. For non-petroleum products, additional reporting may be required if the release exceeds federal reportable quantity thresholds over a release period of 24 hours as detailed in HSC Section 25359.4 and in 40 CFR 302.4.

The DOT has identified two state route segments within Tulare County as hazardous material routes (DOT 2022). Trucks transporting hazardous material would also have to use local collector and arterial streets to access individual project sites in the TCAG region. Transportation projects would also require the temporary storage and use of hazardous materials at locations along project roads.

Trucks transporting hazardous materials for project construction would use many of the same freeways, arterials, and local streets as other traffic. This would create a risk of accidents and associated release of hazardous materials for other drivers and for people along these routes, as well as truck drivers. Although the transportation of hazardous materials could result in accidental spills, leaks, toxic releases, fire, or explosion, the DOT prescribes strict regulations for the safe transportation of hazardous materials, as described in Title 49 of the CFR and the Hazardous Materials Transportation Act. These standard accident and hazardous materials recovery training and procedures are enforced by the state and followed by private state-licensed, certified, and bonded transportation companies and contractors.

The construction of land use and transportation projects included in the proposed 2022 RTP/SCS that require demolition of existing structures, particularly older structures, would have the potential to expose workers and the public to asbestos containing materials or dust containing asbestos. Construction could also occur in areas of naturally occurring asbestos, which could expose construction workers to asbestos. HSC Section 19827.5 requires that local agencies not issue demolition or alteration permits until an applicant has demonstrated compliance with notification requirements under applicable federal regulations regarding hazardous air pollutants, including asbestos. Mandatory compliance with asbestos abatement and disposal regulations and requirements, including SJVAPCD Rule 7050, would minimize the risk of exposure.

Land use projects facilitated by the proposed 2022 RTP/SCS would increase population, jobs, and households and a variety of land uses including residential, commercial, and industrial. Specific uses such as dry cleaners, gas stations, and certain industrial uses would involve routine transport, use, and disposal of hazardous materials such as household hazardous wastes (e.g., paints, cleaning supplies, solvents, and petroleum products) and commercial and industrial hazardous waste. The operation of businesses facilitated by land use projects facilitated by the proposed 2022 RTP/SCS use, create, or dispose of hazardous materials would be regulated and monitored by federal, state, and local regulations that provide a high level of protection to the public and the environment from the hazardous materials manufactured within, transported to, and disposed within the TCAG region. Use of hazardous materials at these businesses would also require permits and monitoring to avoid hazardous waste release through the local CUPA. During operation, businesses that store hazardous materials could potentially experience accidents or upset conditions that result from their routine use. These businesses would be required to prepare spill prevention, containment and countermeasures plans (pursuant to 40 CFR 112) or, for smaller quantities, a spill prevention and response plan. These plans identify best management practices for spill and release prevention and provide procedures and responsibilities for rapidly, effectively, and safely cleaning up and disposing of any spills or releases. Oversight is provided by the CUPA. Pursuant to the requirements and liabilities of applicable regulations, the routine use or accidental spill of hazardous materials at business and industrial uses facilitated by the land use projects included in the proposed 2022 RTP/SCS would not pose a substantial hazard to the public or the environment. Disposal of hazardous waste generated by these businesses would be subject to compliance with DTSC and CalEPA regulations.

Transportation projects included in the proposed 2022 RTP/SCS include a variety of transportation modifications such as roadway widenings, auxiliary lanes, and other maintenance and rehabilitation projects. The projects may increase the capacity of roadways to transport hazardous materials. Roadway projects in the proposed 2022 RTP/SCS would also improve road safety, as well as pedestrian and bicycle safety, thereby potentially reducing transportation-related hazardous materials risks because fewer accidents would occur on safer roads. Based on the requirements of

Title 49 CFR 171–180, construction and operation of transportation projects would provide for the safe transport and disposal of hazardous waste.

The proposed 2022 RTP/SCS land use scenario encourages infill development and increased population and employment density near public transit stops. There could also be increased urbanization along transportation corridors. Thus, the number of people potentially exposed to hazardous conditions could increase as a result of land use projects facilitated by the proposed 2022 RTP/SCS. Although exposure to hazardous conditions could increase, the routine transport, use, and storage of potentially hazardous materials such as fuels, lubricants, solvents, and oils would be required to be conducted in accordance with all applicable State and federal laws, such as the Hazardous Materials Transportation Act, Resource Conservation and Recovery Act, the California Hazardous Material Management Act, and the CCR, Title 22. As described in Section 4.9.2, *Regulatory Setting*, the DOT regulates the transport of hazardous materials by all modes, including rail and highway under the regulations of the Hazardous Materials Transportation Act. The Local Community Rail Security Act of 2006 requires all rail operators to provide security risk assessments to California Public Utilities Commission, which includes emergency response procedures and communication protocols. Mandatory implementation of additional federal, state and local requirements such as CalARP Program and the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act would minimize potential exposure to the public and the environment from accidental releases. Therefore, although population density would increase in proximity to major transportation corridors that are used to transport hazardous and flammable materials, the increased risk of hazard from routine transport or accidental upsets during transport would be minimal.

In conclusion, both planned land use projects and transportation projects associated with the 2022 proposed RTP/SCS could increase the routine transport, use, storage, and disposal of hazardous wastes in the TCAG region. These land use and transportation projects could also increase the potential for unintentional upset and accident conditions. Because of the existing federal, state, and local regulations and oversight in place that would effectively reduce the inherent hazard associated with routine transport, use, storage and disposal activities, and regulations that effectively reduce the potential for individual projects to create a hazard to the public or the environment through reasonably foreseeable upset and accident conditions, impacts would be less than significant.

Mitigation Measures

None required.

Threshold 3:	Emit hazardous emissions or handles hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school

Impact HAZ-2 TRANSPORTATION IMPROVEMENT PROJECTS AND LAND USE PROJECTS ENVISIONED IN THE PROPOSED 2022 RTP/SCS WOULD NOT EMIT HAZARDOUS EMISSIONS OR HANDLE HAZARDOUS OR ACUTELY HAZARDOUS MATERIALS, SUBSTANCES OR WASTE WITHIN ONE-QUARTER MILE OF AN EXISTING OR PROPOSED SCHOOL. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

As discussed in Impact HAZ-1, the land use projects included in the proposed 2022 RTP/SCS could include uses such as dry cleaners, gas stations, and certain industrial uses that would involve routine handling of hazardous materials and waste. Therefore, the proposed 2022 RTP/SCS could increase the amounts of hazardous materials handled within 0.25 mile of schools, depending on the specific location of land uses relative to schools in the region. As discussed in Section 4.14, *Public Services and Recreation*, there are over 100,000 students enrolled in 234 public schools county-wide in school districts. Certain industrial uses, such as chemical plants, may also generate hazardous emissions as byproducts, typically in the form of air emissions.

Any new commercial or industrial operations in proximity to existing schools would be required to comply with regulations related to the routine use, storage, and transport of hazardous materials. Land uses that would generate emissions or involve the handling of extremely hazardous materials, substances, or waste within 0.25 mile of an existing school must notify the affected school district pursuant to Public Resources Code Section 21151.4. As discussed in Impact HAZ-1, compliance with existing regulations would reduce the exposure to potential hazards associated with these land uses.

For new schools that may be developed to address the population distribution changes resulting from the land use scenario included in the proposed 2022 RTP/SCS, the California Education Code, as discussed in Section 4.9.2, *Regulatory Setting*, would ensure that school sites would be free of contamination or cleaned up to a level that would protect students and staff that would occupy a new school site. Therefore, hazardous emissions and handling impacts on schools related to land use projects included in the proposed 2022 RTP/SCS would be less than significant.

The transportation projects included in the proposed 2022 RTP/SCS could increase the capacity to transport hazardous materials on roads within the TCAG region, including within 0.25 mile of schools. However, all materials must be used, stored, and disposed of in accordance with applicable federal, state, and local laws, which would effectively reduce the potential impacts associated with hazardous emissions or handling of hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or potential future school. Therefore, the hazardous materials impacts related to existing and proposed schools from implementation of the transportation projects included in the proposed 2022 RTP/SCS would be less than significant.

Mitigation Measures

None required.

Threshold 4:	Be located on a site which is included on a list of hazardous materials sites compiled by the Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment

Impact HAZ-3 THE PROPOSED 2022 RTP/SCS INCLUDES TRANSPORTATION IMPROVEMENT PROJECTS AND LAND USE SCENARIO PROJECTS THAT COULD BE LOCATED ON SITES ON THE LIST OF HAZARDOUS MATERIAL SITES COMPILED BY GOVERNMENT CODE SECTION 65962.5, AND THEREFORE CREATE A SIGNIFICANT HAZARD TO THE PUBLIC OR ENVIRONMENT. THIS IMPACT WOULD BE SIGNIFICANT AND UNAVOIDABLE.

Throughout the TCAG region there are many sites where historical releases of hazardous materials or wastes have occurred; these are listed in environmental databases pursuant to Government Code Section 65962.5. As described In Section 4.9.1.a, there are hundreds of documented sites of contamination in some stage of DTSC or SWRCB oversight in the region. These sites range from small releases that have had localized effects on private property and have already been remediated to large scale releases from long-term historical industrial practices that have had wider ranging effects on groundwater. Specific sites of documented contamination are not evaluated in this analysis because this is a programmatic level document. Because the precise timing of future land use developments is unknown, an evaluation of the potential for specific sites of known contamination within the TCAG region to be affected by land use projects included in the proposed 2022 RTP/SCS cannot be conducted. However, prior and current land uses can be used to generally characterize the potential for release of hazardous materials (i.e., hazardous materials releases are more likely to have occurred in areas that currently or historically supported industrial uses). In addition, construction activities that disturb subsurface materials could encounter previously unidentified contamination from past practices or placement of undocumented fill or even unauthorized disposal of hazardous wastes. Encountering these hazardous materials could expose workers, the public or the environment to adverse effects depending on the volume, materials involved, and concentrations.

Development on identified hazard sites within the TCAG region would be preceded by investigation, remediation and cleanup under the supervision of the RWQCB, DTSC, or the applicable hazardous materials division (e.g., local oversight or Tulare County Environmental Health Department) before construction activities could begin. The agency responsible for oversight would determine the types of remediation and cleanup required and could include excavation and off-haul of contaminated soils, installation of vapor barriers beneath habitable structures, continuous monitoring wells onsite with annual reporting requirements, or other mechanisms to ensure the site does not pose a health risk to workers or future occupants. In addition, in many instances implementing and/or permitting agencies require submittal of a Phase I ESA prior to approval or implementation of a project. These studies include research in a variety of government databases to determine whether the site has had prior underground tanks or other industrial uses that could result in hazardous materials on or below the ground surface. However, with the exceptions for streamlining projects in transit priority areas and siting public schools, there are no general regulatory requirements to conduct a Phase I ESA, or subsequent investigation of potential contamination. Therefore, because it cannot be assumed these practices would always occur, the impacts related to land use projects included in the proposed 2022 RTP/SCS are significant because there could be significant hazard to the public or the environment.

Development on sites listed in environmental databases pursuant to Government Code Section 65962.5 would be required to undertake remediation procedures prior to grading and development under the supervision of the applicable agency, depending upon the nature of any identified contamination. Nevertheless, the impacts of transportation or land use projects implementing the proposed 2022 RTP/SCS would be significant because there could be significant hazard to the public or the environment related to projects located on sites listed pursuant to Government Code Section 65962.5. The following mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures where applicable for transportation projects that would result in impacts that would potentially be located in areas with existing contamination. The County and cities in the TCAG region can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions.

HAZ-3 Site Remediation

If an individual project included in the proposed 2022 RTP/SCS is located on or near a hazardous materials and/or waste site compiled by Government Code Section 65962.5, the implementing agency shall prepare a Phase I ESA in accordance with the American Society for Testing and Materials' E-1527-05 standard. For work requiring any demolition or renovation, the Phase I ESA shall make recommendations for any hazardous building materials survey work that shall be done. All recommendations included in a Phase I ESA prepared for a site shall be implemented. If a Phase I ESA indicates the presence or likely presence of contamination, the implementing agency shall require a Phase II ESA, and recommendations of the Phase II ESA shall be fully implemented. Examples of typical recommendations provided in Phase I/II ESAs include removal of contaminated soil in accordance with a soil management plan approved by the local environmental health department; covering stockpiles of contaminated soil to prevent fugitive dust emissions; capturing groundwater encountered during construction in a holding tank for additional testing and characterization and disposal based on its characterization; and development of a health and safety plan for construction workers.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction, as applicable.

Significance After Mitigation

Implementation of Mitigation Measure HAZ-3 would reduce site-related hazardous materials impacts to a less than significant because project sites with hazardous material contamination on the list compiled by the Government Code Section 65962.5 would be identified prior to commencement of project construction. Additionally, prior to commencement of construction, measures to remediate contamination, such as containment and disposal of contaminated soil pursuant to federal and state regulations would be required. However, it cannot be guaranteed that all future project level impacts can be mitigated to a less than significant level. There are no additional mitigation measures to reduce this impact to less than significant levels that are feasible. Therefore, this impact would remain significant and unavoidable.

Threshold 5:	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, result in a safety hazard or excessive noise for people residing or working in the project area

Impact HAZ-4 TRANSPORTATION IMPROVEMENT PROJECTS AND THE LAND USE SCENARIO ENVISIONED IN THE PROPOSED 2022 RTP/SCS LOCATED WITHIN AN AIRPORT LAND USE PLAN OR WITHIN TWO MILES OF A PUBLIC OR PUBLIC USE AIRPORT WOULD NOT RESULT IN A SAFETY HAZARD FOR PEOPLE RESIDING OR WORKING IN THE PROJECT AREA. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Land use projects and transportation projects in the proposed 2022 RTP/SCS may be located near a public use airport or a private airstrip. As discussed in Section *4.9.1, Setting*, there are seven airports or airstrips in the TCAG region, including Mefford Field, Sequoia, Porterville, Visalia Municipal, Eckert, Exeter/Thunderhawk, and Woodlake Airports. Impacts associated with development near existing airports are largely dependent upon site and project specific information that is not currently available and would be provided in the future as projects within the proposed 2022 RTP/SCS undergo project level environmental review. However, any development and subsequent planning decisions in proximity to airports would be subject to review under the State Aeronautics Act provided under Public Utilities Code §§ 21167 et seq. Specific projects that may affect navigable airspace are also subject to FAA review, as outlined under 14 CFR Parts 77.5, 77.7 and 77.9. Additionally, land use development projects would be subject to existing zoning regulations, including height restrictions. Because there are existing federal, state, and local regulations and oversight in place that would effectively reduce the inherent hazard associated with development near airports to an acceptable and safe level, the impacts of the proposed 2022 RTP/SCS would be less than significant.

Mitigation Measures

None required.

c. Specific Proposed 2022 RTP/SCS Projects That May Result in Impacts

None of the transportation projects identified in the proposed 2022 RTP/SCS are located on the two road segments that U.S. DOT has identified as hazardous material routes, thereby increasing the amount of hazardous material and waste transported on the roads. All proposed 2022 RTP/SCS transportation projects listed in Section 2, *Project Description*, that are located on the site list compiled by the Government Code Section 65962.5 would have the potential to result in hazardous materials impacts described in Impacts HAZ-1 and HAZ-3. Specific analysis would be required as individual land use projects are implemented to determine the project specific magnitude of exposure to or potential release of hazardous materials. Construction of any number of the transportation projects would require the use of petroleum products and other hazardous materials. For Impact HAZ-3, additional specific analysis described in the above mitigation measures would need to be conducted for listed sites as individual projects are implemented in order to determine the magnitude of project-specific impacts.

4.9.4 Cumulative Impacts

The cumulative impact analysis area for the hazards and hazardous materials analysis consists of the TCAG region and adjoining counties. Information regarding these adjoining counties can be found in Section 3, *Environmental Setting*, Table 3-1. Future development in this region relative to exposure to hazards is considered in the analysis. This cumulative extent is used to evaluate potential impacts from the increase of hazards and hazardous materials within the context of regional development.

The potential impacts related to hazards and hazardous materials are generally related to site specific and project specific characteristics and conditions; however, hazardous sites or releases can occur across multiple adjoining properties or jurisdictions. Although the transport of hazardous materials may occur on rail or on roadways, such as SR 99, that traverse both the TCAG region and adjacent counties, there are existing federal, state, and local regulations and oversight in place that would effectively reduce the inherent hazard associated with routine transport of such materials. Regulations and oversight, as outlined above in Section 4.9.2, *Regulatory Setting*, would also effectively reduce the potential for individual projects to create a hazard to the public or the environment through reasonably foreseeable upset and accident conditions, within the TCAG region as well as adjoining counties. Land use development envisioned as part of the proposed 2022 RTP/SCS could result in the development of sites listed in environmental databases pursuant to Government Code Section 65962.5. Although development of listed sites would be required to undergo remediation and comply with Mitigation Measure HAZ-3, cumulative impacts related to hazards and hazardous materials would be significant, and implementation of the proposed 2022 RTP/SCS would result in cumulatively considerable impacts pre-mitigation, and less-than-cumulatively considerable post-mitigation.

Impacts related to airport hazards are also site-specific, depending on the characteristics and design of individual projects and their location relative to distance and location of nearby airports. Existing regulations place limitations on the types of development that can be permitted within various aircraft zones surrounding an airport, such as building height restrictions or prohibiting residential occupancy. Mandatory compliance with these regulations would prevent substantial hazards related to exposure to airport related safety hazards. Cumulative impacts related to airport hazards would be less than significant and implementation of the proposed 2022 RTP/SCS would not result in cumulatively considerable impacts.

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4.10 Hydrology and Water Quality

This section describes the environmental and regulatory setting as well as water quality, groundwater supply, drainage, runoff, flooding, and dam inundation impacts of development facilitated by the proposed 2022 RTP/SCS.

4.10.1 Setting

Hydrological Setting

The TCAG region is located within the Tulare Lake Hydrologic Region at the south end of the San Joaquin Valley. Streams within the Tulare Lake Hydrologic Region primarily drain towards the Kern, Tulare, and Buena Vista Lakes. Prominent watersheds within the County include the Upper Kaweah, Upper Tule, Upper Kern, Upper Deer/Upper White, and South Fork Kern. In general, streams flow from sources in the Sierra Nevada Mountains in the eastern part of the region downwards to the western area within the southern San Joaquin Valley.

The western portion of the TCAG region overlies three major subbasins of the San Joaquin Valley Groundwater Basin (Department of Water Resources [DWR] Basin 5-022), including the Tule, Kaweah, and portions of the Kings subbasins. The Tule Subbasin lies entirely within Tulare County. The Kaweah Subbasin is primarily overlain by Tulare County but also extends into Kings County. The majority of the Kings Subbasin is overlain by Fresno County but portions extend into Kings County and northwest Tulare County. The subbasin boundaries within Tulare County are depicted in Figure 4.10-1, and the approximate drainage areas of the primary watersheds within the County are depicted in Figure 4.10-2.

Precipitation rarely occurs during the summer months in the TCAG region; the regional climate averages 8.80 inches of rainfall per year, virtually all between December and March, with an average temperature of 63.1 °F (17.2 °C, TID 2010)

Water Agencies and Management Regions

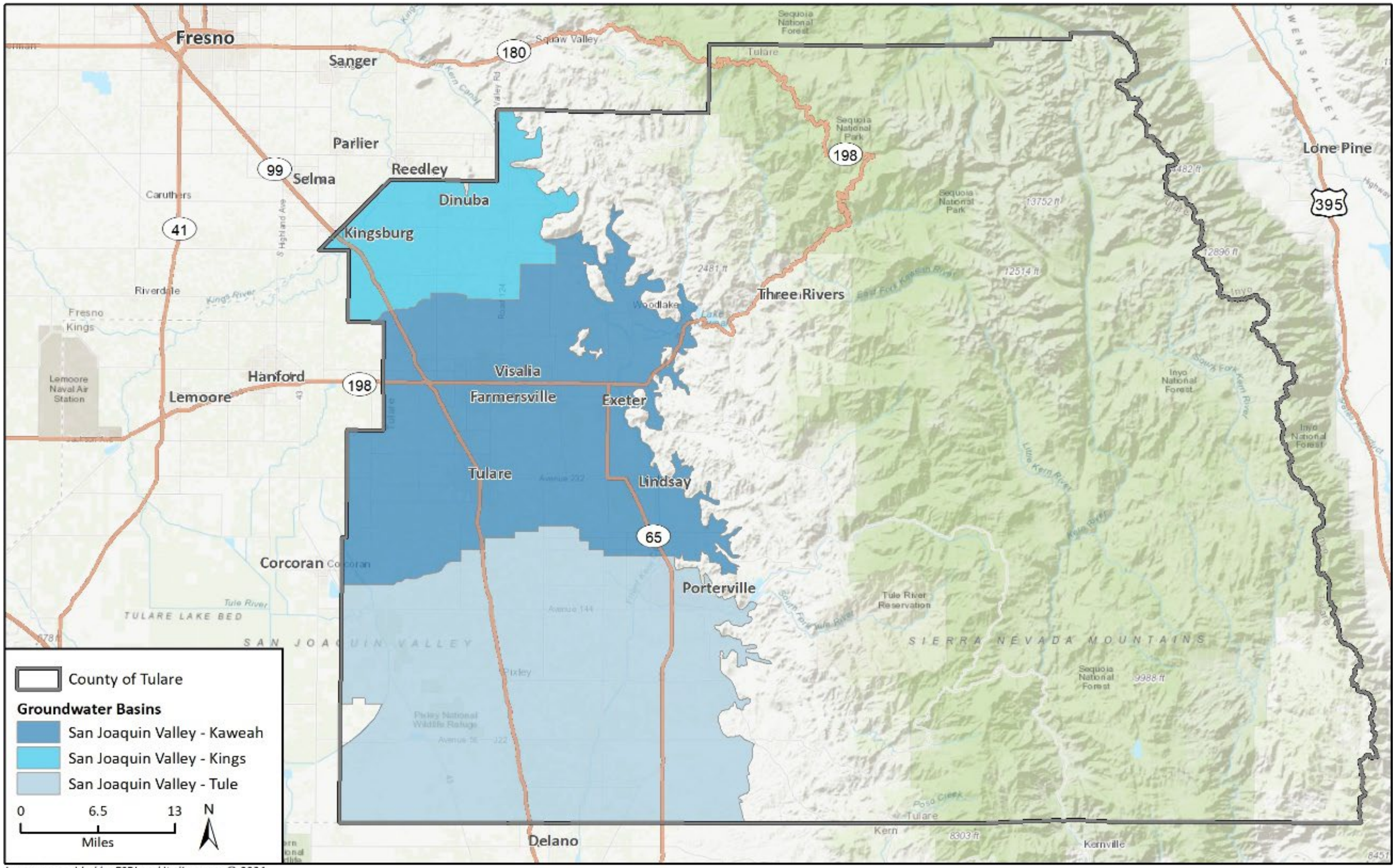
The TCAG region lies within the Central Valley Regional Water Quality Control Boards' (CVRWQCB) boundaries; it is the largest RWQCB in the state and includes all or part of every county surrounding Tulare (except for Inyo County to the east), including Kern, Fresno, and Kings. CVRWQCB is the primary agency responsible for overseeing water quality issues in the region.

There are a total of five Integrated Regional Water Management (IRWM) Regions[1] with service areas within Tulare County; none are contained entirely within County lines. These are the Kings Basin Water Authority, the Kaweah River Basin, the Tule River Basin Group, and the Poso Creek and Southern Sierra IRWMs.

The Tulare County Water Commission is an advisory body to the County Board of Supervisors on regional water issues.

[1] IRWM regions serve to coordinate regional water project funding applications and planning and serve as a primary source of budgetary planning for multi-jurisdictional water infrastructure projects.

Figure 4.10-1 Groundwater Basins within the TCAG Region



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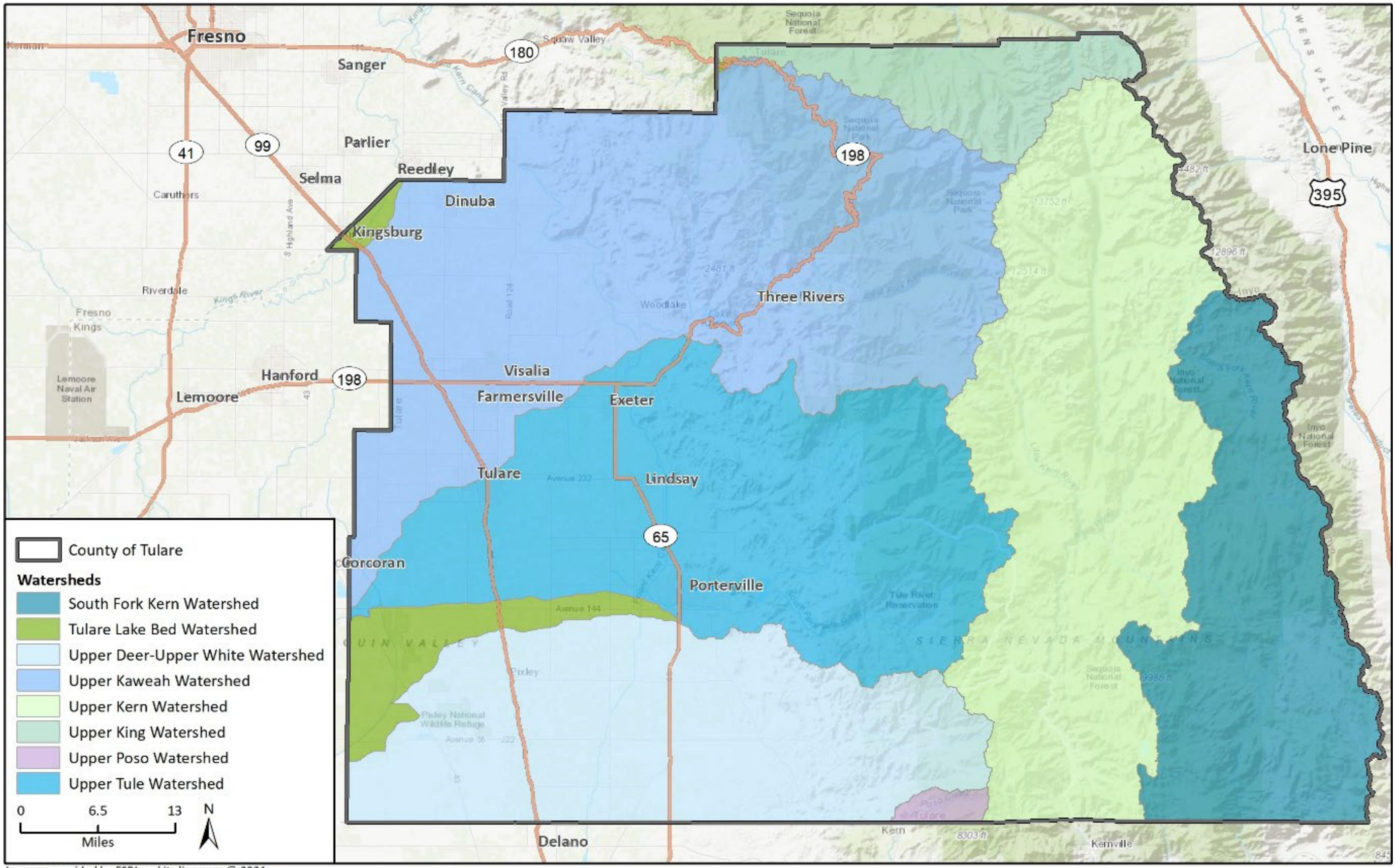
Additional data provided by DWR, 2018.

Figure 4.10-2 Major Regional Watersheds within the TCAG Region



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Water Supply

Supply Sources

Water within the TCAG Region is supplied from multiple sources, including groundwater, imported surface water, recycled water, and the various watersheds within the County and greater Tulare Lake Hydrologic Region. Major water inputs include water from: 1) surface water that travels from the mountains as snowmelt or runoff, which then gets stored in various foothill lakes to be distributed via the watershed systems and a network of canals, 2) water imported from the wetter climates of northern California through the State Water Project (SWP, via the California Aqueduct) and the Central Valley Project (CVP) (via the Friant-Kern Canal), 3) groundwater that is pumped from underground reservoirs or aquifers, and 4) a combination of smaller sources like recycled and reused water within individual water districts or agency service areas.

The quantity of surface water that enters the watersheds in the TCAG region in any year varies greatly because of California's irregular precipitation patterns. In years of minimal precipitation, when surface water flows are reduced, groundwater pumping makes up the difference to meet demand and achieve regional water balance. Agricultural extraction is the largest use of water within the County, accounting for up to 90 percent of groundwater extraction (DWR 2015).

Groundwater in the valley floor portions of the TCAG region occurs in an unconfined state throughout areas containing alluvial fans, and in a confined state beneath its western portion. Extensive alluvial fans associated with the Kings, Kaweah, and Tule Rivers provide highly permeable areas in which groundwater in the unconfined aquifer system is readily replenished. Areas between the streams contain less permeable surface soils and subsurface deposits, impeding groundwater recharge and causing well yields to be relatively low (DWR 2004 a-c, 2015).

DWR has estimated the groundwater overdraft by Hydrologic Region. For the Tulare Lake Basin, the total overdraft in 2015 was estimated at 820,000 acre-feet per year (AFY), the greatest overdraft projected in the State, compared to a historical overdraft averaging 308,000 AFY from the period of 1921 to 1993. This overdraft is due to many factors including reductions of surface supplies in recent years. Groundwater overdraft is most pronounced along the western boundary of the County, as manifested by a lowering of pressure levels in the confined aquifers and historical land subsidence of 12 to 16 feet (DWR 2015).

The TCAG region has been experiencing record-setting drought along with the rest of California and has continuously proclaimed a local drought emergency since 2014. Drought conditions in general reduce available water from all sources other than groundwater supplies, which are limited in terms of the annual amount of water that can be withdrawn without causing a long-term drop in water levels ("Safe Yield") and in the total storage of a basin that can be removed without substantial environmental effects ("Available Yield"). All three major groundwater subbasins within the County have been assigned 'High' overdraft priorities and are considered critically overdrafted under the Sustainable Groundwater Management Act (SGMA, see *Regulatory Setting* below). There are several Groundwater Sustainability Agencies (GSAs) within the TCAG region and most have submitted independent Groundwater Sustainability Plans (GSPs) as required under SGMA (see Section 4.9.2).

The City of Visalia operates the Water Conservation Plant, which provides a limited amount of recycled water to the Tulare Irrigation District for agricultural irrigation. The City of Tulare operates a water treatment plant which discharges treated effluent to ponds which is then available for recycled water projects. Recycled water has potential throughout the County as a source for agricultural irrigation if sufficient infrastructure can be developed.

Regional Usage

There are multiple water agencies and utility districts located within the TCAG region, including wholesalers, municipalities, irrigation districts, privately-owned wells, and private extractors. Most public or privately-owned districts and purveyors lie completely within Tulare County borders, but a few in the northwestern areas extend into Fresno County. The primary municipalities that have adopted Urban Water Management Plans (UWMPs) within the County pursuant to the Urban Water Management Planning Act are the cities of Tulare, Porterville, and Dinuba (Dinuba 2022, Porterville 2022, Tulare 2021). The City of Visalia has a private water service agency (California Water Service Company-Visalia) which also has an adopted UWMP (California Water Service Company-Visalia, 2021).

Due to the disparate organizational and geographic nature of purveyors and agencies responsible for different areas within the TCAG region, lack of an overall water resource authority, and regional use of unmonitored private wells and small purveyors that are not required to produce water planning documents, it is difficult to obtain clear, consistent data on region-wide water use. Few studies have attempted to examine total regional water supply and usage; a 2010 Water Supply Evaluation Report prepared for the 2030 Tulare County General Plan identified the overall Tulare Lake Hydrologic Region as the biggest importer of water amongst all the DWR-defined Hydrologic Regions in the State (Tully &Young 2010). Local and imported water supplies in 2010 amounted to an estimated 1,380,200 acre-feet (AF); the remainder of the region's water supply came from groundwater extraction and pumping and was estimated at 1,471,700 AF (T&Y 2010).

In general, the Kings River watershed was estimated in 2010 to supply sufficient flows for its average annual uses, the Kaweah Watershed had the highest local yield at an average of 430,000 AFY (T&Y 2010) and relied the least on imported and groundwater supply, and the Tule Watershed was most reliant on groundwater and imported water from the CVP (T&Y 2010). The City of Visalia is the major population center within the County and is entirely reliant on groundwater for its water supply (Visalia 2021).

Water Quality

Water quality is a concern because of its potential effect on human health, enterprise, organisms, and ecosystem conditions. Quality is determined by factors such as native hydrogeological condition of groundwater and surface water, and by the amount and sources of contamination (natural and human induced).

Surface Water

A major source of pollution to surface waters is polluted storm water and both urban and agricultural runoff discharges. Urban runoff pollutants are generally collected by stormwater conveyance systems and often discharge from point sources such as outflow pipes into local water bodies and surface waters without any form of treatment. Agricultural runoff can both percolate directly into groundwater over large areas as nonpoint discharge or similarly be collected and conveyed into discharge infrastructure. Common pollutants impairing surface waters from agricultural or urban stormwater runoff can include pesticides, fertilizers, green waste, animal waste, human waste, petroleum hydrocarbons (gasoline, motor oil), trash, and other constituents.

Under Section 303(d) of the Clean Water Act, States are required to develop and update a list of all water bodies under their jurisdiction which fail to meet water quality standards even after point sources of pollution have utilized the minimum levels of pollution control (see Section 4.9.2, *Regulatory Setting,* below). These are referred to as '303(d) impaired' bodies. There are numerous 303(d) impaired water bodies within Tulare County, as depicted in Table 4.10-1 below.

Table 4.10-1 303(d) Impaired Waterbodies in Tulare County

Waterbody Name	Listed Pollutants	Pollutants With TMDLs
Kaweah River		
Kaweah Lake	Mercury	NA
Kaweah River (Below Terminus Dam)	Toxicity, pH	NA
Lower (incl St Johns River)	Toxicity	NA
Northwest Tulare County		
Elbow Creek	Chlorpyrifos	NA
Cross Creek	Toxicity	NA
Mill Creek	Toxicity, Ammonia	NA
Packwood Creek	Toxicity	NA
Outside Creek	Toxicity	NA
Tule River/ Deer Creek		
Success Lake	pH	NA
Lower	Toxicity	NA
Elk Bayou	Chlorpyrifos, Toxicity, pH, Dissolved Oxygen	NA
Deer Creek (Tulare County)	Toxicity, pH, Chlorpyrifos	NA

TMDL: Total Maximum Daily Load
Source: SWRCB Integrated Report 2018

In general, the water quality of the Kings, Kaweah, Tule, and Kern River watersheds is of excellent quality, and the quality of imported surface water is somewhat less (CVRWQCB 2018). Surface water quality is impaired from anthropogenic pollution primarily in the valley floor area of the western County and major point sources of contamination include municipal wastewater, oil field wastewater, winery discharges, and solid waste sites, while the primary non-point source of pollutants is agricultural runoff (CVRWQCB 2018).

Groundwater

Although generally of high quality, water quality in the groundwater basins underlying the TCAG region has degraded over the years due to continual use of the resource. A few areas within the County have groundwater that is naturally unusable or of marginal quality (CVRWQCB 2018). These include concentrations of arsenic, uranium, and radium 228, and nitrates near the foothills of the Sierra Nevada and decreasing moving away to the western half of the TCAG region, and concentrations of herbicides, pesticides, and fertilizers throughout the County's groundwater. The Kings Subbasin tends to be highest in natural radiological contaminants near the mountains, but its consistent recharge tends to dilute the concentrations to the west. The Kaweah Subbasin is high in nitrates from natural and agricultural sources. The Tule Subbasin has the most significant quality issues, including high levels of nitrates, chlorides, and dibromochloropropane (DBCP). Some of the communities along State Route 99 have access to quality groundwater sources including deep confined and shallow unconfined sources, but groundwater quality in many other areas of the Subbasin is unacceptable due to concentrations of arsenic and other natural contaminants (DWR 2004 a-c, CVRWQCB 2018).

A primary water quality problem within the Tulare Lake Basin, including the Subbasins within the TCAG region, is salt accumulation. Imported surface waters from CVP and SWP have a higher salt content than natural waters, and as the Tulare Lake Basin is essentially a 'closed' basin with little subsurface outflow, introduced salts accumulate within first surface water supplies and then groundwater through percolation and applied recharge. The overdraft of groundwater serves to exacerbate the problem as deeper water is used and overall salt concentrations increase. Control of the increasing salt concentrations within the greater Tulare Lake Basin is a major component of the CVRWQCB's Basin Plan (CVRWQCB 2018).

The TCAG region also contains a number of non-sewered populated areas that remain on septic tanks, and which can be another source of water quality issues. Comprehensive action would be needed to provide for extensions of sewer systems to serve these areas or for other measures to address potential groundwater contamination from septic system outflow and leachate.

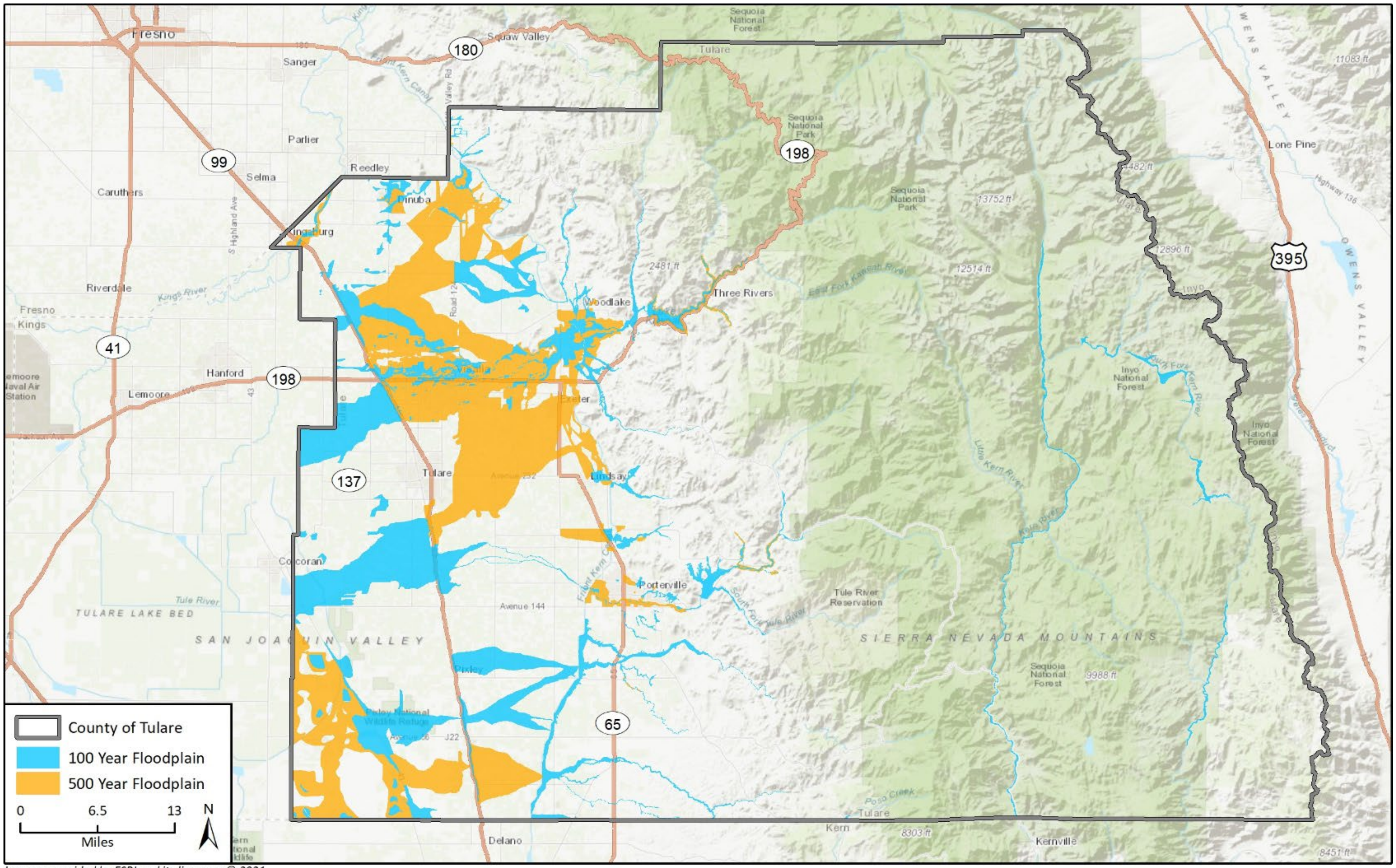
Flooding and Dam Inundation

Streams and Floodplains

Flooding can occur during periods of excessive rainfall or snowmelt. Flooding in steeper mountainous areas, such as the Sierra Nevada range, is usually confined to the stream channel and adjacent floodplain. Larger rivers typically have longer, more predictable flooding sequences and broad floodplains. Figure 4.10-3 illustrates floodplain hazards in the County.

The Tulare County Flood Control District is an independent Special District created by the Tulare County Flood District Act and is managed by the Tulare County Resource Management Agency (RMA). The District is responsible for flood control projects within the County, coordination with State and Federal agencies, and administering the Federal Emergency Management Agency's

Figure 4.10-3 Flood Hazards in the TCAG Region



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Additional data provided by FEMA, 2021.

(FEMA) National Flood Insurance Program (NFIP, see *Regulatory Setting* below). In addition, the Tulare County Water Commission assists in floodplain management measures including flood area delineation and storm reports.

Historical floods have occurred along the Kings, Tule, and Kaweah Rivers, and much of the Hydrologic Region lies within the natural floodplain of the Kaweah and Tule Rivers. Many low-lying areas lie within the 100-year floodplain, as depicted in Figure 4.10-3. The County and various property owners and agencies have installed levees, flood control reservoirs such as the Success Reservoir, and other flood prevention infrastructure.

Dam Inundation

Inundation may be caused by dam failure or overtopping resulting from heavy precipitation. Dams may also fail as a result of structural damage caused by seismic events, erosion, structural design flaws, rapidly rising floodwater or landslides flowing into a reservoir. Populated areas below dams may be exposed to flood hazards resulting from dam failure. Dam failure could also pose a risk to roads, highways, public facilities, agricultural crops, or other land uses within the inundation zone. DWR maintains Dam Inundation Maps which show levels of hazard presented by hypothetical dam failures. Dam inundation maps show ‘High’ downstream hazards from the Sand Creek and Bravo Lake Reservoir, and ‘Significant’ downstream hazards from the Larson Dam. There are numerous other dams within the County with no inundation maps or have a low hazard (DWR 2021).

Urban Stormwater

During heavy rains, flooding can also occur on streets and roads within urbanized areas when stormwaters cannot permeate into the soil due to impermeable surfaces such as asphalt pavement or building footprints. Flooding can also occur when stormwater drainage systems are overwhelmed due to unanticipated rain events, insufficient size or damage, and clogging from lack of maintenance. Flooding can also occur alongside or on major road systems such as highways due to similar issues of impermeable surfaces and/or insufficient drainage.

Tsunami/Seiche

The TCAG region is not subject to tsunami hazards due to its distance from the Pacific Ocean. A seiche is a similar occurrence as a tsunami but generated on the surface of a non-oceanic body of standing water such as a lake or reservoir. Seiches can affect bodies of water as small as swimming pools, but normally would be likely to cause major damage only to developed areas surrounding, or downstream from, large lakes. In addition to small waves initiated by ground shaking which might affect the local shoreline, larger waves can be generated, by large landslides triggered by an earthquake. These waves could overtop a dam in a similar manner to dam inundation. There are several lakes in the County, including Lake Success and Lake Kaweah, which could present a threat from seiches, although there are no historical incidents of seiches occurring within the TCAG region.

4.10.2 Regulatory Setting

a. Federal Laws, Regulations, and Policies

Clean Water Act

Congress enacted the Clean Water Act (CWA), 33 U.S.C. § 1251 et seq., formerly the Federal Water Pollution Control Act of 1972, with the intent of restoring and maintaining the chemical, physical and biological integrity of the waters of the United States (WOTUS). The CWA requires states to set standards to protect, maintain and restore water quality through the regulation of point source and non-point source discharges to surface water and the setting of water quality standards (CWA Section 303). Point source discharges are regulated by the National Pollutant Discharge Elimination System (NPDES) permit process (CWA Section 402). NPDES permitting authority is administered by the State Water Resource Control Board (SWRCB) and the nine RWQCBs (CWA Section 401).

CLEAN WATER ACT SECTION 303(D)

Under Section 303(d) of the CWA, States are required to develop and update a list of all water bodies under their jurisdiction which fail to meet water quality standards even after point sources of pollution have utilized the minimum levels of pollution control These are referred to as '303(d) impaired' bodies. Jurisdictions must establish priority rankings for 303(d) impaired water bodies and develop action plans to improve water quality to minimum standards. The plans include the setting of Total Maximum Daily Loads (TMDLs) for the pollutants which are impairing the water bodies; these limits are stricter than the normal minimum standards in order to bring the impaired bodies into compliance over time.

CLEAN WATER ACT SECTION 401

Under Section 401 of the CWA, the RWQCBs have regulatory authority over actions in waters of the U.S. (WOTUS) through the issuance of water quality certifications, which are issued in conjunction with any federal permit (e.g., permits issued by the USACE under Section 404 of the CWA, described below). This section requires the issuance of certification by the RWQCB that state water quality standards will not be violated.

CLEAN WATER ACT SECTION 402

Section 402 of the CWA regulates point-source discharges to surface waters, among other provisions, requires that all construction sites on an acre or greater of land, and all municipal, industrial, and commercial facilities discharging wastewater or stormwater directly from a point source (e.g., pipe, ditch, or channel) into WOTUS must obtain an NPDES permit. All NPDES permits are written to ensure that the surface water receiving discharges will achieve specified water quality standards.

In California, the NPDES program is administered by the SWRCB through the RWQCBs and requires municipalities to obtain permits that outline programs and activities to control wastewater and stormwater pollution. The CWA prohibits discharges of stormwater or wastewater unless the discharge is in compliance with an NPDES permit. Municipal stormwater and wastewater discharges from Municipal Separate Storm Sewer Systems (MS4s) and all other discharges are regulated by the local permitting authority where USEPA has approved the agency. Most MS4 Permits are tailored versions of general USEPA permits, while many industrial discharge permits are individual permits created for the specific discharge requirements of the project. Tulare County discharges that do not fall under specific municipal MS4 permits are regulated under the Region 5 Region-Wide MS4 Permit (Order R5-2016-0040).

The SWRCB is the permitting authority in California, issues general MS4 permits, and adopted an NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) (Order 2009-0009, as amended by Orders 2010-0014-DWQ and 2012-006-DWQ). The order applies to construction sites or other projects that include one or more acre of soil disturbance, as required by the CWA, but also to projects that disturb less than one acre but which, in the RWQCBs' determination, may pose a threat to water quality. Containment and spill cleanup are encompassed in the Storm Water Pollution Prevention Plan (SWPPP) which is required to be developed as a condition of permit issuance. The SWPPP must include measures to ensure that: all pollutants and their sources are controlled; non-stormwater discharges are identified and eliminated, controlled, or treated; site best management practices (BMPs) are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges; and BMPs installed to reduce or eliminate pollutants after construction are completed and maintained. Any project implementing the proposed 2022 TCAG RTP/SCS that disturbs more than an acre, or that the CVRWQCB determines presents a potential impact to water quality, would be required to obtain coverage under either a specific permit or the Construction General Permit.

Small amounts of construction-related dewatering is mostly covered under the Construction General Permit, but large amounts of dewatering would be required to comply with the CVRWQCB's General Dewatering Permit (Order R5-2013-0074). Dewatering related to projects implementing the proposed 2022 RTP/SCS is likely to be limited in scope, but larger projects or those which are longer in duration may require coverage under the Low Threat Discharge and Dewatering Permit from the CVRWQCB.

CLEAN WATER ACT SECTION 404

Under Section 404 of the Clean Water Act, proposed discharges of dredged or fill material into WOTUS require USACE authorization. The USACE identifies wetlands using a multi-parameter approach, which requires positive wetland indicators in three distinct environmental categories: hydrology, soils, and vegetation. According to the *Corps of Engineers Wetlands Delineation Manual* (1987), except in certain situations, all three parameters must be satisfied for an area to be considered a jurisdictional wetland. The *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (2008) is also used when conducting jurisdictional wetland determinations in areas identified within the boundaries of the Region, including Tulare County. The Corps has historically exerted jurisdiction over many of the waterways and wetland areas in the western TCAG region, including around Porterville, Lindsey, Tulare and Visalia (USACE 2022). Proposed projects on or around these locations may be required to seek a 404 permit from the USACE.

National Flood Insurance Act / Flood Disaster Protection Act

The National Flood Insurance Act of 1968 made flood insurance available for the first time. The Flood Disaster Protection Act of 1973 made the purchase of flood insurance mandatory for the protection of property located in Special Flood Hazard Areas. These laws are relevant because they led to mapping of regulatory floodplains and to local management of floodplain areas according to guidelines that include prohibiting or restricting development in flood hazard zones. As shown in Figure 4.10-3, much of western Tulare County lies within either a 100- or 500-year floodplain.

Federal Emergency Management Agency

FEMA administers the NFIP to provide subsidized flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA also issues Flood Insurance Rate Maps (FIRMs) that identify which land areas are subject to flooding. These maps provide flood information and identify flood hazard zones. FEMA's minimum level of flood protection for new development is the 100-year flood event.

FEMA has also developed requirements and procedures for evaluating earthen levee systems and mapping the areas affected by those systems. Levee systems are evaluated for their ability to provide protection from 100-year flood events and the results of this evaluation are documented in the FEMA Levee Inventory System (FLIS). Levee systems must meet minimum standards and must be maintained according to an officially adopted maintenance plan. Other FEMA levee system evaluation criteria include structural design and interior drainage. There are multiple Levee Districts in Tulare County with levees monitored by FEMA.

Executive Order 11988

Executive Order (EO) 11988 Floodplain Management directs federal agencies to avoid short- and long-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development whenever there is a practicable alternative. Additionally, EO 11988 requires the prevention of uneconomic, hazardous, or incompatible use of floodplains; protection and preservation of the natural and beneficial floodplain values; and consistency with the standards and criteria of the National Flood Insurance Program.

b. State Laws, Regulations, and Policies

Porter Cologne Water Quality Control Act

The Porter Cologne Water Quality Control Act of 1967 Water Code § 13000 et seq.) is the primary water-quality legislation in California and the mechanism for implementation of California's authority under Sections 303, 401, and 402 of the CWA. The Porter-Cologne Water Quality Control Act requires the SWRCB and the nine RWQCBs to adopt water quality criteria to protect State waters. These criteria include the identification of beneficial uses, narrative and numerical water quality standards, and implementation procedures. The Water Quality Control Plan, or Basin Plan, protects designated beneficial uses of State waters through the issuance of Waste Discharge Requirements (WDRs) and through the development of TMDLs. Any entity proposing to discharge waste that could affect the quality of the waters of the State must make a report of the waste discharge to the RWQCB or SWRCB, which in turn issues WDRs, in compliance with the Porter-Cologne Act.

The Water Quality Control Plan for the Tulare Lake Basin and Approved Amendments is the current version of the Basin Plan. It includes water quality objectives and TMDLs for the 303(d) bodies listed in Table 4.10-1, beneficial uses for waters within the region, and an implementation plan. Major elements of the implementation plan include sections addressing agricultural irrigation runoff, salinity of ground waters, contaminants from confined and unconfined animal activities, and municipal and industrial wastewater effluent (CVRWQCB 2018).

Under the Porter-Cologne Act's authority, SWRCB adopted a State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (SWRCB 2021), for inclusion in the forthcoming Water Quality Control Plan for Inland Surface Waters and Enclosed

Bays and Estuaries and Ocean Waters of California. The policy consist of four major elements: 1) a wetland definition; 2) a framework for determining if a feature that meets the wetland definition is a water of the state; 3) wetland delineation procedures; and 4) procedures for the submittal, review, and approval of applications for Water Quality Certifications and Waste Discharge Requirements for dredge or fill activities (SWRCB 2021).

Antidegradation Policy

California's antidegradation policy, formally known as the Statement of Policy with Respect to Maintaining High Quality Waters in California, restricts degradation of surface and ground waters. It protects waters where existing water quality is higher than necessary for the protection of beneficial uses. Any actions with the potential to adversely affect water quality must be consistent with the maximum benefit to the people of the State; not unreasonably affect present and anticipated beneficial use of the water; and not result in water quality less than prescribed in water quality plans and policies. The quality of the major streams uphill of the foothill reservoirs within the TCAG region are considered suitable for all beneficial uses and of good quality, but below the dams many beneficial uses are impaired, and all groundwaters are considered suitable or potentially suitable for agricultural and industrial supply (CVRWQCB 2018).

Caltrans Statewide NPDES Permit

The California Department of Transportation (Caltrans) was issued the nation's first statewide stormwater NPDES permit (Order 99-06-DWQ) in 1999 by the SWRCB. The Caltrans Permit requires Caltrans to regulate nonpoint source discharge from its properties, facilities, and activities. The Caltrans Permit requires development of a program for communication with local agencies and coordination with other municipal separate storm sewer system (MS4) programs where those programs overlap geographically with Caltrans facilities. As part of the permit, Caltrans is required to create and annually update a Stormwater Management Plan (SWMP) that is used to outline the regulation of pollutant discharge caused by current and future construction and maintenance activities. SWMP requirements apply to discharges from Caltrans stormwater conveyances, including catch basins and drain inlets, curbs, gutters, ditches, channels, and storm drains. The SWMP must be approved by the SWRCB, and as specified in the permit, it is an enforceable document. Compliance with the permit is measured by implementation of the SWMP. Caltrans' policies, manuals and other guidance related to stormwater are intended to facilitate implementation of the SWMP. Caltrans also requires all contractors to prepare and implement a program to control water pollution effectively during the construction of all projects.

Urban Water Management Planning Act

In 1983, the California Legislature enacted the Urban Water Management Planning Act (Water Code, Section 10610 et seq.), which requires urban water suppliers to develop Urban Water Management Plans (UWMP) to actively pursue the efficient use of available supplies as well as conduct drought assessments and planning. This Act also requires the provision of water service to be affordable to lower income households (Section 10631.1). Similarly, Government Code Section 65589.7 (Senate Bill [SB] 1087) requires water service providers to reserve water allocations for low-income housing. Every five years, water suppliers are required to update their UWMPs to identify short-term and long-term water demand management measures to meet growing water demands.

Sustainable Groundwater Management Act

In September 2014, the state passed legislation requiring that California's critical groundwater resources be sustainably managed by local agencies. The Sustainable Groundwater Management Act (SGMA) gives local agencies the power to sustainably manage groundwater. It required DWR to establish priority levels for groundwater basins within the State based on their level of overdraft and required GSAs to develop GSPs for medium- and high-priority groundwater basins that would bring the basins into sustainability by 2040 or 2042. Basins determined to be in critical overdraft were required to develop GSPs first. All three DWR-delineated subbasins within Tulare County were deemed in critical overdraft (DWR 2022a) and there are dozens of individual GSAs with their own GSPs within the County. DWR is in the process of determining its approval of submitted GSPs for non-critical basins which were due by January 31, 2022; however, the GSPs in the TCAG region were submitted during the initial submission period in 2019 and are currently approved and in their first 5-year planning cycle; the next round of revisions will be due in 2025. Some of the larger GSAs within the County (DWR 2022a, 2022b) include:

- Lower Tule River Irrigation District
- Eastern Tule Groundwater Sustainability Agency
- Greater Kaweah Groundwater Sustainability Agency
- Kings River East Groundwater Sustainability Agency
- East Kaweah Groundwater Sustainability Agency
- Mid Kaweah Groundwater Subbasin Joint Powers Authority
- Delano-Earlimart Irrigation District
- Tri-County Water Authority
- Pixley Irrigation District
- Alpaugh Groundwater Sustainability Agency
- Alpaugh Irrigation District

Along with mandating the formation of GSAs, SGMA provided the newly formed GSAs a set of tools to assist with groundwater management, including the ability to conduct investigations, levy fees, determine a basin's sustainable yield, and measure and limit groundwater extraction within their area. However, none of the GSPs approved to-date include actions beyond public outreach/education, conducting investigations, and levying fees; some propose voluntary extraction measurement programs and clearly envision mandatory measurement programs being implemented in regional and local codes, but none dictate groundwater limits. Such action would have to be preceded by the determination of a basins' sustainable yield through exercising of GSA statutory investigative powers and would have to be implemented through the promulgation of regulations in a traditional legislative process. In general, adopted GSPs call for increased data-gathering, including through expanded use of voluntary metering of individual wells. Many local governments already require metering on new wells, and where this is the case, many GSAs are beginning to collect that information as part of their investigative power. SGMA requires GSAs to update their GSPs every five years once approved.

Senate Bill 610 and 221

Senate Bill (SB) 610 of 2001 improves the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 promotes more collaborative planning between local water suppliers and cities and counties. Under SB 610, water supply assessments (WSAs) must be furnished to local governments for inclusion in any environmental documentation for certain projects subject to CEQA. A similar framework, SB 221, provides a method for applying similar considerations to certain land use entitlements. WSA requirements would be determined at the project level for projects implementing the proposed 2022 RTS/SCS which requires further CEQA analysis.

Assembly Bill 1881—Water Conservation in Landscaping Act

Assembly Bill (AB) 1881, the Water Conservation in Landscaping Act of 2006, enacted many landscape efficiency requirements for improving the efficiency of water use in new and existing urban irrigated landscapes in California. AB 1881 required DWR to update the existing Model Local Water Efficient Landscape Ordinance and local agencies to adopt the updated model ordinance or an equivalent. The law also required the adoption of performance standards and labeling requirements for landscape irrigation equipment, including irrigation controllers, moisture sensors, emission devices, and valves to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy or water. AB 1881 would apply to any of the proposed projects implementing the proposed 2022 RTP/SCS which featured landscaping greater than 2,500 sf, including a limit to plant types used which restricts potential evapotranspiration to 70 percent of the local reference values—in effect requiring landscaping to lose less water to evapotranspiration than native plants.

2022 Water Conservation Emergency Regulation

Due to the prolonged drought throughout the State, in January 2022 SWRCB adopted the Water Conservation Emergency Regulation. Requirements for the duration of the emergency regulations (currently authorized from January 18, 2022 to January 18, 2023) include turning off decorative water fountains, prohibiting using water hoses to clean sidewalks, and turning off irrigation systems during rain and for two days after rain. SWRCB is developing draft proposed updates to the regulation consistent with Executive Order N-7-22 issued on March 28, 2022, including extending the duration and banning the irrigation of non-functional turf.

Cobey-Alquist Floodplain Management Act

The Cobey-Alquist Floodplain Management Act (Water Code § 8400 -8415) gives support to the NFIP by encouraging local governments to plan, adopt and enforce land use regulations for floodplain management, to protect people and property from flooding hazards. The Act discourages the construction of most types of development on ‘designated floodways’ and requires local agencies to set and enforce development restrictions for development within ‘restricted zones.’ Implementation of floodplain development regulations is a prerequisite for any agency to obtain State funding assistance with flood control projects or infrastructure of certain types. The Tulare County Flood Control District sets these regulations under the authority of the Tulare County Resource Management Agency and is in compliance with the Cobey-Alquist requirements.

c. Local Laws, Regulations, and Policies

Tulare County General Plan and Regulations

The 2030 Tulare County General Plan includes goals and policies related to protecting the County’s water supply and securing future supplies in Chapter 11, Water Resources, and flood and storm management in the Health and Safety Chapter (Tulare County 2012). Major goals include HS-5, minimizing effects of flooding and storms, and WR-1 and -2, protection of surface and groundwater resources. These overarching goals are implemented by a wide variety of policies and work plans such as HS-5.4 (flood control measures and stormwater retention), HS-5.10 (flood control and hydromodification design), WR-1.1 (groundwater withdrawal management), WR-1.8 (basin management participation), WR-2.1 (protection of water quality), WR-2.4 (erosion and sediment control), and WR-2.8 (point source pollution control).

The Tulare County Code contains stormwater and water quality regulations in Part IV, Chapter 27, and has numerous other ordinances related to water quality including agricultural runoff regulations in Part IV, Chapter 25 and watercourse modification in Part IV, Chapter 15. The Tulare County Flood Control Master Plan has been in effect since 1973 and continues to be incorporated into each General Plan update.

The Tulare County General Plan and County Code would apply to projects in the TCAG Region located within unincorporated areas.

City General Plans and Regulations

The City of Visalia has numerous goals and policies related to water quality and hydrology in the General Plan, especially in the Water Resources section of the Open Space and Conservation Element, which covers water quality, and in the Parks, Schools, Community Facilities, and Utilities Element, which deals with stormwater goals (City of Visalia 2014a). The City also has a detailed Stormwater Management Plan adopted in 2005 (City of Visalia 2014b). Goals include OSC-O-6 (Protect water resources and quality), OSC-O-7 (preservation of waterways as habitat, groundwater recharge, and flood control), and PSCU-O-14 (management practices for groundwater recharge and stormwater management) which are implemented by Policies such as OSC-P-8 (waterway protection), OSC-P-10 (waterway setbacks), PSCU-P-60 (incorporation of stormwater detention basins) and PSCU-P-61 (control of stormwater runoff and pollutants). The Visalia Municipal Code contains stormwater, flood management, and conservation regulations in Titles 13, 15, and 16.

The City of Porterville 2030 General Plan Open Space and Conservation Element includes several goals and policies related to protection of the Tule River, which flows through the planning area and to groundwater recharge to the Tule Subbasin (City of Porterville 2014). The Guiding Policy is OSC-G-8, ensuring adequate water quality and supply for the entire community, and Implementation Policies include OSC-I-37 (watershed protection standards), OSC-I-39 (minimizing erosion and runoff), OSC-I-40 through 45 (pollution management), and OSC-I-53 through 56 (recharge and infiltration protection). The Porterville City Code has numerous regulations and ordinances related to water quality and conservation, including Chapter 7.IV on green building codes, and Chapter 19A which contains the Storm Drainage Systems regulations.

Other cities in the TCAG Region, such as Tulare (City of Tulare 2014) and Exeter (City of Exeter 2002), have similar provisions, goals, policies, and regulations in their General Plans and municipal ordinances.

4.10.3 Impact Analysis

a. Methodology and Significance Thresholds

Appendix G of the State CEQA Guidelines identifies the following criteria for determining whether a project's impacts would have a significant impact related to hydrology and water quality:

1. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality;
2. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;
3. 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:
   a. Result in substantial erosion or siltation on- or off-site;
   b. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
   c. 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
   d. Impede or redirect flood flows;

a) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation; or
b) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

b. Project Impacts and Mitigation Measures

The following section discusses hydrology and water quality impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. Due to the programmatic nature of proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible. In general, however, implementation of transportation and land use projects envisioned by proposed 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1:	Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality

Impact HYD-1 IMPLEMENTATION OF PROPOSED TRANSPORTATION PROJECTS AND FUTURE PROJECTS INCLUDED IN THE LAND USE SCENARIO ENVISIONED IN THE PROPOSED 2022 RTP/SCS WOULD NOT VIOLATE WATER QUALITY STANDARDS OR WASTE DISCHARGE REQUIREMENTS, OR OTHERWISE SUBSTANTIALLY DEGRADE SURFACE OR GROUND WATER QUALITY. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Implementation of proposed transportation and land use projects envisioned in the proposed 2022 RTP/SCS would result in both short-term and long-term impacts to surface and groundwater water quality. For program-level analyses, water-related impacts are often similar among individual projects within project classes (e.g., constructing new roadways, widening existing roadways, etc.). For example, when a new roadway is constructed, it will tend to have a greater impact than the widening of an existing roadway as it would generate runoff and contamination issues where there previously were none, as well as tend to create a larger amount of new impermeable surfaces than a widening project would. Similarly, improvements within built-up urban areas are less likely to generate concerns over water body pollution than improvements outside the urban landscape, as urban areas frequently have better stormwater drainage (and potential treatment) than countryside roadways, where stormwater capture may consist of a ditch or swale along the road.

Ground Water Quality

Ground water quality can be impaired in a variety of ways, including through drawdown of shallow, nutrient-polluted agricultural runoff near over-pumped wells; overall untreated runoff from agricultural and animal operations that percolates directly into shallow aquifers; percolation of wastes from septic systems; and percolation into the water table from polluted surface water where such interchange occurs. The proposed 2022 RTP/SCS does not feature alterations to the region's agricultural land uses, and the land use proposals feature increased urban density which would not be likely to include septic usage. Therefore, the primary potential impact to regional ground water quality would be associated with impacts to surface water quality in areas where surface water is directly connected to underlying ground water supplies. Potential impacts associated with increased overdraft of ground water are discussed in Impact HYD-2.

Surface Water Quality

Certain transportation improvements would increase overall impervious surface area throughout the TCAG region. For example, the multiple road and highway widening projects would introduce increased pavement in areas that are currently undeveloped, with corresponding increases in runoff. Construction activities for transportation projects facilitated by the proposed 2022 RTP/SCS may include soil disturbance, excavation, grading, and similar activities with a high potential to generate sediment and other pollutants. Sediment especially would not require stormwater to transport it into the environment; a high wind would be sufficient. Such projects would also serve to encourage increased use of the improved transportation network and facilitate the planned growth of the County population, leading to an increase in operational contamination from transportation use.

Development projects envisioned under the land use scenario could also introduce impervious surfaces, including infill sites, if the infill site is currently unpaved. However, it is likely that most infill sites are already developed, thus minimizing the increase of impervious surfaces. These and other more outlying projects that would increase impervious surfaces may generate adverse impacts to surface water quality. Pollutants and chemicals associated with urban activities would run off new roadway surfaces or other new impervious surfaces flowing into nearby bodies of water during storm events. These pollutants would include but are not limited to heavy metals from auto emissions, oil, grease, debris, and air pollution residues. Such contaminated urban runoff may result in the incremental long-term degradation of water quality.

Most transportation improvement projects would enhance and upgrade existing and outdated stormwater infrastructure, improving runoff quality: such benefits may be outweighed by the increases in current levels of pollutants caused by increase of traffic flows encouraged by better transportation systems. Similarly, any proposed 2022 RTP/SCS projects with landscaping may require fertilizer/pesticide application, which could enter nearby bodies of water and cause adverse effects to water quality.

As discussed under Section 4.9.2, *Regulatory Setting*, the federal CWA requires that coverage under an NPDES permit be obtained for construction projects that would disturb greater than one acre, or that are part of a larger plan of development that itself covers more than one acre. Acquisition of coverage under the Construction General Permit is dependent on the preparation of a SWPPP that contains project specific BMPs to control the discharge of pollutants, including sediment, into the local surface water drainages as well as post-construction measures to ensure continued permit compliance. In addition, all transportation projects for which Caltrans is the sponsor agency would comply with the Caltrans Statewide NPDES permit that regulates all stormwater discharges from Caltrans owned conveyances, maintained facilities and construction activities. Most proposed 2022 RTP/SCS transportation projects, such as state highway widenings and interchange construction, would disturb more than one acre and therefore subject to these regulations.

Coverage under the Region 5 Region-Wide MS4 Permit would be required for all projects and land uses during their operation that discharged to an MS4 system, including compliance with the general Findings and the Program Elements Part F (Planning and Land Development/Post Construction Storm Water Management Program) of Attachment J, such as all requirements for post-construction BMPs, LID features, and implementation or compliance with Stormwater Management Plans.

In addition, planning and approval of the various future projects envisioned by the proposed 2022 RTP/SCS would require the lead agencies and project sponsors to ensure compliance with existing local jurisdiction requirements, including applicable municipal code sections such as the City of Visalia's Stormwater Management Plan and the stormwater and water quality regulations of Part IV of the County Code.

In addition, the land use scenario included in the 2022 RTP/SCS would generate new sources of wastewater, which would also be conveyed to wastewater treatment facilities in the region Discharges of treated wastewater, also called effluent, from the treatment plants are regulated as point sources by the RWQCB and must meet water quality effluent limitations established in the NPDES permit issued by the RWQCB for the treatment plant. Thus, although implementation of the 2045 MTP/SCS would increase the volume of point-source wastewater discharges in the TCAG region, required compliance and monitoring of effluent prior to discharge from treatment facilities would ensure impacts would be less than significant.

Compliance with the various regulations and restrictions of the multiple types of permits individual projects may fall under, as well as conformity with applicable County or municipal General Plan policies, would serve to reduce impacts from project construction and operational lifespan by requiring measures to prevent runoff and pollutants from leaving a project site wherever it was located within the TCAG Region, and ensuring all non-point and point source discharges to surface waters standards of the applicable NPDES Permits and Water Quality Control Plans such as the Basin Plan. These measures and permit requirements may not serve to eliminate impacts to water quality for certain individual projects; however, permit coverage would ensure that the transportation and land use projects implementing the proposed 2022 RTP/SCS would not violate any water quality standards or waste discharge requirements; therefore impacts from violation of water quality standards or waste discharge requirements, or other impairment of water quality, would be less than significant.

Mitigation Measures

No mitigation is required.

Threshold 2:	Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin

Impact HYD-2 TRANSPORTATION AND LAND USE PROJECTS IMPLEMENTING THE PROPOSED 2022 RTP/SCS WOULD SUBSTANTIALLY DECREASE GROUNDWATER SUPPLIES AND INTERFERE WITH GROUNDWATER RECHARGE SUCH THAT IT MAY IMPEDE SUSTAINABLE GROUNDWATER MANAGEMENT OF THE BASIN. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.

In undeveloped conditions, natural vegetation can intercept and retain precipitation and limit surface runoff, and runoff that occurs over large areas is often unconcentrated and able to percolate down into the ground and replenish groundwater supplies naturally. When natural areas, including bare dirt, are covered over by impermeable surfaces such as pavement, this natural infiltration is obstructed. Runoff from such areas is concentrated and may increase volumes and flow rate greater than the natural infiltration rate of the surrounding soil, leading to saturated ground which cannot accept any more water and ultimately impair natural recharge due to loss of otherwise rechargeable rainwater to evaporation or discharge to streams that flow to areas unable to assist recharge.

Major proposed 2022 RTP/SCS transportation projects and the land use scenario envisioned by proposed 2022 RTP/SCS could affect groundwater supplies by incrementally reducing groundwater recharge potential. This reduction in groundwater recharge could occur because the impermeable surfaces associated with the proposed improvements would increase surface water runoff at the expense of natural infiltration. The proposed 2022 RTP/SCS encourages infill development within urbanized areas of the TCAG region, and the land development envisioned could interfere with groundwater recharge by increasing the extent of impervious surfaces already present in this area. Urbanized areas are typically characterized by extensive impervious surfaces such as buildings and paved roads; as such, infill development would have minimal potential to further alter the rates and patterns of groundwater recharge to the overall basin. However, infill as well as any outlying development on currently unpaved sites would result in a net increase of impervious surfaces in the area and could have associated impacts on site specific runoff and infiltration patterns.

Land Use Projects

As development under the proposed 2022 RTP/SCS occurs, site specific drainage features would be designed to retain, capture, and convey increased runoff in accordance with the city or county design standards and State requirements, such as the Program Elements Part F post-construction site control features and hydromodification requirements of the Region-Wide MS4 Permit discussed under Section 4.9.2, *Regulatory Setting,* and Impact HYD-1, above. Compliance with these standards and regulations typically includes the use of LID features which, as described above, are designed to simulate natural processes of runoff and infiltration to minimize or avoid potential adverse effects associated with new development. Most land use development would not occur on currently permeable surface and uses that did would incorporate design features in order to reduce impacts to recharge; therefore, impacts to groundwater recharge from land use projects implementing the proposed 2022 RTP/SCS would be less than significant.

Transportation Projects

In addition to the development that would occur under the proposed 2022 RTP/SCS, transportation projects could also increase the extent of impervious surfaces. Many of the planned transportation projects, such as the addition of new lanes to existing roads or highways, would have negligible effect on the overall extent of impervious surfaces, as they would occur in areas already characterized by paved surfaces. In addition, transportation improvements often serve to increase infiltration and recharge as outdated (or nonexistent) runoff infrastructure and design is replaced by modern drainage and LID features. As with the infill development discussed above, transportation projects would also be implemented with project specific drainage plans for new features would be designed to retain, capture, and convey runoff in accordance with the city or county design standards, where applicable, and federal and State requirements. As many projects may serve to improve recharge in their area, or would be required to implement design features to reduce impacts to groundwater recharge, impacts to groundwater recharge from transportation projects proposed by the proposed 2022 RTP/SCS would be less than significant.

Groundwater Supply Management

Implementation of transportation and land use projects envisioned in the proposed 2022 RTP/SCS would result in both short-term and long-term impacts to groundwater management throughout the TCAG region.

Activities would be implemented under California regulations governing use of groundwater, including SGMA, as well as groundwater provisions of applicable local general plans. Taken as a whole, these regulations and plans are intended to reduce groundwater use and subsequent overdraft of groundwater basins.

Regional municipal UWMPs provide strategies for reducing water usage and increasing available supply, such as investing in reclaimed water infrastructure and increasing user education and awareness of conservation practices UWMPs cannot impose any mandatory regulations or limits on water use, and any improvements in future proposals are currently speculative.

As described above, the medium- and high-priority basins in the TCAG region are being managed by GSAs, each of which is responsible for developing a GSP for its respective basin(s) or having submitted an existing management plan that meets all the requirements of a GSP, for DWR's consideration to approve as an Alternative GSP for compliance with SGMA. The GSPs are required to provide mechanisms that allow the sustainable use of groundwater, with growth projections considered.

During grading and general construction activities, water would be needed to suppress fugitive dust generated by construction equipment, for the mixing of concrete or other materials, for cleaning, and for a variety of other uses. Given the current state of overdraft of many groundwater basins in the study area, and the likelihood that more than one project would be constructed simultaneously in areas with over-drafted basins, the short-term groundwater supply impact of projects implementing the proposed 2022 RTP/SCS would be significant.

Over the long term, the water use of the proposed transportation projects would primarily include irrigation uses for project landscaping components, with some increased water usage from upgraded transportation facilities. Such use would be incrementally minor for individual projects. As most transportation improvements involve modification of existing facilities and would not result in a substantial increase in landscaped areas that require irrigation, some projects would not increase operational water use at all. Those projects which incorporate landscaping, including vegetating graded areas for slope stability and maintenance, for use as noise barriers, or as part of stormwater control, such water use may constitute a significant draw on regional supplies by full buildout at 2046 Although there is existing use of reclaimed water for transportation facility landscaping, this is not common countywide. In more remote areas, reclaimed water sources are not located within a reasonable distance of landscaping needs. As such, it may not be economically feasible to convey reclaimed water to outlying areas.

For land use projects under the proposed 2022 RTP/SCS, including municipal and industrial projects, measures contained within the Region-wide MS4 Permit or General Plans may serve to reduce water use impacts. The Region-wide MS4 NPDES Permit would require many projects to incorporate LID strategies such as stormwater reuse and onsite infiltration under the general Findings and the Program Elements Part F (Planning and Land Development/Post Construction Storm Water Management Program) of Attachment J. General Plan policies and ordinances at the local and regional level, such as Green Building Codes, would encourage or require consideration of reclaimed water and drought-resistant landscaping, and AB 1881 would apply to most landscaped areas over 2,500 sf. These and similar measures may not apply to every planned improvement under the proposed 2022 RTP/SCS, and increased demands on ground water supplies from additional land use projects are likely.

Summary

Existing regulatory requirements at the local, State, and federal level include measures to minimize any increases in off-site stormwater runoff by encouraging on-site infiltration, which would minimize the potential reduction in groundwater recharge. Conformity with applicable GSPs and SGMA requirements in specific project areas is discussed under Impact HYD-5. As discussed in Section 4.10.2, *Regulatory Setting*, and further under Impact HYD-5, GSPs in the TCAG region do not contain regulatory groundwater extraction limits; most require investigations, and some impose fees though local propositions and ordinances. Further, the large number of GSAs, each covering small areas within the TCAG region, will make coordination difficult. The existing GSPs espouse a variety of goals, options, and plans, but at present there is no overarching sustainable management structure for any of the basins, and no proposals to form larger, unified GSA structures within the region have currently been put forward for public consideration or proposed to DWR.

Due to the current over-drafted state of the basins, the magnitude of change from the current conditions caused by any additional overdraft of groundwater supply would be significant. Therefore, short- and long-term water uses associated with the proposed 2022 RTP/SCS would substantially decrease groundwater supplies and thereby impede sustainable groundwater management. The below mitigation measures would reduce this impact as they are not included in most LID or conservation regulatory schemes that apply within the region.

Mitigation Measures

Transportation project sponsor agencies can and should implement the following mitigation measures for applicable transportation projects. The County and cities in the TCAG region can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions.

HYD-2(a) Construction Dust Suppression Water Supply

For all proposed 2022 RTP/SCS projects, where feasible, implementing agencies shall use reclaimed and/or recycled water for dust suppression during construction activities. This includes use of such reclaimed water in water trucks utilized for project construction occurring outside developed areas and away from water infrastructure which would otherwise provide such reclaimed water. This measure shall be noted on construction plans and shall be spot checked by the local jurisdiction.

HYD-2(b) Landscape Watering

In jurisdictions that do not already have an appropriate local regulatory program related to landscape watering, implementing agencies shall design proposed 2022 RTP/SCS projects that include landscaping shall be designed with drought tolerant plants and drip irrigation. When feasible, native plant species shall be used. In addition, landscaping associated with proposed improvements shall be maintained using reclaimed water when feasible. If reclaimed water could feasibly be utilized for project landscape watering due to proximity of reclaimed water sources but is unavailable due to lack of connecting infrastructure, implementing agencies shall conduct an analysis of the upgrades needed to provide such infrastructure, which will include the potential for new connections to existing reclaimed water systems to provide reclaimed water to other nearby sources besides the proposed project in the analysis, and shall perform such steps as necessary to utilize available reclaimed water if feasible.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. These mitigation measures shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

Significance After Mitigation

Implementation of the above measures would reduce proposed Project impacts on water supply and groundwater overdraft in the TCAG region. However, due to the programmatic nature of this proposed 2022 RTP/SCS EIR, a precise, project-level analysis of specific water demand and supply impacts associated with individual transportation and land use projects is not possible. The land use scenario envisioned by the proposed 2022 RTP/SCS along with transportation projects would result in the need for additional water supply, even with the implementation of mitigation measures listed above. Given the severe overdraft conditions of area groundwater basins, impacts would remain significant and unavoidable. No additional feasible mitigation measures to reduce this impact to a less than significant levels is available.

Threshold 3:	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 substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; 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 impede or redirect flood flows

Impact HYD-3 TRANSPORTATION AND FUTURE LAND USE PROJECTS IMPLEMENTING THE PROPOSED 2022 RTP/SCS WOULD NOT SUBSTANTIALLY ALTER THE EXISTING DRAINAGE PATTERN OF A SITE OR AREA THROUGH ALTERATION OF THE COURSE OF A STREAM OR RIVER OR THROUGH THE ADDITION OF IMPERVIOUS SURFACES IN A MANNER WHERE DRAINAGE CHANGES WOULD RESULT IN FLOODING ON- OR OFF-SITE, REDIRECT OR IMPEDE FLOOD FLOWS, EXCEED THE CAPACITY OF STORMWATER SYSTEMS, OR PROVIDE ADDITIONAL POLLUTED RUNOFF. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Construction of transportation and land use projects under proposed 2022 RTP/SCS could result in the change of existing drainage patterns on individual project sites or within a project area, which could impact hydrology or water quality. Project grading and construction of impervious surfaces for transportation projects may alter existing drainage patterns by altering slopes and reducing infiltration. Additionally, land use projects included in the SCS land use scenario could also increase impervious surfaces and develop structures that may alter existing drainages. Projects that include improvements on or near bridges may result in fill material being placed within stream channels, although it is unlikely that any of the future transportation projects would necessitate or result in actual alteration of a streambed or course as no entirely new bridges, river crossings, or alterations are proposed. Additionally, many projects would feature some level of risk of sediment loading and erosion which could further alter drainage patterns within the immediate area. Implementation of transportation and land use projects implementing the proposed 2022 RTP/SCS may increase stormwater flows, resulting in increased volume and/or velocity of stormwater runoff. Potential increases in stormwater volume and/or velocity could result in on- or off-site flooding.

However, planned transportation and land use projects would be designed to comply with existing State and local jurisdiction hydromodification requirements, including applicable County and municipal code sections related to stormwater runoff and drainages, such as curb and gutter design, and would be required to build drainage infrastructure if necessary to control and accommodate any increase in stormwater flows. Effects of increased polluted runoff have already been examined in this EIR, including under Impact HYD-1 specifically, and runoff from drainage changes would be included under those runoff impacts. Any streambed filling would be required to comply with the terms of any applicable USACE 404 or RWQCB permit which would include an analysis of any impacts from flooding or drainage alteration; in addition, County General Plan Policy WR 1.10 would apply to any projects in the unincorporated County involving stream filling or construction near streams. Oversight of projects within flood areas or affecting flood control infrastructure would be provided by the Tulare County Flood Control District and would help to minimize potential impacts related to alteration of future flood flows.

Land use projects under proposed 2022 RTP/SCS would require drainage control and hydromodification measures required either under an individual MS4 NPDES Permit or under the Region-Wide MS4 Permit and would include adherence to the Region-Wide MS4 Permit's hydromodification requirements and implementation of LID drainage control features if required under Program Requirement Part F. These measures would typically include incorporation of permeable paving, vegetated swales, infiltration retention basins, or other features that would minimize stormwater runoff and volume, and are selected from sets of feasible options based on project-specific site or engineering characteristics. Similar sets of requirements may further be imposed by local regulatory programs as discussed under 4.10.2, *Regulatory Setting,* above.

Compliance with the existing suite of applicable policies and regulations minimize impacts related to on- or off-site flooding, stormwater drainage capacity, polluted runoff, and redirection or impedance of flood , and such impacts would therefore be less than significant.

Mitigation Measures

No mitigation measures are required.

Threshold 4:	In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation

Impact HYD-4 TRANSPORTATION AND LAND USE PROJECTS IMPLEMENTING THE PROPOSED 2022 RTP/SCS WOULD NOT RISK RELEASE OF POLLUTANTS DUE TO PROJECT INUNDATION IN FLOOD HAZARD, TSUNAMI, OR SEICHE ZONES. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Transportation and land use projects implementing the proposed 2022 RTP/SCS could be subject to flooding hazards due to storm events and/or dam failure.

Flooding/Dam Failure

Transportation and land use projects implementing the proposed 2022 RTP/SCS in low-lying areas, 100-year and 500-year flood plains, and in proximity to waterways and/or dam inundation zones may be subject to flood hazard. In general, throughout the TCAG region, the dam inundation areas lie within natural floodplains; therefore, this analysis considers the effects of flooding and dam failure to be similar. The effects of flooding could include temporary inundation of a facility that impedes its use or causes long-term damage to the facility. Flooding may also cause immediate damage to roadways, bikeways, and bridges, particularly during high-velocity flood events that wash away or erode facilities, typically occurring adjacent to rising rivers or streams, or if located in a dam inundation area. Unpaved roads are particularly vulnerable, although any facility within the flood zone of a stream would be subject to impacts. Erosion caused by flooding can damage paved facilities, and bridge supports can be undermined or washed away.

There are several federal, state, and local programs to reduce flooding and control the flow of floodwaters, as well as to encourage proper flood planning within the region as discussed in the Regulatory Setting. The National Flood Insurance Act makes the purchase of flood insurance mandatory for properties in Special Flood Hazard Areas to prevent the loss of property from flooding. The Cobey-Alquist Floodplain Management Act encourages local governments to plan, adopt and enforce land use regulations for floodplain management to protect people and property from flood hazards. The California Division of Dam Safety inspects dams across the State, including in the TCAG region, on a yearly schedule to ensure that they are performing and being maintained in a safe manner. The Tulare County Flood Control District inspects and provides normal operation of most basins, channels, and other flood protection facilities and the routine and emergency maintenance and repair of these facilities in the County as well as providing oversight of construction and development within the floodplains. The Flood Control District also provides assistance to the Flood Control or Public Works Departments of municipalities within the TCAG region, including to the City of Visalia’s Flood Control office and the City of Tulare Surface Water

Management Division. Virtually all public levees and floodplain infrastructure are maintained by the Flood Control District except for municipal stormwater infrastructure.

Land use changes envisioned within the SCS would mostly occur within developed areas or on the edges of such areas and would therefore be connected to existing or planned stormwater and flood control infrastructure and be required to conform with applicable regulations regarding runoff control and pollution control, including the mitigation measures proposed in this EIR. Such development would not substantially interfere with existing flood infrastructure without separate project-specific analysis of such impacts and the impacts of potential runoff to water quality have already been examined and mitigated to the greatest extent feasible. The impacts of urban development increase the risk of flood inundation and the release of pollutants due to such inundation due to the increase in impermeable surfaces. This impact would be less than significant. A greater risk of impact would arise from the transportation projects in less developed areas with less extensive flood protection or capability to deal with potential polluted runoff from roadways during a flood event. Locations of transportation improvements proposed in the proposed 2022 RTP/SCS within floodplain areas of the County are depicted in Figure 4.10-4 through Figure 4.10-6.

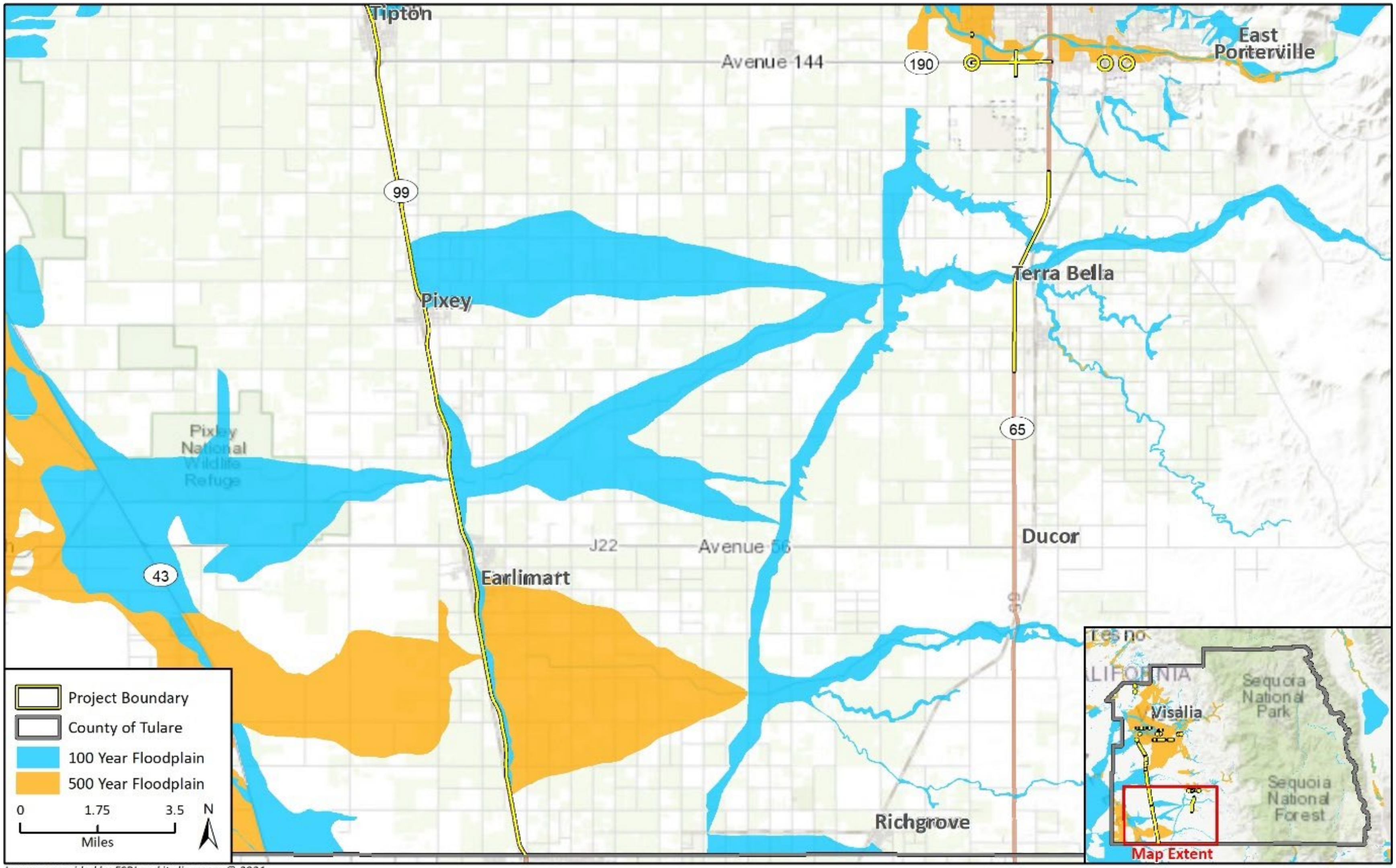
However, all such projects within floodplain or dam inundation areas would be required to adhere to any development restrictions or regulations enforced by the Tulare County Flood Control District, and projects within municipal areas such as the City of Tulare that are outside the floodplain areas would need to comply with hydromodification regulations of the municipal Flood Control or Public Works Department for drainage and stormwater flooding. The implementation of SWPPP plans and BMPs imposed through these or other regulatory plans, as well as the requirements to improve local stormwater flow capacity if needed, would serve to mitigate the risks of flooding to these projects to the greatest extent feasible. Unlike in an urban area, where floodwaters might put pollutants normally safe from rain flows at risk, except in extraordinary circumstances, the amount of pollution being washed off a roadway in a flood would be the same as that washed off in a heavy rain, as most pollutants on roads are contaminants like motor oil, metals from brake pads, trash, and similar debris. It is possible floodwaters would rise high enough to overcome drainage ditches, bioswales and similar pollution-capturing systems alongside roadways and bridges but such situations would distribute relatively few pollutants (those immediately extant on the road stretch being flooded) over a large area and would have a lesser impact than the long-term impacts of constant runoff from the roadways that is already mitigated by runoff control devices.

Although individual projects implementing the proposed 2022 RTP/SCS have the potential to adversely affect water quality at a project-specific level due to floodwater inundation, projects would adhere to existing regulations regarding risks from water quality pollutants and flood surges. The risks from polluted runoff during flood events would be similar to those of rain events on countryside roadways, and while greater in developed areas, would likewise be more regulated and surrounded by infrastructure better able to deal with such flows.

The types of development that would be most likely to result in release of pollutants during inundation include uses such as wastewater treatment plants, chemical manufacturing plants, or hazardous materials landfills. Generally, the proposed 2022 RTP/SCS envisions land development in already urbanized areas where wastewater treatment plants, landfills, and chemical manufacturing plants already exist to serve existing development. Accordingly, the land use projects envisioned in the proposed 2022 RTP/SCS would not substantially increase the risk of release of pollutants into the environment as a result of inundations.

Based on the above analysis, water quality impacts of the proposed 2022 RTP/SCS due to flooding or dam failure would be less than significant.

Figure 4.10-4 Projects With Potential Flood Hazards: South TCAG Region



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Additional data provided by FEMA, 2021.

Figure 4.10-5 Projects With Potential Flood Hazards: Mid TCAG Region

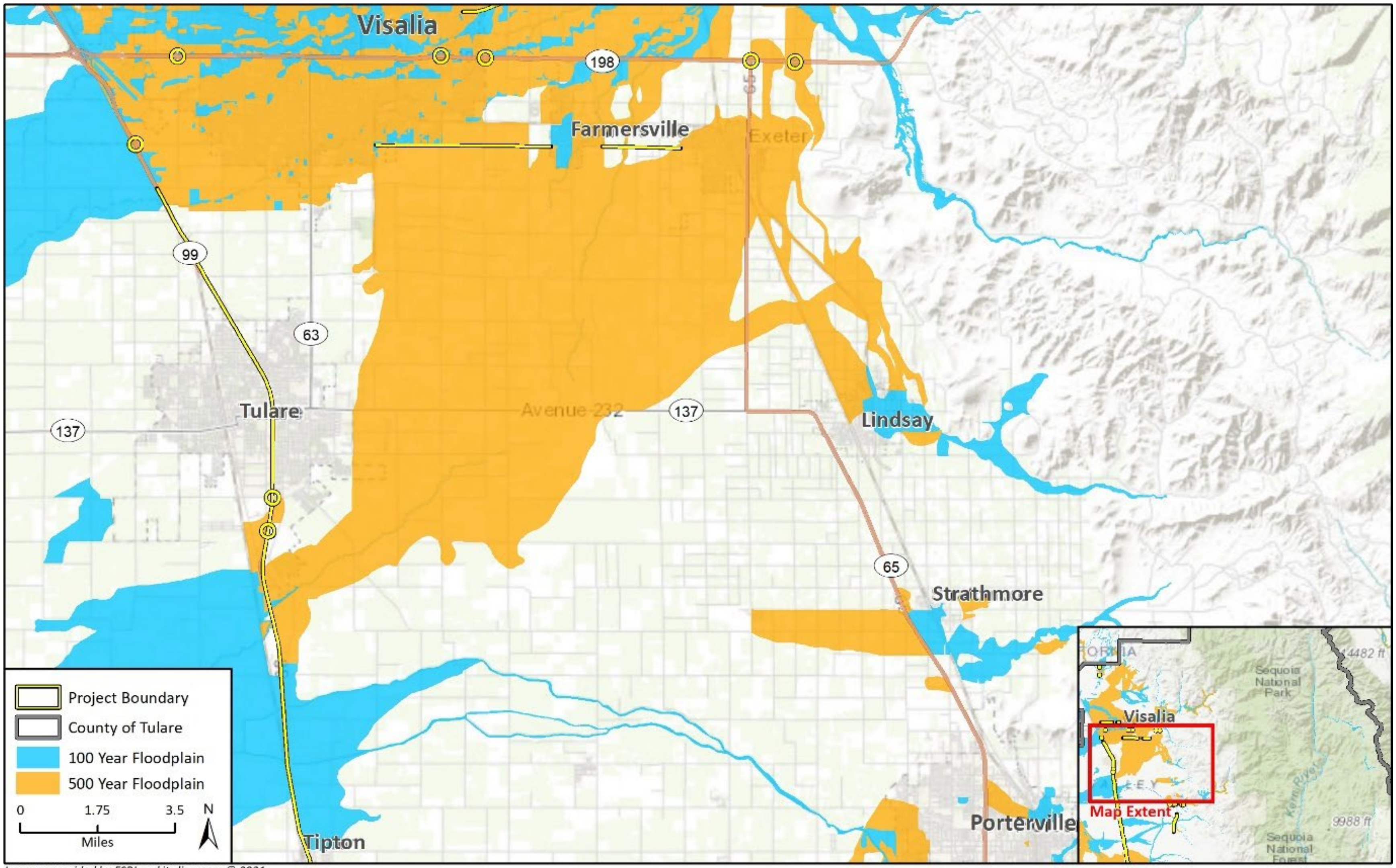

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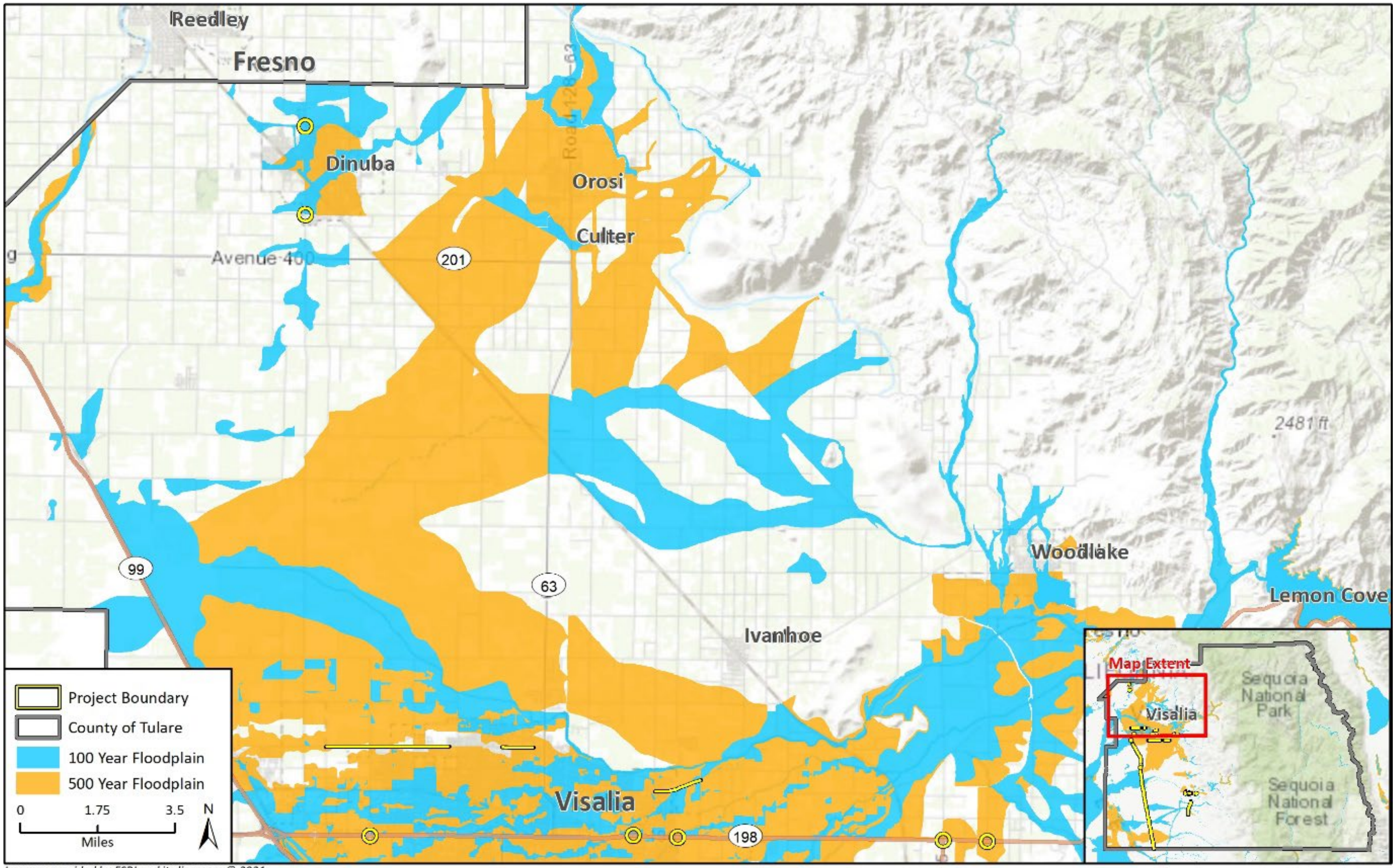
Figure 4.10-6 Projects With Potential Flood Hazards: North TCAG Region



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Additional data provided by FEMA, 2021.

Tsunami and Seiche

The TCAG region is not subject to tsunami hazards due to its distance from the Pacific Ocean. Seiches could be possible in the larger lakes and reservoirs after a major earthquake or similar event that causes large-scale disturbance to the waters. Due to the size of the lakes and reservoirs within the TCAG region, seiche waves topping a dam and flowing downstream from a lake would be expected to be roughly the same size as the flood from dam failure or flooding from heavy rains; the primary difference would be the sudden nature of a seiche which may catch local populations and agencies unawares, as well as the more forceful nature of a sudden burst of water as opposed to a gradual increase in flow from rainfall flooding. The regulations and structures already in place to control development on floodplains and within dam inundation areas which serve to reduce impacts on floodplains would apply equally to reduce seiche impacts within the TCAG region as they would apply in the same locations. Therefore, impacts from tsunami or seiche behavior would be the same as impacts from other types of flooding and would be less than significant.

Mitigation Measures

No mitigation measures are required.

Threshold 5:	Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan

Impact HYD-5 TRANSPORTATION AND LAND USE PROJECTS IMPLEMENTING THE PROPOSED 2022 RTP/SCS COULD CONFLICT WITH OR OBSTRUCT IMPLEMENTATION OF A WATER QUALITY CONTROL PLAN OR SUSTAINABLE GROUNDWATER MANAGEMENT PLANS. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.

Implementation of transportation and land use projects implementing the proposed 2022 RTP/SCS would affect water quality, but there is nothing in the proposed 2022 RTP/SCS which would prevent the CVRWQCB or any applicable local agency from carrying out the regulatory provisions of the Basin Plan. The transportation projects included in the proposed 2022 RTP/SCS would not conflict with the beneficial uses for water identified in the Basin Plan. For example, transportation projects would not interfere with the beneficial use of water for municipal and domestic supplies, agricultural supply, or wildlife habitat supply. Likewise, the land use scenario envisioned in the proposed 2022 RTP/SCS would not obstruct or conflict with beneficial uses of water in the water quality control plan. The land use scenario in the proposed 2022 RTP /SCS focuses on infill development and locating people and employment near transit. The infill characteristics of the land use scenario would generally be consistent with the past use of water in these areas, and supportive of the beneficial uses identified in the water quality control plan, such as municipal and domestic supplies. But this increase in development would result in an increase in demand for groundwater.

The stated primary goals of the Basin Plan include management of the 303(d) listed bodies, maintenance of water throughout the County for designated beneficial uses, and management of salt concentrations within the groundwater subbasins (CVRWQCB 2018). It is unlikely that proposed Project implementation would have any effect on the attainment of these main goals, and new development and improvements facilitated by the project would be required to maintain adherence with changes in the Basin Plan as they are planned in the future. Transportation or land use projects with a potential for affecting 303(d) impaired water bodies would be strictly regulated and are unlikely in general to produce the kinds of pollutants for which the bodies are mostly impaired, which tend to be the result of agricultural and not transportation or urban pollution. Impacts to beneficial uses of 303(d) impaired bodies would be expected to be less than significant in the same vein as impacts to listed pollutant levels. Finally, the salt concentrations in the greater Tulare Lake Basin in general are a result of the imported water supply system. The Basin Plan in general monitors salt concentrations through specific conductivity measurements and sets maximum conductivity levels for the Kings, Kaweah, Tule, and Kern Rivers at various checkpoints. Similarly, to constituents of concern in the 303(d) bodies, various salts and constituents increasing ionic content and specific conductivity in receiving waters are more commonly associated with agriculture than with transportation (in areas that do not regularly freeze and require heavy applications of road salts). Should individual projects be likely to cause potential substantial impacts to the salinity of receiving waters, the CVRWQCB would have authority to mandate limitations or monitoring of discharges for salinity under the SWPPP required by the General Permit (or imposed by CVRWQCB for smaller projects deemed a threat for salinity).

The land use pattern included in the proposed 2022 RTP/SCS would generate new sources of wastewater, which would also be conveyed to wastewater treatment facilities in the region for secondary or tertiary treatment. Discharges of treated wastewater, also called effluent, from the treatment plants are regulated by the CVRWQCB and must meet water quality effluent limitations established in the applicable NPDES/WDR permits for point source discharges, as also discussed under Impact HYD-1, above. Thus, although implementation of the proposed 2022 RTP/SCS would increase the volume of point-source wastewater discharges in the TCAG region, required compliance and monitoring of effluent prior to discharge from treatment facilities would ensure Basin Plan compliance and impacts would be less than significant.

Implementation of the proposed 2022 RTP/SCS would not obstruct or hinder CVRWQCB or municipal agencies from fulfilling their regulatory duties and would be required to comply with all statues, codes, and regulations that applied. Further, the land use projects envisioned in the proposed 2022 RTP/SCS would not conflict with the stated goals of the Basin Plan. Therefore, impacts of the proposed project to implementation of any water quality control plan would be less than significant.

Regarding impacts on sustainable groundwater management plans, as discussed under Impact HYD-2, implementation of the proposed 2022 RTP/SCS would likely have an impact on groundwater levels and supply. As detailed under the *Regulatory Setting*, groundwater management within California in general falls under SGMA, and multiple GSAs and GSPs exist within Tulare County.

As discussed under Section 4.9.2, *Regulatory Setting,* along with information-gathering, setting of fees, and determining sustainable yields, the primary regulatory tool provided to GSAs under SGMA is the ability to set and enforce area-specific mandatory groundwater pumping limitations through regular updates to GSPs for medium- and high-priority groundwater basins. DWR-approved GSPs are required to provide mechanisms that allow the sustainable use of groundwater, with growth projections considered, and the first set of adopted and DWR-approved GSPs are focused on measuring extractions to obtain the necessary data to determine sustainable yields, although some GSAs within the TCAG region (such as the Greater Kaweah GSA [Greater Kaweah GSA 2022]), have begun exploring public input on the idea of pumping caps, and many have begun imposing fees for their information gathering plans.

As DWR-approved GSPs determine sustainable yields through their current cycles and begin to incorporate pumping limitations or other groundwater sustainability policies based on their determined sustainable yields, projects being implemented under the proposed 2022 RTP/SCS would be required to conform with any new applicable regulations supporting groundwater use and sustainable groundwater management. However, water use facilitated by the proposed 2022 RTP/SCS could obstruct any current GSP in the TCAG region, as an increase in water demand could result from projects implementing the proposed 2022 RTP/SCS land use scenario (refer to Impact HYD-2). Although those projects would be subject to monitoring requirements as set forth in the applicable GSPs, including the addition of new monitoring devices as needed on existing or new wells utilized by any projects, overdraft of groundwater could still occur in conflict with adopted GSPs. Therefore, this impact would be significant and unavoidable.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement Mitigation Measures HYD-2(a) and HYD-2(b) above where applicable for projects implementing the proposed 2022 RTP/SCS with the potential to impact conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plans. Cities in the TCAG region and the County can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site specific conditions.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. These mitigation measures shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

Significance After Mitigation

Implementation of the above measures would reduce proposed Project impacts on water supply and groundwater overdraft in the TCAG region as it relates to conflicts with or obstructs implementation of a water quality control plan or sustainable groundwater management plans. However, due to the programmatic nature of this proposed 2022 RTP/SCS EIR, a precise, project-level analysis of specific water demand and supply impacts associated with individual transportation and land use projects is not possible. The land use scenario envisioned by the proposed 2022 RTP/SCS along with transportation projects would result in the need for additional water supply, even with the implementation of mitigation measures listed above. Given the severe overdraft conditions of area groundwater basins, impacts would remain significant and unavoidable. No additional feasible mitigation measures to reduce this impact to a less than significant levels is available.

c. Specific MTP/SCS Projects that May Result in Impacts

All proposed 2022 RTP/SCS transportation projects that require new construction or landscaping would result in at least some of the impacts discussed in impacts HYD-1 through HYD-5; and therefore, are not specifically identified as having individual potential impacts. The proposed 2022 RTP/SCS projects are listed in Appendix B. Additional specific analysis would be required as individual projects are implemented to determine the project specific magnitude of impact.

4.10.4 Cumulative Impacts

The cumulative impact analysis area for hydrology and water quality encompasses the watersheds and groundwater basins affected by the transportation projects and land use pattern envisioned in the proposed 2022 RTP/SCS, including creeks and drainages, floodplains, and aquifers. Therefore, the cumulative impact assessment area consists of the TCAG region and the adjoining counties, which encompasses the applicable watersheds and basins. Although there is some surface water connectivity between the TCAG region and Inyo County through Sierra Nevada watersheds, neither area is hydrologically connected.

Cumulative development would increase erosion and sedimentation resulting from grading and construction, as well as changes in drainage patterns which could degrade surface and ground water quality. In addition, new development would increase the generation of urban pollutants that may adversely affect water quality in the long term. As with the proposed 2022 RTP/SCS, individual construction projects within the cumulative impact area would be required to comply with applicable water quality regulations. Compliance with these existing requirements would reduce project level impacts throughout the cumulative impact area; as such, cumulative impacts related to water quality would be less than significant, and the proposed 2022 RTP/SCS contribution to this impact would not be cumulatively considerable.

Development within the cumulative impact area would increase impervious surfaces and reduce groundwater infiltration. However, counties and cities in the cumulative impact area have regulatory requirements for stormwater management, effectively requiring minimization of stormwater runoff. Because the volume of runoff would be reduced by these regulations, as well as State and federal regulations, precipitation would be retained on individual project sites and infiltrated or treated and discharged to swales, creeks, or other drainages. The proposed 2022 RTP/SCS contribution to cumulative groundwater recharge impacts would not be cumulatively considerable. Development within the cumulative impact area would substantially decrease groundwater supplies by increasing the amount of overdraft throughout critically over-drafted basins, impeding sustainable groundwater management. Therefore, cumulative impacts related to groundwater supply would be significant and the proposed 2022 RTP/SCS contribution to this impact would be cumulatively considerable pre -mitigation. Mitigation measures HYD-2(a) and HYD-2(b) would reduce this impact, but it would remain cumulatively considerable after mitigation.

Development within the cumulative impact area could result in incremental modifications over time that can have cumulative adverse effects on drainage in the cumulative impact area by impeding and displacing flood flows, contributing incrementally to surface drainage runoff or degrading water quality, and the capacity of a drainage way to carry flood flows and/or the overall quality of the water may be cumulatively affected. New development envisioned under the proposed 2022 RTP/SCS and associated impervious cover could also be potentially significant on a cumulative basis if it would contribute to a significant increase in the overall net impervious surface throughout the region which leads to changes in regional drainage patterns. As discussed in Impact HYD-3, projects implementing the proposed 2022 RTP/SCS would be required to maintain pre-project hydrology and projects that would disturb more than one acre would be subject to requirements that prevent increase in runoff flows. These drainage requirements would minimize the contribution of the proposed 2022 RTP/SCS to cumulative drainage impacts, and the contribution of the proposed 2022 RTP/SCS to these impacts would not be cumulatively considerable.

Development within the cumulative impact area may occur within floodplains and floodways, and may include development of projects such as industrial parks, wastewater treatment plants, hazardous materials storage, or other infrastructure which may pose a release of pollutants as a result of inundation. Implementing agencies would conduct or require project-specific hydrology studies for projects proposed to be constructed within floodplains to demonstrate compliance with Executive Order 11988 (for federally funded projects), the NFIP, the National Flood Insurance Act, and the Cobey-Alquist Floodplain Management Act, as well as any further FEMA or State requirements that are adopted at the local level. These studies would identify project design features that reduce impacts on either floodplains or flood flows that would be required through the permitting process, as well as requiring measures to reduce the risk of pollutant release from inundation. Therefore, the cumulative effects of risk of polluted runoff from flood inundation is less than significant. The land use development envisioned in the proposed 2022 RTP/SCS would not substantially increase the risk of release of pollutants into the environment as a result of inundations, as it would have to comply with the local, state, and federal requirements described above and there are no projects proposed which pose a release of pollutants as a result of inundation. Therefore, the contribution of the proposed 2022 RTP/SCS to these impacts would not be cumulatively considerable.

All of the cumulative impact area lies within the CVRWQCB and falls under the Basin Plan. All development within the Basin Plan area must comply with the goals, beneficial uses, and 303(d) limitations outlined in the Plan, as well as falling under the authority of any Orders issued by CVRWQCB. Therefore, the cumulative impact to obstruction of the Basin Plan is less than significant, and the proposed 2022 RTP/SCS's contribution to this impact would not be cumulatively considerable. There are dozens of individual GSAs within the cumulative impact area. Each development within the cumulative area would only fall under management actions required by the GSA's GSP approved within its individual area. Although each GSP is local, some of the groundwater basins within the cumulative impact area are hydrologically connected. Each individual basin has multiple GSPs covering different portions of the basin which could create significant cumulative impacts among adopted GSPs, specifically through groundwater overdraft as identified in HYD-2. Although projects implementing the 2022 RTP/SCS would only conflict with those GSPs in their basin, this cumulative impact would be significant across the entire basin. Cumulative impacts related to conflicts with GSPs would be significant and the proposed 2022 RTP/SCS contribution to this impact would be cumulatively considerable pre -mitigation. Mitigation measures HYD-2(a) and HYD-2(b) would reduce this impact, but it would remain cumulatively considerable after mitigation.

4.11 Land Use and Planning

This section evaluates impacts of the proposed 2022 RTP/SCS associated with physically dividing an established community and causing a significant environmental impact due to a conflict with a land use plan, policy, or regulation.

4.11.1 Setting

a. Land Use Patterns

The TCAG region encompasses the entirety of Tulare County, including eight incorporated cities, 13 unincorporated communities, and the Tule River Indian Reservation (Figure 4.11-1). The City of Visalia is the most urbanized area in the County followed by Tulare and Porterville. Other cities within the County are generally smaller. Agriculture is the driving force of the economy. In 2020, the population of Tulare County was approximately 473,117. Visalia, Tulare, and Porterville comprised more than half of the population with other Tulare County residents living in the smaller incorporated cities and unincorporated communities and lands. Throughout the County, outside of the larger cities, agricultural uses are the most prominent land use on the valley floor. Geographically, the region is characterized by agricultural soils, foothills, and mountainous regions.

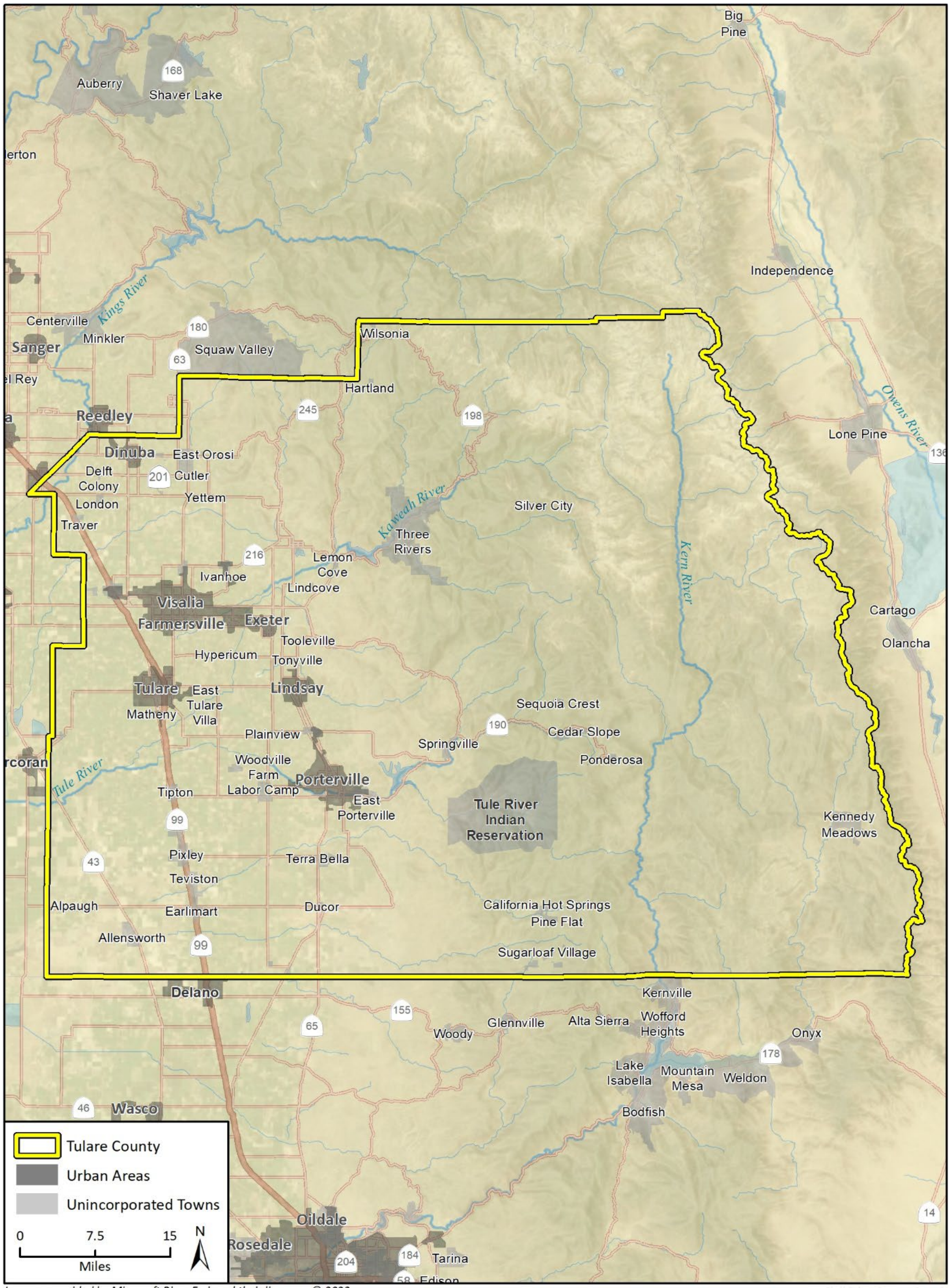
Tulare County is home to eight incorporated cities (Dinuba, Farmersville, Porterville, Visalia, Exeter, Lindsay, Tulare, and Woodlake). As required by law, each city and the County has a general plan containing at minimum seven statutorily required elements, among them a land use element and housing element that designate appropriate land uses throughout the jurisdiction, accommodate each jurisdiction's share of the regional housing needs, and define specific goals, policies, and objectives that the local jurisdiction has determined to be important.

A city or county may also provide for land use planning by developing community or specific plans for smaller, more specific areas within its jurisdiction. These more localized plans provide for focused guidance for developing a specific area, with development standards tailored to the area, as well as systematic implementation of the general plan. There are a total of fourteen individual community plans within Tulare County. These areas include Alpaugh, Earlimart, East Orosi, Goshen, Ivanhoe, Lemon Cove, London, Pixley, Plainview, the Poplar Cotton Center, Ducor, Richgrove, Springville, Strathmore, Sultana, Terra Bella, Three Rivers, Tipton, Traver, and Woodville. Tulare County is divided into five individual Supervisorial Districts, each responsible for the communities within that specific district.

4.11.2 Regulatory Setting

Numerous federal, State, and local laws, regulations, policies, programs, plans, codes, and ordinances regulate land use in the TCAG region. Local land use issues are regulated by the general plans, specific plans, and zoning ordinances adopted by the County and the various incorporated cities within the County. The County itself is landlocked, surrounded by Fresno County to the north, Kern County to the south, Kings County to the west, and Inyo County to the east. Thus, it is not within the immediate proximity of any local, state, or national coastal zones.

Figure 4.11-1 TCAG Planning Area



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Additional data provided by U.S. Census Bureau, 2020; Tulare Co Resource Management Agency, 2020.

Federal Laws, Regulations, and Policies

Code of Federal Regulations Title 25

Federally recognized Native American tribes are legally considered independent units of government and granted domestic tribal sovereignty. "Tribal sovereignty" refers to tribes' right to govern themselves, define their own membership, manage tribal property, and regulate tribal business and domestic relations; it further recognizes the existence of a government-to-government relationship between such tribes and the federal government. In general, State and local governments do not have "civil regulatory" jurisdiction (i.e., land use) on Indian Land, which is land held in trust or restricted status for a tribe. In the TCAG region, the Tule River Indian Tribe is federally recognized.

State Laws, Regulations, and Policies

Sustainable Communities Strategy and Climate Protection Act (SB 375)

SB 375 is a California law passed in 2008 that requires each MPO to demonstrate, through the development of a Sustainable Communities Strategy (SCS), how its region will integrate transportation, housing, and land use planning to meet the greenhouse gas (GHG) reduction targets set by the State.

In addition to creating requirements for MPOs, it also creates requirements for CTC and CARB. Some of the requirements include the following:

- CTC must maintain guidelines for the travel demand models that MPOs develop for use in the preparation of their RTPs or MTPs.
- CARB must develop regional GHG emission reduction targets for automobiles and light duty trucks for 2020 and 2035 by September 30, 2010. These targets were approved on September 23, 2010. CARB is tasked to update the regional targets every eight years, with the option of revising them every four years. The latest targets were approved on March 18, 2018 and went into effect October 1, 2018.
- Each MPO must prepare an SCS as part of its RTP or MTP to demonstrate how it will meet the regional GHG targets.
- Each MPO must adopt a public participation plan for development of the SCS that includes informational meetings, workshops, public hearings, consultation, and other outreach efforts.
- If an SCS cannot achieve the regional GHG target, the MPO must prepare an Alternative Planning Strategy (APS) showing how it would achieve the targets with alternative development patterns, infrastructure, or transportation measures and policies.
- Each MPO must prepare and circulate a draft SCS at least 55 days before it adopts a final RTP or MTP.
- After adoption, each MPO must submit its SCS to CARB for review.
- CARB must review each SCS to determine whether, if implemented, it would meet the GHG targets. CARB must complete its review within 60 days.

TCAG's previous RTP/SCS reduced GHG emissions to meet the target set by CARB from 2005 levels by 2020, and an eight percent per capita reduction from 2005 levels by 2021 (TCAG 2021). These targets apply to the entire TCAG region for all on-road light duty trucks and passenger vehicles emissions, and not to individual cities or sub-regions. Therefore, TCAG, through the proposed 2022 RTP/SCS, must continue to reduce these levels to meet the 2035 target. The proposed 2022 RTP/SCS includes the years for which the regional targets are required (base year/2021 and 2035) and the proposed 2022 RTP/SCS also includes the additional scenario year of 2045 to comply with federal law. The proposed 2022 RTP/SCS meets the 2035 and would very likely meet the 2045 GHG targets.

SB 375 specifically states that nothing in the law changes local governments local land use authorities. The proposed 2022 RTP/SCS provides a regional policy foundation that local governments may build upon if they so choose. The proposed 2022 RTP/SCS includes and accommodates the growth projections for the region. SB 375 also requires that forecasted development patterns for the region be consistent with the eight-year regional housing needs as allocated to member jurisdictions through the Regional Housing Needs Allocation (RHNA) process under State housing law.

In addition, this EIR lays the groundwork for the streamlined review of qualifying development projects. Qualifying projects that meet statutory criteria and are consistent with the proposed 2022 RTP/SCS are eligible for streamlined environmental review pursuant to CEQA under SB 375 and other laws; see Section 1.4.1. Office of Planning and Research 2017 General Plan Guidelines.

Office of Planning and Research 2017 General Plan Guidelines

The 2017 General Plan Guidelines (Governor's Office of Planning and Research 2017) is the first comprehensive update to the guidelines since 2003 and addresses numerous new laws, requirements, resources, and research that affect long-range planning in California. The 2017 update includes links to external documents and additional resources. This includes guidance for implementing the following legislation: Environmental Justice (SB 1000), Climate Change (SB 379), Sustainable Communities Strategies (SB 375), Flood Management (SB 5), Vehicle Miles Traveled (SB 743), Island or Fringe Communities (SB 244), Tribal Consultation (AB 52) and Local Hazard Mitigation Plans (AB 2140). Beyond State law requirements, the 2017 General Plan Guidelines also provide direction on topics including healthy communities, equitable and resilient communities, economic development, climate change and renewable energy.

Smart Mobility 2010 Framework

The Smart Mobility Framework, formally known as *Smart Mobility 2010: A Call to Action for the New Decade* (Caltrans 2010), was prepared by Caltrans in partnership with the U.S. EPA, the Governor's Office of Planning and Research, and the California Department of Housing and Community Development to address both long-range challenges and short-term programmatic actions to implement multi-modal and sustainable transportation strategies in California. The Smart Mobility Framework helps guide and assess how well various levels plans, programs, and projects (e.g., RTPs, General Plans, specific development proposals, etc.) meet a definition of "smart mobility". The Smart Mobility Framework is intended to move people and freight while enhancing California's economic, environmental, and human resources by emphasizing:

- Convenient and safe multimodal travel
- Speed suitability
- Accessibility
- Management of the circulation network
- Efficient use of land

Planning and Zoning Law

California Government Code Section 65000, et seq., regulates the substantive and topical requirements of general plans. State law requires each city and county to adopt a general plan "for the physical development of the county or city, and any land outside its boundaries which bears relation to its planning." The California Supreme Court has called the general plan the "constitution for future development." The general plan expresses the community's development goals and embodies public policy relative to the distribution of future land uses, both public and private.

Zoning authority originates from city and county police power and from the Planning and Zoning Law, which sets minimum requirements for local zoning ordinances. Zoning ordinances must be consistent with the general plan and specific plans. The consistency requirement does not apply to charter cities other than Los Angeles unless the charter city adopts a consistency rule.

Senate Bill 743

SB 743 changes the way that public agencies evaluate the transportation impacts of projects under CEQA, recognizing that roadway congestion, while an inconvenience to drivers, is not itself an environmental impact (see Pub. Resource Code, § 21099, subd. (b)(2)). SB 743 provides opportunities to streamline CEQA for qualifying urban infill development near major transit stops in metropolitan regions statewide. A transit-oriented infill project can be exempt from CEQA if consistent with a specific plan for which an EIR was prepared, and consistent with the use, intensity, and policies of an SCS or Alternative Planning Strategy that is certified by the CARB as meeting its greenhouse gas reduction targets. A city or county may designate an "infill opportunity zone" by resolution if it is consistent with the general plan and any applicable specific plan and is a transit priority area within the adopted SCS or Alternative Planning Strategy. This infill opportunity zone is then exempt from level of service standards in the congestion management plan.

State Open Space Standards

State planning law (Government Code Section 65560) provides a structure for the preservation of open space by requiring every city and county in the State to prepare, adopt, and submit to the Secretary of the Resources Agency a "local open-space plan for the comprehensive and long-range preservation and conservation of open-space land within its jurisdiction." The following open space categories are identified for preservation:

- **Open space for public health and safety,** including, but not limited to, areas that require special management or regulation because of hazardous or special conditions;
- **Open space for the preservation of natural resources,** including, but not limited to, natural vegetation, fish and wildlife, and water resources;
- **Open space for resource management and production,** including, but not limited to, agricultural and mineral resources, forests, rangeland, and areas required for the recharge of groundwater basins;
- **Open space for outdoor recreation,** including, but not limited to, parks and recreational facilities, areas that serve as links between major recreation and open space reservations (such as trails, easements, and scenic roadways), and areas of outstanding scenic and cultural value; and
- **Open space for the protection of Native American sites,** including, but not limited to, places, features, and objects of historical, cultural, or sacred significance, such as Native American sanctified cemeteries, places of worship, religious or ceremonial sites, or sacred shrines located

on public property (further defined in PRC Sections 5097.9 and 5097.993). Local Laws, Regulations, and Policies

The following section focuses on the key plans that regulate land use in the TCAG region, which are the county and city general plans. This section outlines the status of those plans.

Local Regulations, Laws, and Policies

The following section focuses on the key plans that regulate land use in the TCAG region, which are the county and city general plans, community plans, and a review of the zoning ordinance. This section outlines the status of those plans.

Tulare County General Plan

The Tulare County General Plan 2030 update is the County's guiding document outlining physical development in the County (County of Tulare 2021). The County General Plan is broken down into the following elements: Land Use and Urban Boundaries, Scenic Landscapes, Circulation, Public Facilities and Services, Safety, Environmental Resource Management, Noise, Area Plans. It also includes a Housing Element, Community Plans, and associated zoning code (Tulare County, 2012). In summary, the General Plan seeks to maintain the agricultural nature of the County, while recognizing that diversification of the economy is necessary to maintain an economically viable County (County of Tulare 2021).

City of Dinuba General Plan

Many of the goals and objectives in the City of Dinuba General Plan were formulated with the goal to preserve and enhance Dinuba's unique character and achieve an optimal balance of residential, commercial, industrial, public, and open space land uses. Land uses in the vicinity of Gateways should be of high-quality design which reflects favorably on the image of the community (City of Dinuba 2021).

City of Exeter General Plan

The City of Exeter General Plan consists of seven elements: land use, circulation, open space, conservation, noise, safety, and housing. Each element typically contains a profile of existing conditions in the community, and then a series of goals, policies, and action plans to achieve the City's objectives during the life of the General Plan. Some of the elements contain maps that designate future land uses and circulation features (City of Exeter 2021).

City of Farmersville General Plan

The City of Farmersville General Plan consists of four elements: land use, circulation, open space, and conservation. Specifically, the land use element of Farmersville's General Plan contains seven sections: existing land use patterns and population trends, population and land use projections, land use designations and population densities, planning issues and land use goals, implementation measures, land use designations, and a land use map (City of Farmersville 2021).

City of Lindsay General Plan

The City of Lindsay General Plan is the City's third version of the General Plan with the stated goal of bringing together the mandatory elements of a General Plan as prescribed by State Law. It retains policies adopted in 1980 that remain valid, consolidating existing policies that have been adopted by reference pertaining to housing, conservation, open space, seismic safety, and noise, as developed by Tulare County (City of Lindsay 2021).

City of Porterville General Plan

Much of the existing land use pattern found in the Planning Area can be traced back to Porterville's evolution as a valley agriculture center. Downtown Porterville has a mixture of retail, public facilities, and older residential neighborhoods. Larger commercial, agriculture, and newer residential neighborhoods are located further out from the city center. Some industrial land is located adjacent to State Route 190 (SR 190) and Union Pacific Railroad. Parks and schools are distributed throughout residential neighborhoods within the city. In addition to balancing the anticipated growth geographically, the General Plan directs residential expansion in the new growth areas into a network of approximately seventeen neighborhoods. Policies in the General Plan strive to promote the integration of new neighborhoods with existing urban development, and to preserve and enhance neighborhood connectivity with a continuous street network (City of Porterville 2021).

City of Tulare General Plan

The purpose of the City of Tulare 2030 General Plan is to adjust the City's current course to accommodate an urbanizing City with an expanding population in what was once a solely rural area. Furthermore, the Plan seeks to create a plan to create a pace of population growth that is both safe and offers a high quality of life for its residents, while taking resource conservation and the financial health of the city into consideration (City of Tulare 2021).

City of Visalia General Plan

Key elements of the City of Visalia General Plan include strengthening of existing activity centers and commercial corridors in the city, as well as expansion of the city's industrial capacity, retail base, and new residential neighborhoods. Specific concepts include establishing new, inclusive neighborhoods, each with an activity node, community facilities, and a range of housing types; expanding industrial lands north of Riggin Avenue and south of the Airport (City of Visalia 2021).

City of Woodlake General Plan

The City of Woodlake's first general plan was prepared in 1978 and established growth lines around the city and delineated policies pertaining to the annexation of lands into the City. The 2008 update revised four elements: land use, circulation, open space, and conservation (City of Woodlake 2021).

4.11.3 Impact Analysis

a. Methodology and Significance Thresholds

Appendix G of the State CEQA Guidelines identifies the following criteria for determining whether a project's impacts would have a significant impact on land use:

1. Physically divide an established community; and/or
2. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation (including, but not limited to, the General Plan or Zoning Ordinance) and result in a physical change to the environment not already addressed in the other resource chapters of this EIR.

The proposed 2022 RTP/SCS was assessed to determine whether the transportation projects and TCAG land use pattern and strategies could conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. This review focused on the process used by TCAG to develop regional growth projections, the transportation network and programs, housing needs estimates, and the SCS land use strategies. This evaluation of land use assumes that construction and development under the proposed 2022 RTP/SCS would adhere to applicable federal, State, and local regulations and would conform to appropriate standards in the industry, as relevant for individual projects. Land use impacts related to implementation of the proposed 2022 RTP/SCS land use development pattern and transportation projects would be inherently operational in nature and the following analysis discusses effects of the proposed Plan following implementation.

Impacts related to conflicts with habitat conservation plans or natural community conservation plans are discussed in Section 4.4, *Biological Resources*. Impacts related to population and housing are discussed in Section 4.13, *Population and Housing.*

b. Project Impacts and Mitigation Measures

The following section discusses potential impacts and mitigation measures that may be associated with transportation improvements and the land use scenario contained within the proposed 2022 RTP/SCS. Section 4.11.3.c summarizes the impacts associated with capital improvement projects in the proposed 2022 RTP/SCS. Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time. In general, however, implementation of proposed transportation improvement projects and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1:	Would the project physically divide an established community?

Impact LU-1 IMPLEMENTATION OF PROPOSED TRANSPORTATION IMPROVEMENTS AND THE LAND USE SCENARIO ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD NOT PHYSICALLY DIVIDE AN ESTABLISHED COMMUNITY. THIS IMPACT WOULD BE LESS THAN SIGNIFICANT.

In general, the proposed 2022 RTP/SCS implements roadway projects and transportation improvements that will decrease traffic congestion, increase mobility, and improve alternative transportation infrastructure. Construction of additions to existing facilities and new facilities routinely involve temporary disruptions within established communities such as lane or road closures along roads and highways and service delays or detours for bus routes and passenger rail. Local jurisdictions routinely require traffic control plans and related measures to ensure that construction activities accommodate vehicular and pedestrian access, such as designating alternate routes or scheduling disruptive activities late at night or on weekends. With these controls, construction activities would not result in the physical division of established communities.

The proposed 2022 RTP/SCS intends to improve the system for all modes of transit so vehicles and non-motorized transit can use the streets simultaneously and safely. As a result, while few roads may be expanded and widened under the proposed 2022 RTP/SCS, these and/or other planned projects would include improvements to bicycle and pedestrian facilities. Because the existing roads subject to expansion or widening are already part of the communities in which they are located, such projects would not have the potential to divide those communities. The projects are intended to achieve the goals of the proposed 2022 RTP/SCS to increase mobility and decrease VMT, therefore the projects should result in bringing communities closer together rather than dividing them. New roadway, roadway rehabilitation projects, bridge repairs, bicycle lanes and ADA accessibility projects included in the proposed 2022 RTP/SCS are long-planned projects that are typically included in local circulation elements. As such, they have been anticipated and accommodated in local land use planning and would be integrated into the community infrastructure. These projects are expected to increase community connectivity and mobility and decrease congestion and GHG emissions.

The existing and new road projects contained in the proposed 2022 RTP/SCS originate from either local circulation plans or state projects supported by cities and counties. The projects have therefore been coordinated with and integrated into local plans that support and connect communities consistent with state planning law.

The land use scenario envisioned by the proposed 2022 RTP/SCS would encourage infill, mixed use, and transit-oriented development within existing urbanized areas along transportation corridors, although development would still occur in more suburban and rural areas. The land use scenario follows adopted city plans, taking into consideration recent updates and buildout scenarios, following existing regulations to promote infill development in existing communities along with planned growth in other areas. In general, this infill type of development would not divide a community; rather it would promote the development of existing vacant or underutilized properties. Other types of development would be consistent with the localized planning as well. This infill development would locate people closer to existing employment, goods, and services within established communities. Buildout of the SCS land use scenario would result in more compact development in those established communities. The existing and new road projects contained in the proposed 2022 RTP/SCS originate from either local circulation plans or state projects supported by individual cities and/or the County. The projects have therefore been coordinated with and integrated into local plans that support and connect communities consistent with state planning law. Therefore, impacts related to dividing an established community would be less than significant.

Mitigation Measures

No mitigation measures are required.

Threshold 2:	Would the project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation (including, but not limited to, the General Plan or Zoning Ordinance) and result in a physical change to the environment not already addressed in the other resource chapters of this EIR?

Impact LU-2 THE PROPOSED 2022 RTP/SCS PROJECT IMPLEMENTATION WOULD NOT CAUSE A SIGNIFICANT ENVIRONMENTAL IMPACT DUE TO A CONFLICT WITH ANY LAND USE PLAN, POLICY, OR REGULATION (INCLUDING, BUT NOT LIMITED TO, THE GENERAL PLAN OR ZONING ORDINANCE) AND RESULT IN A PHYSICAL CHANGE TO THE ENVIRONMENT NOT ALREADY ADDRESSED IN THE OTHER RESOURCE CHAPTERS OF THIS EIR. THIS IMPACT WOULD BE LESS THAN SIGNIFICANT.

In planning for projected growth in the region, the proposed 2022 RTP/SCS represents a voluntary growth strategy that retains local government land use autonomy. Neither SB 375 nor any other law requires local member agency general plans or land use regulation to implement the land use policies in the proposed 2022 RTP/SCS. Thus, implementation is dependent on local government policy decisions and voluntary action. The proposed 2022 RTP/SCS includes a list of planned and programmed projects including local and regional capital improvements that have been anticipated or accounted for in local general plans and specific plans. These plans are summarized above in the Regulatory Setting section.

The land use scenario envisioned in the proposed 2022 RTP/SCS was developed in close coordination with TCAG member agency planning staff and builds on local general plans and general plan updates currently in process or completed. The Cross-Valley Corridor Blueprint Plus Scenario has an objective of the overall density of new development 5% higher than Blueprint, like Blueprint Plus. These densities are applied to a future transit-oriented development pattern anticipating increased importance of the Cross-Valley Corridor (CVC, 75 miles spanning three counties and linking the metro areas of Hanford/Lemoore – Visalia MSA – Porterville) and maximizing transit, bike, and pedestrian links to provide access from all parts of the county to urban centers along the corridor. The scenario incorporates even greater alternative mode investments that benefit the region's disadvantaged communities such as express passenger service/bus rapid transit (BRT) on State Routes 63, 65, and 198, Avenue 280, and other regional routes serving the CVC. The vision for the proposed 2022 RTP/SCS is built on a set of integrated policies, strategies, and investments to maintain and enhance the transportation system to meet the diverse needs of the region through 2050. Proposed 2022 RTP/SCS projects encourage a multi-modal transportation network in high quality transit areas with emphasis on non-motorized transportation and land use patterns to reduce distance between trip destinations. This approach is consistent with the general provisions of the FAST Act, and the Caltrans Smart Mobility 2010 framework. The proposed 2022 RTP/SCS was prepared with the specific intent to comply with the SB 375 goal to reduce GHG emissions.

Central to the Cross-Valley Corridor Blueprint Plus Scenario SCS is a land use plan identifying the general location of uses, residential densities, and building intensities within the region. Starting with land uses allowed by existing, adopted local General Plans, the land use plan envisioned by the proposed 2022 RTP/SCS provides for intensification of residential and commercial land uses in urban areas proximate to existing transit, aligning with existing and future transit priority areas (TPAs). The intent of these changes is ultimately to shorten trip distances and reduce VMT by (1) relieving traffic congestion throughout the TCAG region, and (2) promoting safety and efficiency of trips, both local and inter-city, by funding alternative transportation modes, especially public transit.

In addition, the proposed 2022 RTP/SCS would help the region reach its GHG emission reduction targets established by CARB under AB 32, SB 32, and SB 375, as discussed in Section 4.8, *Greenhouse Gas Emissions/Climate Change*. The proposed 2022 RTP/SCS encourages development in high quality transit areas to reduce automobile traffic and commute lengths and would meet the CARB-established goal of a net zero per capita increase in GHG emissions from passenger vehicles and light trucks in 2035 (see Section 4.8, *Greenhouse Gas Emissions/Climate Change*). At the local level, the proposed 2022 RTP/SCS builds on and incorporates regional and local planning efforts of its member agencies, including local general plans.

Meetings with local agency staff, as discussed above, resulted in consensus among the local agencies on a land use pattern and transportation network for the TCAG region. While this consensus suggests that the proposed 2022 RTP/SCS would not conflict with key policies or regulations adopted to avoid or mitigate environmental impacts, as presented throughout this EIR, the proposed 2022 RTP/SCS would result in significant and unavoidable impacts in several environmental issue areas, including: aesthetics/visual resources, agriculture resources, air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology, noise, population and housing, public services, recreation, transportation, tribal cultural resources, utilities, and wildfire. The proposed 2022 RTP/SCS would result in significant and unavoidable impacts to these environmental issue areas as disclosed in the respective EIR sections. The envisioned land use scenario would not result in additional impacts beyond the findings of significant and unavoidable impacts as already analyzed in respective environmental issue area sections of this EIR.

The proposed 2022 RTP/SCS was assessed to determine whether the SCS land use pattern and strategies could conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. This review focused on the process used by TCAG to develop regional growth projections, the transportation network and programs, housing needs estimates, and the SCS land use strategies. The SCS land use and transportation projects envisioned within the proposed 2022 RTP/SCS would result in conflicts with land use plans, policies, or regulations. However, the proposed 2022 RTP/SCS would not result in a physical change to the environment that has not already been addressed in the other resource chapters of this EIR. The impacts of any such conflicts are described throughout those sections of the EIR.

Mitigation Measures

Mitigation measures are provided for applicable resources throughout their respective environmental issue area sections of the EIR to reduce impacts. No additional mitigation is required for this impact.

c. Specific RTP Projects That May Result in Impacts

All proposed transportation projects listed in Section 2, *Project Description*, would associate with Impacts LU-1 and LU-2.

4.11.4 Cumulative Impacts

Intensified development of cities in the TCAG region could influence land uses in adjoining counties. Accordingly, the cumulative impact analysis area for land use and planning consists of the TCAG region and adjoining counties. Future development in this region that could divide an established community or conflict with any major land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect is considered in the analysis. This cumulative extent is used to evaluate potential impact from the combined growth in this region.

The TCAG region is adjacent to four counties: Fresno, Kings, Kern, and Inyo. The land between each of these counties and the TCAG region is largely undeveloped agricultural land or open space; however, the City of Reedley in Fresno County is in close proximity to the City of Dinuba in Tulare County. The existing land use scenarios in the TCAG region would continue to develop and could result in expansion of urban areas into undeveloped land, as discussed in Section 4.2, *Agriculture and Forestry Resources*. However, because few developed communities or urban growth areas are at or near the four county boundaries adjacent to the TCAG region, and because development within nearby communities (e.g., Reedley) would be concentrated within already developed areas, cumulative impacts would be less than significant. Implementation of the proposed 2022 RTP/SCS would concentrate development in infill areas and as such, would not result in the division of established communities. Therefore, cumulative impacts related to physically dividing an established community would be less than significant. The contribution of the proposed 2022 RTP/SCS to this impact would not be cumulatively considerable.

Each of four adjacent counties has adopted general plans that direct new growth to existing developed areas, strongly support agricultural land preservation, and are part of other regional RTP/SCSs. These general plans include goals, policies and programs adopted for the purpose of avoiding or mitigating environmental effects. Development under the existing plans would, therefore, be required to comply with all existing goals, policies, and programs within existing plans. Cumulative impacts would be less than significant.

The implementation of the proposed 2022 RTP/SCS would result in significant and unavoidable impacts in several environmental issue areas including: aesthetics/visual resources, agriculture resources, air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology, noise, population and housing, public services, recreation, transportation, tribal cultural resources, utilities, and wildfire. The transportation projects and envisioned land use scenario would not result in additional impacts beyond the findings of significant and unavoidable impacts already analyzed in respective environmental issue area sections within this EIR and would not result in a physical change to the environment that has not already been addressed in this EIR. Implementation of mitigation as listed throughout resource chapters of this EIR would reduce impacts of the proposed 2022 RTP/SCS. Implementation of the proposed 2022 RTP/SCS would not result in a cumulatively considerable contribution to a significant cumulative impact.

4.12 Noise

This section evaluates potential noise and vibration impacts from development facilitated by the proposed 2022 RTP/SCS.

4.12.1 Setting

a. Overview of Noise and Vibration

The following discussion describes the characteristics of noise and vibration. These characteristics are used to assess potential impacts at sensitive land uses. Noise- and vibration-sensitive land uses include locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, senior facilities, schools, hospitals, guest lodging, libraries and some passive recreation areas are examples of typical noise- and vibration-sensitive land uses.

Noise

Sound is a vibratory disturbance created by a moving or vibrating source, which is capable of being detected by the hearing organs. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment (California Department of Transportation [Caltrans] 2013a).

Noise levels are commonly measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels so that they are consistent with the human hearing response, which is most sensitive to frequencies around 4,000 Hertz and less sensitive to frequencies around and below 100 Hertz (Kinsler, et. al. 1999). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used to measure earthquake magnitudes. A doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dBA; reducing the energy in half would result in a 3 dBA decrease (Crocker 2007).

Human perception of noise has no simple correlation with sound energy: the perception of sound is not linear in terms of dBA or in terms of sound energy. Two sources do not “sound twice as loud” as one source. It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA, increase or decrease (i.e., twice the sound energy); that a change of 5 dBA is readily perceptible (8 times the sound energy); and that an increase (or decrease) of 10 dBA sounds twice (half) as loud ([10.5x the sound energy] Crocker 2007).

Sound changes in both level and frequency spectrum as it travels from the source to the receiver. The most obvious change is the decrease in level as the distance from the source increases. The manner in which noise reduces with distance depends on factors such as the type of sources (e.g., point or line, the path the sound will travel, site conditions, and obstructions). Noise levels from a point source typically attenuate, or drop off, at a rate of 6 dBA per doubling of distance (e.g., construction, industrial machinery, ventilation units). Noise from a line source (e.g., roadway, pipeline, railroad) typically attenuates at about 3 dBA per doubling of distance (Caltrans 2013a). The propagation of noise is also affected by the intervening ground, known as ground absorption. A hard site, such as a parking lot or smooth body of water, receives no additional ground attenuation and the changes in noise levels with distance (drop-off rate) result from simply the geometric spreading of the source. An additional ground attenuation value of 1.5 dBA per doubling of distance applies to a soft site (e.g., soft dirt, grass, or scattered bushes and trees) (Caltrans 2013a). Noise levels may also be reduced by intervening structures; the amount of attenuation provided by this "shielding" depends on the size of the object and the frequencies of the noise levels. Natural terrain features such as hills and dense woods, and man-made features such as buildings and walls, can significantly alter noise levels. Generally, any large structure blocking the line of sight will provide at least a 5-dBA reduction in source noise levels at the receiver (Federal Highway Administration [FHWA] 2011). Structures can substantially reduce exposure to noise as well. The FHWA's guidelines indicate that modern building construction generally provides an exterior-to-interior noise level reduction of 20 to 35 dBA with closed windows.

The impact of noise is not a function of loudness alone. The time of day when noise occurs and the duration of the noise are also important factors of project noise impact. Most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors have been developed. One of the most frequently used noise metrics is the equivalent noise level (L_{eq}); it considers both duration and sound power level. L_{eq} is defined as the single steady A-weighted level equivalent to the same amount of energy as that contained in the actual fluctuating levels over time. Typically, L_{eq} is summed over a one-hour period. Lmax is the highest root mean square (RMS) sound pressure level within the sampling period, and Lmin is the lowest RMS sound pressure level within the measuring period (Crocker 2007).

Noise that occurs at night tends to be more disturbing than that occurring during the day. Community noise is usually measured using Day-Night Average Level (L_{dn}), which is the 24-hour average noise level with a +10 dBA penalty for noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours; it is also measured using Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a +5 dBA penalty for noise occurring from 7:00 p.m. to 10:00 p.m. and a +10 dBA penalty for noise occurring from 10:00 p.m. to 7:00 a.m. (Caltrans 2013a). Noise levels described by L_{dn} and CNEL usually differ by about 1 dBA. The relationship between the peak-hour L_{eq} value and the L_{dn}/CNEL depends on the distribution of traffic during the day, evening, and night. Quiet suburban areas typically have CNEL noise levels in the range of 40 to 50 dBA, while areas near arterial streets are in the 50 to 60-plus CNEL range. Normal conversational levels are in the 60 to 65-dBA L_{eq} range; ambient noise levels greater than 65 dBA L_{eq} can interrupt conversations (Federal Transit Administration [FTA] 2018).

Vibration

Groundborne vibration of concern in environmental analysis consists of the oscillatory waves that move from a source through the ground to adjacent structures. The number of cycles per second of oscillation makes up the vibration frequency, described in terms of Hz. The frequency of a vibrating object describes how rapidly it oscillates. The normal frequency range of most groundborne vibration that can be felt by the human body starts from a low frequency of less than 1 Hz and goes to a high of about 200 Hz (Crocker 2007).

While people have varying sensitivities to vibrations at different frequencies, in general they are most sensitive to low frequency vibration. Vibration in buildings, such as from nearby construction activities, may cause windows, items on shelves, and pictures on walls to rattle. Vibration of building components can also take the form of an audible low frequency rumbling noise, referred to as groundborne noise. Groundborne noise is usually only a problem when the originating vibration spectrum is dominated by frequencies in the upper end of the range (60 to 200 Hz), or when foundations or utilities, such as sewer and water pipes, physically connect the structure and the vibration source (FTA 2018). Although groundborne vibration is sometimes noticeable in outdoor environments, it is almost never annoying to people who are outdoors. The primary concern from vibration is that it can be intrusive and annoying to building occupants and vibration-sensitive land uses.

Vibration energy spreads out as it travels through the ground, causing the vibration level to diminish with distance away from the source. High-frequency vibrations diminish much more rapidly than low frequencies, so low frequencies tend to dominate the spectrum at large distances from the source. Discontinuities in the soil strata can also cause diffractions or channeling effects that affect the propagation of vibration over long distances (Caltrans 2013b). When a building is impacted by vibration, a ground-to-foundation coupling loss will usually reduce the overall vibration level. However, under rare circumstances, the ground-to-foundation coupling may actually amplify the vibration level due to structural resonances of the floors and walls.

Vibration amplitudes are usually expressed in peak particle velocity (PPV) or RMS vibration velocity. The PPV and RMS velocity are normally described in inches per second. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is often used in monitoring of blasting vibration because it is related to the stresses that are experienced by buildings (Caltrans 2013b).

b. Noise and Vibration Sources

The principal noise generators in the TCAG region are associated with transportation (i.e., major roads, airports, and rail lines). Local collector streets are not typically significant noise sources as traffic volume and speeds are generally much lower than for freeways and arterial roadways.

Similar to the environmental setting for noise, the vibration environment is typically dominated by traffic from nearby roadways and activity on construction sites. Heavy trucks typically operate on major streets and can generate groundborne vibration that varies depending on vehicle type, weight, and pavement conditions. Nonetheless, vibration due to roadway traffic is typically not perceptible. The major noise and vibration sources in the region are described below.

Motor Vehicle Traffic

Motor vehicles, including cars/light trucks, buses, and various types of trucks, are the most substantial source of noise in most of the TCAG region. This can be attributed to the extensive network of major, primary, and secondary arterials located throughout the region, as well as the large number of vehicle trips that occur each day.

The primary roadway corridor noise source in the TCAG region is State Route (SR) 99 due to the high traffic volumes and the high traffic speed of the roadway. In 2020, daily traffic on SR 99 averaged approximately 1,500,000 vehicles per day through the TCAG region, ranging from a low of 44,000 vehicles near SR 190 East to a high of 73,000 vehicles at SR 198 (Caltrans 2022). As a result, noise levels along the entire SR 99 corridor in the region exceed 65 dBA CNEL. The noise level above 65 dBA CNEL would be approximately 600 feet from SR 99 through the region (Tulare County 2010).

Traffic on other major transportation corridors in the TCAG region, such as SR 43, 63, 65, 137, 190, 201, 216, and 245, also generates noise in excess of 65 dBA CNEL within certain distances from the centerline of the freeway/roadway. Traffic on several roads in the region, including Avenue 280, Riggin Avenue, Nebraska Avenue, Kamm Avenue, Westwood Street, Newcomb Street, and Piano Street, also generates noise in excess of normally acceptable standards for noise-sensitive uses.

Aircraft Operation

Both the Mefford Field and Visalia Municipal airports have commercial and general aviation activities. Because of the level of activity at these airports, noise generated at these airports is audible in the surrounding communities. Therefore, land uses in the surrounding areas have been planned to ensure that noise levels remain at acceptable levels for the various uses.

The Potterville, Woodlake, and Sequoia Field Ynez airports are general aviation airports, with little commercial traffic and no jet operations. While these general aviation airports do not generate as much noise as Mefford Field or Visalia, flight operations have also had impacts on the nearby residential areas because of their location.

The Eckert Field and Thunderhawk Field airports are privately owned and managed facilities. General aviation aircraft operations occur during daytime hours. The 60 dB CNEL contour for annual average operations at most regional airports is located relatively close to the runway due to relatively low numbers of operations and an aircraft fleet consisting primarily of smaller propeller aircraft. However, it should be noted that maximum noise levels from individual operations by high performance single and twin-engine aircraft, aerial application aircraft, fire suppression aircraft and some corporate jets may be expected to result in significant short term noise impacts for persons located near the approach, departure or local training patterns of an airport (County of Tulare 2010).

In addition to airplanes, helicopter flights occur throughout the TCAG region. These flights typically follow major and primary arterials with the exception of police patrol activities. Other flight-related activities include tourist sightseeing, Tulare County Sheriff's Department for search and rescue operations, Southern California Edison for power infrastructure work, and helicopter emergency medical services. Kaweah Delta in Tulare is verified as a Level III Trauma Center and provides helicopter emergency medical services. Helicopters traveling to Kaweah Delta come from Fresno to Bakersfield. Although single-event noise exposure resulting from helicopter operations may be considered a nuisance, the relatively low frequency and short duration of these operations do not significantly affect average daily noise levels anywhere in the region.

Railroad Operations

Train operations on the Union Pacific Railroad, Burlington Northern-Santa Fe Railroad, and San Joaquin Valley Railroad generate noise within proximity to the railroad lines. The Union Pacific Railroad right-of-way traverses the TCAG region adjacent to SR 99. The Burlington Northern-Santa Fe Railroad travels in the southwest corner of the region. The San Joaquin Valley Railroad travels between Fresno and Bakersfield, California.

Railroad operations generate high, relatively brief, intermittent noise events. These noise events are an environmental concern for sensitive uses located along rail lines and near sidings and switching yards. According to the FTA Transit Noise and Vibration Impact Assessment guidance document (2018), vehicle propulsion rail units generate the following noises: (1) whine from electric control systems and traction motors that propel rapid transit cars, (2) diesel-engine exhaust noise from locomotives, (3) air-turbulence noise generated by cooling fans and (4) gear noise. Additional noise of motion is generated by the interaction of wheels/tires with their running surfaces. The interaction of steel wheels and rails generates three types of noise: (1) rolling noise due to continuous rolling contact, (2) impact noise when a wheel encounters a discontinuity in the running surface, such as a rail joint, turnout or crossover and (3) squeal generated by friction on tight curves.

When comparing electric- and diesel-powered trains, speed dependence is strong for electric-powered transit trains because wheel/rail noise dominates, and noise from this source increases strongly with increasing speed. On the other hand, speed dependence is less for diesel-powered commuter rail trains, particularly at low speeds where the locomotive exhaust noise dominates. As speed increases, wheel-rail noise becomes the dominant noise source and diesel- and electric-powered trains will generate similar noise levels. For transit vehicles in motion, close-by sound levels also depend upon other parameters, such as vehicle acceleration and vehicle length, plus the type/condition of the running surfaces. For very high-speed rail vehicles, air turbulence can also be a significant source of noise. In addition, the guideway structure can also radiate noise as it vibrates in response to the dynamic loading of the moving vehicle.

Rail operations generate varying noise levels depending on the type of rail activity. Heavier commuter or freight trains, which are diesel-powered, generate more noise than electrically-powered light-rail vehicles. According to the FTA, six commuter trains traveling at 50 miles per hour with a horn blowing generate a noise level of 81 dBA L_{eq} at 50 feet. This same activity without a horn generates a noise level of 68 dBA L_{eq} at 50 feet. In comparison, 12 light rail transit trains traveling 40 miles per hour generate a noise level of 65 dBA L_{eq} at 50 feet. These same light rail transit trains generate a noise level of 57 dBA L_{eq} at 20 miles per hour at 50 feet (FTA 2018).

Noise-sensitive land uses within approximately 800 feet of the tracks could be exposed to noise levels above 65 dBA (Tulare County 2012). In the northern part of the TCAG region, much of the rail corridor is located in open areas. In the southern part of the region, train tracks are generally located closer to residences.

Industrial and Manufacturing

Noise from industrial complexes and manufacturing plants are characterized as stationary or point sources even though they may include mobile sources like heavy equipment. Local governments typically regulate noise from industrial, manufacturing and construction equipment and activities through enforcement of noise ordinance standards, implementation of general plan policies and imposition of conditions of approval for building or grading permits.

In general, in the TCAG region and throughout California, industrial complexes and manufacturing plants are located away from sensitive land uses and, as such, noise generated from these sources has less of an effect on surrounding properties.

Construction Noise and Vibration

Noise and vibration from construction sites are characterized as stationary or point sources even though heavy construction equipment is often mobile. Construction activities typically generate high, intermittent noise and vibration on and adjacent to construction sites and related noise and vibration impacts are short-term, occurring primarily on weekdays and during daylight hours. The dominant source of noise from most construction equipment is their diesel engine. During pile driving or pavement breaking events, impact noise is the dominant source and equipment produces the highest vibration levels. Construction equipment operates in two modes, stationary and mobile. Stationary equipment operates in one location for one or more days at a time and can generate a constant noise level (e.g., pumps, generators, and air compressors) or variable noise levels (e.g., pile drivers and pavement breakers). Mobile equipment moves around the construction site (e.g., dozers, tractors). Noise levels vary depending on the power cycle being used. Mobile equipment such as trucks, move to and from the site using adjacent streets/roads.

4.12.2 Regulatory Setting

a. Federal Laws, Regulations, and Policies

Relevant federal regulations include those established by the FHWA, FTA, Federal Aviation Administration (FAA), and Department of Housing and Urban Development (HUD).

Federal Highway Administration

Title 23, Part 772 of the Code of Federal Regulations - Traffic Noise

Traffic noise impacts, as defined in 23 CFR § 772.5, occur when the predicted noise level in the design year approach or exceed the noise abatement criteria (NAC) specified in 23 CFR § 772, or a predicted noise level substantially exceeds the existing noise level (a “substantial” noise increase). A “substantial increase” is defined as an increase of 12 dB L_{eq} during the peak hour of traffic. For sensitive uses, such as residences, schools, churches, parks, and playgrounds, the NAC for interior and exterior spaces is 57 dB L_{eq} and 66 dB L_{eq}, respectively, during the peak hour of traffic noise. Table 4.12-1 summarizes NAC corresponding to various land use activity categories. Activity categories and related traffic noise impacts are determined based on the actual land use in a given area.

Title 40, Part 205, Subpart B of the Code of Federal Regulations – Medium and Heavy Trucks

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 CFR Part 205, Subpart B. The federal truck pass by noise standard is 80 dB at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers. The FHWA regulations for noise abatement apply to federal or federally funded projects involving the construction of a new highway or significant modification of an existing freeway when the project would result in a substantial noise increase or when the predicted noise levels approach or exceed the NAC.

Table 4.12-1 Noise Abatement Criteria (NAC)

Activity Category	Hourly L_{eq}	Hourly L10[1]	Analysis Location	Description of Activity Category
A	57	60	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67	70	Exterior	Residential
C	67	70	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings

Activity Category	Hourly L_{eq}	Hourly L10[1]	Analysis Location	Description of Activity Category
D	52	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E	72	75	Exterior	Hotels, motels, offices, restaurants/bars and other developed lands, properties or activities not included in A-D or F
F	---	---	---	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical) and warehousing
G	---	---	---	Undeveloped lands that are not permitted

[1] L10 is the level of noise exceeded for 10% of the time.
Source: FHWA 2018

Title 23, Part 772 of the Code of Federal Regulations – Federal and Federal-Aid Highway Projects

Title 23 of the Code of Federal Regulations (23 CFR § 772) provides procedures for preparing operational and construction noise studies and evaluating noise abatement for federal and federal-aid highway projects. Under 23 CFR § 772.5, projects are categorized as Type I, II, or III projects.

FHWA defines a Type I project as a proposed federal or federal-aid highway project for the construction of a highway on a new location or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment, or increases the number of through-traffic lanes. A Type II project is a noise barrier retrofit project that involves no changes to highway capacity or alignment.

Type I projects include those that create a completely new noise source, increase the volume or speed of traffic, or move the traffic closer to a receiver. Type I projects include the addition of an interchange, ramp, auxiliary lane, or truck-climbing lane to an existing highway, or the widening an existing ramp by a full lane width for its entire length. Projects unrelated to increased noise levels, such as striping, lighting, signing, and landscaping projects, are not considered Type I projects.

Under 23 CFR § 772.11, noise abatement must be considered for Type I projects if the project is predicted to result in a traffic noise impact. In such cases, 23 CFR § 772 requires that the project sponsor "consider" noise abatement before adoption of the environmental document. This process involves identification of noise abatement measures that are reasonable, feasible and likely to be incorporated into the project as well as noise impacts for which no apparent solution is available.

Type III projects are Federal or Federal-aid highway projects that do not meet the classification of a Type I or Type II project. Noise analysis is not required for Type III projects. Projects unrelated to increased noise levels, such as striping, lighting, signing, and landscaping projects, are considered Type III projects.

Federal Aviation Administration

Title 14, Part 36 of the Code of Federal Regulations - Aircraft Noise

Aircraft operated in the U.S. are subject to federal requirements regarding noise emissions levels. These requirements are set forth in Title 14 CFR, Part 36. Part 36 establishes maximum acceptable noise levels for specific aircraft types, taking into account the model year, aircraft weight and number of engines.

Federal Transit Administration

The FTA has developed guidance to evaluate noise impacts from operation of surface transportation modes (i.e., passenger cars, trucks, buses, and rail) in the 2018 FTA *Transit Noise Impact and Vibration Assessment* (FTA 2018). All mass transit projects receiving federal funding must use these guidelines to predict and assess potential noise and vibration impacts. As ambient levels increase, smaller increments of change are allowed to minimize community annoyance related to transit operations.

Department of Housing and Urban Development

Title 24, Part 51, Subpart B of the Code of Federal Regulations – Noise Abatement and Control

The mission of HUD includes fostering "a decent, safe, and sanitary home and suitable living environment for every American." Accounting for acoustics is intrinsic to this mission as safety and comfort can be compromised by excessive noise. To facilitate the creation of suitable living environments, HUD has developed a standard for noise criteria. The basic foundation of the HUD noise program is set out in the noise regulation 24 CFR Part 51 Subpart B, Noise Abatement and Control.

HUD's noise policy requires noise attenuation measures be provided when proposed projects are to be located in high noise areas. Within the HUD Noise Assessment Guidelines, potential noise sources are examined for projects located within 15 miles of a military or civilian airport, 1,000 feet from a road or 3,000 feet from a railroad.

HUD exterior noise regulations state that 65 dBA L_{dn} noise levels or less are acceptable for residential land uses and noise levels exceeding 75 dBA L_{dn} are unacceptable. HUD's regulations do not contain standards for interior noise levels. The HUD regulations establish a goal of 45 decibels, and the attenuation requirements are focused on achieving that goal. The HUD guidelines assume that with standard construction methods and materials, any building will provide sufficient attenuation so that if the exterior level is 65 dBA L_{dn} or less, the interior level will be 45 dBA L_{dn} or less. Noise criteria are consistent with FHWA and related state requirements

b. State Laws, Regulations, and Policies

Land Use Compatibility Guidelines

The Governor's Office of Planning and Research is required to adopt and periodically revise guidelines for the preparation and content of local general plans. The 2017 General Plan Guidelines (Governor's Office of Planning and Research 2017) establish land use compatibility guidelines. Where a noise level range is denoted as "normally acceptable" for the given land use, the highest noise level in that range should be considered the maximum desirable for conventional construction that does not incorporate any special acoustic treatment. The acceptability of noise environments classified as "conditionally acceptable" or "normally unacceptable" will also depend on the anticipated amount of time that will normally be spent outside the structure and the acoustic treatment to be incorporated in structural design.

With regard to noise-sensitive residential uses, the recommended exterior noise limits are 60 dBA CNEL for single-family residences and 65 dBA CNEL for multi-family residences. The recommended maximum interior noise level is 45 dBA CNEL, which could normally be achieved using standard construction techniques if exterior noise levels are within the levels described above.

Caltrans

Caltrans establishes noise limits for vehicles licensed to operate on public roads (Caltrans 2013a). For heavy trucks, the State pass by standard is consistent with the federal limit of 80 dB. The State pass-by standard for light trucks and passenger cars (less than 4.5 tons gross vehicle rating) is also 80 dB at 15 meters from the centerline. For new roadway projects, Caltrans uses the NAC discussed above in connection with FHWA. In addition, Caltrans has published the Traffic Noise Analysis Protocol (May 2011) for assessing noise levels associated with roadway projects (Caltrans 2020a).

Caltrans has a *Transportation and Construction Induced Vibration Manual* that provides general guidance on vibration issues associated with construction and operation of projects in relation to human perception and structural damage (Caltrans 2020b).

Section 216 of the California Streets and Highways Code relates to the noise effects of a proposed freeway project on public and private elementary and secondary schools. Under this code, a noise impact occurs if, as a result of a proposed freeway project, noise levels exceed 52 dBA L_{eq} in the interior of public or private elementary or secondary classrooms, libraries, multipurpose rooms, or spaces. If a project results in a noise impact under this code, noise abatement must be provided to reduce classroom noise to a level that is at or below 52 dBA L_{eq}. If the noise levels generated from roadway sources exceed 52 dBA L_{eq} prior to the construction of the proposed freeway project, then noise abatement must be provided to reduce the noise to the level that existed prior to construction of the project.

California's Airport Noise Standards and Compatibility Planning

The State of California has the authority to establish regulations requiring airports to address aircraft noise impacts near airports. The State of California's Airport Noise Standards, found in Title 21 of the California Code of Regulations, identify a noise exposure level of 65 dB CNEL as the noise impact boundary around airports. Within the noise impact boundary, airport proprietors are required to ensure that all land uses are compatible with the aircraft noise environment, or the airport proprietor must secure a variance from Caltrans.

California Noise Insulation Standards

The California Noise Insulation Standards found in Title 24 of the California Code of Regulations set requirements for new multi-family residential units, hotels, and motels that may be subject to relatively high levels of transportation-related noise. For exterior noise, the noise insulation standard is 45 dBA L_{dn} in any habitable room and requires an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than 60 dBA L_{dn}.

California Aeronautics Act

The State Aeronautics Act (Public Utilities Code, Section 21670 et seq.) requires the establishment of Airport Land Use Commissions (ALUCs), which are responsible for developing airport land use compatibility plans (ALUCPs) for noise-compatible land uses in the immediate proximity of a commercial or public airport (Section 21675). ALUCs have two major roles: preparation and adoption of ALUCPs, which address policies for both noise and safety and review of certain local government land use actions and airport plans for consistency with the land use compatibility plan.

The ALUCP is the major tool for ALUC land use regulation. The intent of the ALUCP is to encourage compatibility between airports and the various land uses that surround them. ALUCPs typically include the development of noise contours to identify excessive airport-related noise levels and measures to reduce noise levels.

The Aeronautics Division of Caltrans has published the *California Airport Land Use Planning Handbook* (Caltrans 2011). The purpose of the *California Airport Land Use Planning Handbook* is to provide guidance for conducting airport land use compatibility planning. This handbook includes a section related to noise and states, "The basic strategy for achieving noise compatibility in the vicinity of an airport is to prevent or limit development of land uses that are particularly sensitive to noise. Common land use strategies are ones that either involve few people (especially people engaged in noise-sensitive activities) or generate significant noise levels themselves (such as other transportation facilities or some industrial uses)."

Within the TCAG region, TCAG serves as the ALUC and is responsible for protecting public health, safety, and welfare by ensuring that vacant lands in the vicinity of airports are planned and zoned for uses compatible with airport operations. The Tulare County Airport Land Use Plan was adopted in 1993 (TCAG 1993).

c. Regional and Local Laws, Regulations, and Policies

To identify, appraise and remedy noise and vibration problems in local communities, Tulare County and incorporated cities in the TCAG region are each required to adopt a noise element as part of their General Plan. Local governments use the Governor's Office of Planning and Research's General Plan Guidelines (2017), including land use compatibility guidelines, to prepare General Plan noise elements.

Each noise element is required to analyze and quantify current and projected noise levels associated with local noise sources, including, but not limited to highways and freeways, primary arterials and major local streets, rail operations, air traffic associated with the airports; local industrial plants; and other ground stationary sources that contribute to the community noise environment. Beyond statutory requirements, local jurisdictions are free to adopt their own goals and policies in their noise elements, although most jurisdictions have chosen to adopt noise/land use compatibility guidelines that are similar to those recommended by the State. Land use compatibility considers both existing noise levels in a community, as well as community attitudes toward dominant noise sources.

In addition to regulating noise through noise element policies, local jurisdictions regulate noise through enforcement of local ordinance standards. These standards generally relate to noisy activities (e.g., use of loudspeakers and construction) and stationary noise sources and facilities (e.g., air conditioning units and industrial activities). The TCAG region has eight incorporated cities, each of which has its own adopted noise standards. Noise standards for the County and incorporated cities in the region typically apply land-use compatibility criteria of 60-65 dBA L_{dn} as being the normally acceptable range for new residential developments, and interior noise criteria of 45 dBA L_{dn}, consistent with the overall State recommendations.

As discussed above, the State Aeronautics Act (Public Utilities Code, Section 21670 et seq.) requires the preparation of an ALUCP for nearly all public-use airports in the State (Section 21675). The Tulare County Comprehensive Airport Land Use Plan addresses aviation related matters such as safety, noise, overflight, and height policies and safety zones (Tulare County ALUC 2012). The Countywide plan affects Visalia, Tulare, Exeter, Woodlake, Sequoia, Eckert, and Porterville Airports and their surrounding communities. The goal of the ALUCP is to protect residents from the negative environmental noise, safety and traffic impacts that can potentially be induced by airports.

4.12.3 Impact Analysis

a. Methodology and Significance Thresholds

The analysis of noise impacts considers the effects of both temporary construction-related noise and long-term noise associated with proposed transportation system improvements. Temporary construction noise was estimated based upon levels presented in the FTA Transit Noise and Vibration Impact Assessment.

Appendix G of the State CEQA Guidelines identifies the following criteria for determining whether a project's impacts would have a significant impact related to noise; TCAG has added a threshold related to absolute noise increases:

1. Generate 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;
2. Generate a substantial absolute increase in ambient noise;
3. Generate excessive groundborne vibration or groundborne noise levels; or
4. 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.

Tulare County and the eight incorporated cities within the TCAG region each have their own noise standards that can be used to determine impact significance. These local noise standards typically apply land-use compatibility criteria of 60-65 dBA CNEL as the normally acceptable range for residential developments, and interior noise criteria of 45 dBA CNEL, consistent with the overall State recommendations and the recommendations of HUD for residential uses.

The analysis of potential impacts assumes implementation of all applicable standards, including those established by local jurisdictions, counties, the State of California, and federal agencies, where appropriate.

This EIR analyzes noise impacts on a program level only. Future project-level analyses for various projects implementing the proposed 2022 RTP/SCS would be included in project-level CEQA documents.

b. Project Impacts and Mitigation Measures

The following section discusses potential impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. Section 4.12.3.c summarizes the impacts associated with capital improvement projects in the proposed 2022 RTP/SCS. Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time. In general, however, implementation of proposed transportation improvement projects and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1: Generate 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

Threshold 2: Generate a substantial absolute increase in ambient noise

Impact N-1 CONSTRUCTION ACTIVITY ASSOCIATED WITH TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD GENERATE A SUBSTANTIAL TEMPORARY INCREASE IN AMBIENT NOISE LEVELS IN EXCESS OF STANDARDS ESTABLISHED IN LOCAL GENERAL PLANS OR NOISE ORDINANCES AND WOULD GENERATE A SUBSTANTIAL ABSOLUTE NOISE INCREASE OVER EXISTING NOISE LEVELS. THIS IMPACT WOULD BE SIGNIFICANT AND UNAVOIDABLE.

The operation of equipment during the construction of roadway infrastructure, as well as land-use development envisioned in 2022 RTP/SCS would result in temporary increases in noise in the immediate vicinity of individual construction sites. As shown in Table 4.12-2, average noise levels associated with the use of heavy equipment at construction sites typically range from 76 to 88 dBA at 50 feet from the source, depending upon the types of equipment in operation at any given time and the phase of construction. For projects that require pile driving, construction noise levels may reach 101 dBA at 50 feet from the source. For projects that do not require pile driving, the highest noise levels typically occur during excavation and foundation development, which involves the use of such equipment as backhoes, bulldozers, pile drivers, and front-end loaders.

Table 4.12-2 Typical Noise Levels for Construction Equipment (dBA)

Equipment	Typical Level 25 feet from the Source	Typical Level 50 feet from the Source	Typical Level 100 feet from the Source
Air Compressor	86	80	74
Backhoe	86	80	74
Concrete Mixer	91	85	79
Dozer	91	85	79
Grader	91	85	79
Jack Hammer	94	88	82
Loader	86	80	74
Paver	91	85	79
Pile-drive (Impact)	107	101	95

Equipment	Typical Level 25 feet from the Source	Typical Level 50 feet from the Source	Typical Level 100 feet from the Source
Pile-driver (Sonic)	101	95	89
Roller	91	85	79
Saw	82	76	70
Scarified	89	83	77
Scraper	91	85	79
Truck	90	84	78

Source: FTA 2018

Noise generated by construction projects would vary depending on the project and intensity of equipment use. Roadway widening projects and new roadway projects would likely require the operation of multiple pieces of heavy-duty equipment that generate high noise levels. Alternatively, repainting/restriping projects typically requiring minimal use of heavy equipment. This conservative analysis assesses construction noise based on the operation of heavy-duty equipment. Noise levels from point sources such as individual construction sites associated with land use projects envisioned in the proposed 2022 RTP/SCS typically attenuate at a rate of 6 dBA per doubling of distance. Therefore, areas within 800 feet of a construction site with heavy-duty equipment may be exposed to noise levels exceeding 65 dBA. Areas within 3,200 feet of impact pile drivers may be exposed to noise levels exceeding 65 dBA.

Some local agencies in the TCAG region include specific regulations in their municipal code to reduce construction noise impacts. In most cases, these regulations restrict construction activities to specific times and days. Such local policies serve to reduce the impacts of noise on surrounding communities by prohibiting construction during the night when people are engaged in noise-sensitive activities like sleeping. Nevertheless, this impact is significant because applicable noise standards would be exceeded, or because a substantial temporary increase in ambient noise levels in the project vicinity would occur.

The following mitigation measures would reduce this impact.

Mitigation Measure

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measure developed for the proposed 2022 RTP/SCS program where applicable for transportation projects that would result in noise impacts, and where feasible and necessary based on project and site-specific considerations. Tulare County and incorporated cities in the County can and should implement this measure where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project-specific environmental documents may adjust this measure as necessary to respond to site-specific conditions.

N-1 Construction Noise Reduction

To reduce construction noise levels to achieve applicable standards, implementing agencies for transportation and land use projects shall implement the measures identified below where feasible.

a. **Compliance with local Construction Noise Regulations.** Implementing agencies shall ensure that, where residences or other noise sensitive uses are located within 800 feet of construction sites without pile driving, appropriate measures shall be implemented to ensure consistency with local noise ordinance requirements relating to construction. Specific techniques may include, but are not limited to, restrictions on construction timing, use of sound blankets on construction equipment, and the use of temporary walls and noise barriers to block and deflect noise.

b. **Noise Complaint and Enforcement Manager.** Designate an on-site construction complaint and enforcement manager for projects within 800 feet of sensitive receivers. Implementing agencies shall post phone numbers for the on-site enforcement manager at construction sites along with complaint procedures and who to notify in the event of a problem.

c. **Pile Driving**. For any project within 3,200 feet of sensitive receptors that requires pilings, the implementing agency shall require caisson drilling or sonic pile driving as opposed to pile driving, where feasible. This shall be accomplished through the placement of conditions on the project during its individual environmental review.

d. **Construction Equipment Noise Control**. Implementing agencies shall ensure that equipment and trucks used for project construction utilize the best available noise control techniques (including mufflers, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds).

e. **Impact Equipment Noise Control.** Implementing agencies shall ensure that impact equipment (e.g., jack hammers, pavement breakers, and rock drills) used for project construction be hydraulically or electrically powered wherever feasible to avoid noise associated with compressed air exhaust from pneumatically powered tools. Where use of pneumatically powered tools is unavoidable, use of an exhaust muffler on the compressed air exhaust can lower noise levels from the exhaust by up to about 10 dBA. When feasible, external jackets on the impact equipment can achieve a reduction of 5 dBA. Whenever feasible, use quieter procedures, such as drilling rather than impact equipment operation.

f. **Construction Activity Timing Restrictions.** Except where timing restrictions are already established in local codes or policies, construction activities shall be limited to:
   - Monday through Friday: 7 a.m. to 6 p.m.
   - Saturday: 9 a.m. to 5 p.m.

g. **Placement of Stationary Noise Sources.** Locate stationary noise sources as far from noise-sensitive receptors as possible. Stationary noise sources that must be located near existing receptors will be equipped with the best available mufflers.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are Tulare County and incorporated cities within the County. This mitigation measure shall, or can and should, be applied during project permitting and environmental review and implemented during construction, as applicable.

Significance After Mitigation

Implementation of Mitigation Measure N-1 would reduce construction noise impacts. However, even with implementation of Mitigation Measure N-1, construction noise from all 2022 RTP/SCS projects may not be reduced below applicable thresholds and impacts would remain significant and unavoidable. No additional mitigation measures to reduce this impact to less than significant levels are feasible.

Threshold 1:	Generate 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
Threshold 2:	Generate a substantial absolute increase in ambient noise

Impact N-2 TRANSPORTATION IMPROVEMENTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD GENERATE A SUBSTANTIAL PERMANENT INCREASE IN AMBIENT NOISE LEVELS IN EXCESS OF STANDARDS OR OVER EXISTING NOISE LEVELS AND GENERATE A SUBSTANTIAL ABSOLUTE NOISE INCREASE OVER EXISTING NOISE LEVELS. THIS IMPACT WOULD BE SIGNIFICANT AND UNAVOIDABLE.

Traffic

Overall traffic levels on highways and roadways in the TCAG region are projected to increase as a result of regional growth through the year 2046 (refer to Section 4.15, Transportation).

The proposed 2022 RTP/SCS includes several projects that would potentially increase traffic noise by increasing traffic levels along and in the vicinity of affected facilities. Such projects include intersection improvements, widening existing roadways, widening ramps and bridge structures, constructing new interchange, and road improvements that would allow increased traffic volumes. These projects are intended to relieve current or projected future traffic congestion or unacceptable safety conditions. However, in some cases, projects that expand roadway capacity would accommodate additional traffic volumes and/or relocate noise sources closer to sensitive receptors. Therefore, this impact is significant because applicable noise standards would be exceeded, or because a substantial permanent increase in ambient noise levels in the project vicinity would occur.

Airports

The proposed 2022 RTP/SCS does not include any airport improvement projects or programs that would directly or indirectly increase aircraft operations at operating airports in the TCAG region. Therefore, 2022 RTP/SCS would not increase ambient noise levels associated with airports. No impacts due to aircraft operations would occur.

Rail Operations

The proposed 2022 RTP/SCS does not include any rail improvement projects or programs that would directly or indirectly increase rail operations on the Union Pacific Railroad, San Joaquin Valley Railroad, and the Burlington Northern-Santa Fe Railroad in the TCAG region. Therefore, 2022 RTP/SCS would not increase ambient noise levels associated with rail operations. The closest Amtrak stations are in the Cities of Hanford and Corcoran in Kings County. No impacts due to rail operations would occur.

Bus Operations

The proposed 2022 RTP/SCS includes the support of public transportation. In Tulare County, buses are the primary mode of public transportation. Fixed Route and Dial-A-Ride services are provided by Visalia Transit and Tulare County Regional Transit Agency (TCRTA). Amtrak coordinates with Visalia

Transit to provide a feeder bus linking Visalia from the city's transit center with the Hanford Station in Kings County. Greyhound and Orange Belt Stages also operate in Tulare County. In 2016, Visalia Transit began the V-LINE- bus service between Visalia (from the transit center and Visalia Municipal Airport) to various locations in Fresno County (the Fresno Yosemite International Airport, California State University, Fresno, and Courthouse Park). Intercounty connections are also provided by TCRTA between Dinuba and Reedley and to Delano and Kingsburg. The 2022 RTP/SCS bus and transit improvement projects or programs could directly or indirectly increase bus or other transit operations in the TCAG region or in new locations. Therefore, the 2022 RTP/SCS could increase service beyond existing routes, generate identifiable noise levels beyond current conditions, or otherwise increase ambient noise levels associated with bus operations. Therefore, this impact is significant.

The following mitigation measures would reduce the traffic impact identified above.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measure developed for the proposed 2022 RTP/SCS program where applicable for transportation projects that would result in traffic noise impacts, and where feasible and necessary based on project and site-specific considerations. Project-specific environmental documents may adjust this measure as necessary to respond to site-specific conditions.

N-2 Noise Assessment and Control for Mobile and Point Source Reduction

Implementing agencies for 2022 RTP/SCS projects shall complete detailed noise assessments using applicable guidelines (e.g., Caltrans Traffic Noise Analysis Protocol) for roadway projects that may impact noise sensitive receptors. The implementing agency shall ensure that a noise survey is conducted that, at minimum:

- Determines existing and projected noise levels
- Determines the amount of attenuation needed to reduce potential noise impacts to applicable State and local standards
- Identifies potential alternate alignments that allow greater distance from, or greater buffering of, noise-sensitive areas
- If warranted, recommends methods for mitigating noise impacts, including:
    - Appropriate setbacks
    - Sound attenuating building design, including retrofit of existing structures with sound attenuating building materials
    - Use of sound barriers (earthen berms, sound walls, or some combination of the two)
    - Locate transit-related passenger stations, central maintenance facilities, decentralized maintenance facilities, and electric substations away from sensitive receptors to the maximum extent feasible.

Where new or expanded roadway projects are found to expose receptors to noise exceeding normally acceptable levels, the individual project lead agency shall implement techniques as recommended in the project-specific noise assessments. The preferred methods for mitigating noise impacts shall include the use of appropriate setbacks and sound attenuating building design, including retrofit of existing structures with sound attenuating building materials where feasible. In instances where use of these techniques is not feasible, the use of sound barriers (earthen berms, sound walls, or some combination of the two) shall be considered. Whenever possible, a combination of elements shall be used, including open grade paving, solid fences, walls, and landscaped berms. Other techniques such as rubberized asphalt or "quiet pavement" shall be used where feasible to reduce road noise for new roadway segments or modifications requiring repaving. The effectiveness of noise reduction measures shall be monitored by taking noise measurements and installing adaptive mitigation measures to achieve applicable standards.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. This mitigation measure shall, or can and should, be applied during project permitting and environmental review and implemented during construction, as applicable.

Significance After Mitigation

Implementation of Mitigation Measure N-2 would reduce noise from mobile sources. However, even with implementation of Mitigation Measure N-2, mobile source noise from buildout of the proposed 2022 RTP/SCS may continue to impact nearby noise sensitive receivers and exceed acceptable standards. Impacts would remain significant and unavoidable. No additional mitigation measures to reduce this impact to less than significant levels are feasible.

Threshold 3: Generate excessive groundborne vibration or groundborne noise levels

Impact N-3 CONSTRUCTION ACTIVITIES ASSOCIATED WITH TRANSPORTATION PROJECTS UNDER THE PROPOSED 2022 RTP/SCS WOULD GENERATE EXCESSIVE GROUNDBORNE VIBRATION LEVELS. NEW TRUCK, BUS, AND TRAIN TRAFFIC RESULTING FROM THE PROPOSED 2022 RTP/SCS WOULD GENERATE EXCESSIVE VIBRATION LEVELS. THESE IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.

Construction

Construction-related vibration has the potential to damage structures, cause cosmetic damage (e.g., crack plaster), or disrupt the operation of vibration-sensitive equipment. Vibration can also be a source of annoyance to individuals who live or work close to vibration-generating activities. Heavy construction operations can cause substantial vibration near the source. Table 4.12-3 shows vibration levels associated with typical construction equipment. Similar to construction noise, vibration levels would be variable depending on the type of construction project and related equipment use.

Table 4.12-3 Vibration Source Levels for Construction Equipment

		Approximate Vibration Level (VdB)			
Equipment		25 feet from Source	50 feet from Source	100 feet from Source	200 feet from Source
Caisson Drilling		87	78	69	60
Jackhammer		79	70	61	52
Large Bulldozer		87	78	69	60
Loaded Truck		86	77	68	58
Pile Driver (impact)	Upper range	112	103	94	84
	Typical	104	95	86	77

Equipment		Approximate Vibration Level (VdB)			
		25 feet from Source	50 feet from Source	100 feet from Source	200 feet from Source
Pile Driver (sonic)	Upper range	105	96	87	78
	Typical	93	84	75	65
Small Bulldozer		58	48	39	30
Vibratory Roller		94	85	76	67
Source: FTA 2018					

Typical project construction activities, such as the use of jackhammers, other high-power or vibratory tools, compactors, and tracked equipment, may also generate substantial vibration (i.e., greater than 0.2 inches per second PPV) in the immediate vicinity, typically within 15 feet of the equipment. Through the use of scheduling controls, typical construction activities would be restricted to hours with least potential to affect nearby properties. Thus, perceptible vibration can be kept to a minimum and not result in human annoyance or structural damage.

Some specific construction activities result in higher levels of vibration. Pile driving has the potential to generate the highest vibration levels and is the primary concern for structural damage to nearby structures, especially when near fragile and/or historic structures. Vibration levels generated by pile driving activities would vary depending on project conditions, such as soil conditions, construction methods and equipment used. Depending on the proximity of existing structures to each construction site, the structural soundness of the affected buildings and construction methods, vibration caused by pile driving or other foundation work with a substantial impact component such as blasting, rock or caisson drilling, and site excavation or compaction may be high enough to be perceptible outside the construction area and potentially damage existing structures.

Tulare County and some of the incorporated cities in the TCAG region include regulations in their municipal code that reduce construction noise and vibration impacts. In most cases, these regulations restrict vibration-generating construction activities to specific times and days. Such local policies reduce the impacts of vibration on surrounding communities by prohibiting construction during the night when people are engaged in vibration-sensitive activities like sleeping. Nevertheless, this impact is significant because some project-specific transportation project construction could cause excessive groundborne vibration or groundborne noise levels.

Operation

The primary vibration sources associated with transportation system operations include heavy truck and bus traffic along roadways and train traffic along rail lines. However, vehicle traffic, including heavy trucks traveling on a highway, rarely generate vibration amplitudes high enough to cause structural or cosmetic damage, except in rare cases (e.g., where heavy truck traffic passes near fragile older buildings). Heavy trucks traveling over potholes or other pavement irregularities can cause vibration high enough to result in complaints from nearby residents. These conditions are commonly addressed by smoothing the roadway surface. Based on vibration measurements throughout California by Caltrans, worst-case traffic vibrations were shown to drop below the threshold of perception at distances of 150 feet or greater (Caltrans 2013b). Given that sensitive receptors are located within 150 feet of transportation facilities within the TCAG region, and that 2022 RTP/SCS transportation projects include roadway expansion and construction of high occupancy vehicle lanes on SR 99, SR 198, or other highways, significant impacts related to vibration associated with truck traffic could occur.

Rail activity is also a source of vibration. Caltrans conducted measurements of vibration levels associated with train activity throughout the State and found a peak vibration level of 0.36 inches per second PPV at ten feet from the track (Caltrans 2004). Based on this reference vibration level, vibrations from train activity drop below the threshold of perception at distances greater than 250 feet. The proposed 2022 RTP/SCS does not include any rail improvement projects or programs that would directly or indirectly increase rail operations on the Union Pacific Railroad, San Joaquin Valley Railroad, and the Burlington Northern-Santa Fe Railroad in the TCAG region. Therefore, 2022 RTP/SCS would not increase vibration levels associated with rail operations.

The following mitigation measures would reduce the impacts identified above.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures developed for the proposed 2022 RTP/SCS program where applicable for transportation projects that would result in vibration impacts, and where feasible and necessary based on project and site-specific considerations. Project-specific environmental documents may adjust these measures as necessary to respond to site-specific conditions.

N-3(a) Vibration Mitigation for Construction of Transportation Projects

Where local vibration and groundborne noise standards do not apply, implementing agencies of 2022 RTP/SCS projects utilizing heavy construction equipment shall estimate vibration levels generated by construction activities and use the Caltrans vibration damage potential threshold criteria to screen for and screen out projects as to their potential to damage buildings on site or near a project.

Table 4.12-4 Caltrans Vibration Damage Potential Threshold Criteria

	Maximum PPV (in/sec)	
Structure and Condition	Transient Sources	Continuous/ Frequent Intermittent Sources
Extremely fragile historic buildings	0.12	0.08
Fragile buildings	0.20	0.10
Historic and some old buildings	0.50	0.25
Older Residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial structures	2.00	0.50

Source: Transportation and Construction Vibration Guidance Manual (2020b)

If construction equipment would generate vibration levels exceeding acceptable levels as established by Caltrans, implementing agencies shall, or can and should, complete the following tasks:

- Prior to construction, survey the project site for vulnerable buildings, and complete geotechnical testing (preconstruction assessment of the existing subsurface conditions and structural integrity), for any older or historic buildings within 50 feet of pile driving. The testing shall be completed by a qualified geotechnical engineer and qualified historic preservation professional and/or structural engineer.

- Prepare and submit a report to the lead agency that contains the results of the geological testing. If recommended by the preconstruction report implementing agencies shall require ground vibration monitoring of nearby historic structures. Methods and technologies shall be based on the specific conditions at the construction site. The preconstruction assessment shall include a monitoring program to detect ground settlement or lateral movement of structures in the vicinity of pile-driving activities and identify corrective measures to be taken should monitored vibration levels indicate the potential for building damage. In the event of unacceptable ground movement with the potential to cause structural damage, all impact work shall cease, and corrective measures shall be implemented to minimize the risk to the subject, or adjacent, historic structure.
- To minimize disturbance withing 550 feet of pile-driving activities, implement "quiet" pile-driving technology, such as predrilling of piles and the use of more than one pile driver to shorten the duration of pile driving), where feasible, in consideration of geotechnical and structural requirements and conditions as defined as part of the geotechnical testing, if testing was feasible.
- Use cushion blocks to dampen noise from pile driving.
- Phase operations of construction equipment to avoid simultaneous vibration sources

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. This mitigation measure shall, or can and should, be applied during project permitting and environmental review and implemented during construction, as applicable.

N-3(b) Vibration Mitigation for Operation of Transportation Projects

Where local vibration and groundborne noise standards do not apply, implementing agencies of 2022 RTP/SCS projects shall comply with all applicable local vibration and groundborne noise standards, or in the absence of such local standards, comply with guidance provided by the FTA in *Transit Noise and Vibration Impact Assessment* (FTA 2018) to assess impacts to buildings and sensitive receptors and reduce vibration and groundborne noise. FTA recommended thresholds shall be used except in areas where local standards for groundborne noise and vibration have been established. Methods that can be implemented to reduce vibration and groundborne noise impacts include, but are not limited to:

- Bus and Truck Traffic
  - Constructing of noise barriers
  - Use noise reducing tires and wheel construction on bus wheels
  - Use vehicle skirts (i.e., a partial enclosure around each wheel with absorptive treatment) on freight vehicle wheels

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. This mitigation measure shall, or can and should, be applied during project permitting and environmental review and implemented during construction, as applicable.

Significance After Mitigation

Implementation of Mitigation Measure N-3(a) would reduce potential construction vibration impacts. However, even with implementation of Mitigation Measure N-3(a), construction vibration from all 2022 RTP/SCS projects may not be reduced below applicable thresholds and impacts would remain significant and unavoidable. No additional mitigation measures to reduce this impact to less than significant levels are feasible. Implementation of Mitigation Measure N-3(b) would reduce potential operational vibration impacts. However, even with implementation of Mitigation Measure N-3(b), vibration from buildout of the proposed 2022 RTP/SCS may continue to be excessive. Impacts would remain significant and unavoidable. No additional mitigation measures to reduce this impact to less than significant levels are feasible.

Threshold 1:	Generate 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
Threshold 2:	Generate a substantial absolute increase in ambient noise

Impact N-4 LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS MAY PLACE SENSITIVE RECEPTORS IN AREAS WITH NOISE LEVELS IN EXCESS OF STANDARDS ESTABLISHED IN THE LOCAL GENERAL PLAN OR NOISE ORDINANCE. THIS IMPACT WOULD BE SIGNIFICANT AND UNAVOIDABLE.

The proposed 2022 RTP/SCS is based on a land use and transportation scenario which defines a pattern of future growth and transportation system investment for the region emphasizing TOD and infill development near transit and other transportation facilities, but development outside these areas could occur as well. Population and job growth is allocated principally within existing urban areas near public transit and existing transit corridors. New noise-sensitive development in infill areas could be exposed to noise levels exceeding County or incorporated city noise standards for residential land uses, specifically, the 65 dBA L_{dn} standard, with a lesser potential in more suburban and rural areas. Potential sources of noise exposure include traffic, rail and/or bus operations, commercial activity, and industrial activity. New development in infill areas near transit may also expose existing noise-sensitive uses to noise levels exceeding local noise thresholds. Impacts would be significant because applicable noise standards could be exceeded, or because infill project residents could be exposed to a substantial increase in ambient noise levels.

The following mitigation measures would reduce this impact.

Mitigation Measure

Tulare County and incorporated cities within the County can and should implement the following mitigation measure where relevant to land use projects implementing the proposed 2022 RTP/SCS, and where feasible and necessary based on project and site-specific considerations. Project-specific environmental documents may adjust this measure as necessary to respond to site-specific conditions.

N-4 Noise Mitigation for Land Uses

If a land use project is located in an area with exterior ambient noise levels above local noise standards, the implementing agency shall ensure that a noise study is conducted to determine the existing exterior noise levels in the vicinity of the project. If the project would be impacted by ambient noise levels, feasible attenuation measures shall be used to reduce operational noise to meet acceptable standards. In addition, noise insulation techniques shall be utilized to reduce indoor noise levels to thresholds set in applicable State and/or local standards. Such measures may include but are not limited to dual-paned windows, solid core exterior doors with perimeter weather stripping, air conditioning system so that windows and doors may remain closed, and situating exterior doors away from roads. The noise study and determination of appropriate mitigation measures shall be completed during the project's individual environmental review.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for land use projects are Tulare County and incorporated cities within the County. This mitigation measure shall, or can and should, be applied during project permitting and environmental review and implemented during construction, as applicable.

Significance After Mitigation

Implementation of Mitigation Measure N-4 would reduce noise for sensitive land uses in areas that exceed noise standards. However, even with implementation of Mitigation Measure N-4, noise from buildout of 2022 RTP/SCS may continue to impact nearby noise sensitive receptors and exceed acceptable standards. This impact would remain significant and unavoidable. No additional mitigation measures to reduce this impact to less than significant levels are feasible.

Threshold 4: 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, expose people residing or working in the project area to excessive noise levels

Impact N-5 TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD BE LOCATED IN CLOSE PROXIMITY TO EXISTING AIRPORTS SUCH THAT APPLICABLE EXTERIOR AND INTERIOR NOISE THRESHOLDS WOULD BE EXCEEDED. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.

The proposed 2022 RTP/SCS emphasizes infill development near transit and other transportation facilities. Public airports typically service entire regions, whereas smaller private airports or airstrips tend to serve local users. However, like other noise sources, noise from airports and aircraft flight events have the greatest effect on nearby land uses. As shown in Table 4.12-5, there are five public use and two private use airports in the TCAG region that serve commercial and general aviation users.

Table 4.12-5 Public and Private Airports within the TCAG Region

Airport	Public/Private Use	Airport Land Use Compatibility Plan (YES/NO)
Visalia Municipal Airport	Public	Yes
Mefford Field Airport	Public	Yes
Potterville Airport	Public	No
Woodlake Airport	Public	No
Sequoia Field Ynez Airport	Public	No
Eckert Field Airpark	Private	No
Thunderhawk Field Airport	Private	No

Visalia Municipal Airport and Mefford Field Airport have an active ALUCP (or the equivalent) to discourage incompatible land uses within the vicinity of the airport. However, even with ALUCPs the potential still exists for forecasted development consistent with the proposed 2022 RTP/SCS to occur in areas of 70 dBA CNEL, exceeding recommended airport noise thresholds of 65 dBA CNEL for residential land uses and the project-specific land use compatibility thresholds of 70 dBA CNEL.

In addition to consideration of exterior CNEL noise levels, increases in interior noise levels near airports have the potential to result in sleep disturbance at nearby sensitive land uses. This discussion addresses aviation related noise issues; impacts related to exposure to aviation related safety hazards are discussed in detail in Section 4.9, *Hazards and Hazardous Materials*. In accordance with the Federal Interagency Committee on Noise (FICON) guidance, aircraft-generated interior single-event noise levels of 65 dBA could result in a 5 percent or less chance of awakening someone (FICON 1992). Local land use compatibility standards contained in city and county general plans would typically dictate whether specific site review was required for construction of sensitive land uses in areas potentially affected by aircraft noise. However, given the regional scale of the proposed 2022 RTP/SCS, it is possible that the plan's forecasted land use development pattern could result in exposure to exterior and interior noise levels from existing airports or airstrips that exceed applicable thresholds. There would be a potentially significant impact resulting from excessive airport noise levels if projected development were to occur in close proximity to existing airports or airstrips. Because implementation of the proposed 2022 RTP/SCS land use development pattern could potentially result in land use development being located in close proximity to existing airports such that applicable exterior and interior noise thresholds would be exceeded, people residing or working in the area may be exposed to excessive noise levels. This is a significant impact that would require mitigation.

Some transportation projects in the proposed 2022 RTP/SCS would be within the vicinity of a private airstrip or an airport land use plan. Individuals would not be exposed to airport-related noise during operation of these projects, as they would not entail habitable structures or other facilities in which people would work or visit. However, during construction of these projects, construction personnel would be exposed to excessive noise levels. Such exposure would be temporary, and therefore considered less than significant.

The following mitigation measures would reduce the impacts identified above.

Mitigation Measures

Tulare County and incorporated cities within the County can and should implement the following mitigation measure where relevant to land use projects implementing the proposed 2022 RTP/SCS near existing public or public use airports, and where feasible and necessary based on project and site-specific considerations. Project-specific environmental documents may adjust this measure as necessary to respond to site-specific conditions.

N-5 Noise Mitigation Near Airports

Implementing agencies for all new development proposed to be located within an existing airport influence zone, as defined by the locally adopted ALUCP or local general plan, or within two miles of a private use airport, shall require a site-specific noise compatibility study. The study shall consider and evaluate existing aircraft noise, based on specific aircraft activity data for the airport in question, and shall include recommendations for site design and building construction. Such measures may include but are not limited to dual-paned windows, solid core exterior doors with perimeter weather stripping, air conditioning system so that windows and doors may remain closed, and situating exterior doors away from roads, such as dual paned windows. The noise study and determination of appropriate mitigation measures shall be completed during the project's individual environmental review.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for land use projects are Tulare County and incorporated cities within the County. This mitigation measure shall, or can and should, be applied during project permitting and environmental review and implemented during construction, as applicable.

Significance After Mitigation

To the extent that a local agency requires an individual project to implement Mitigation Measure N-5, the appropriate design and building construction would ensure compliance with relevant plans or codes, and this impact would be reduced to a less than significant level. However, even with implementation of Mitigation Measure N-5, noise from buildout of the proposed 2022 RTP/SCS may continue to impact nearby noise sensitive receptors and exceed acceptable standards. This impact would remain significant and unavoidable. No additional mitigation measures to reduce this impact to less than significant levels are feasible.

c. Specific RTP Projects That May Result in Impacts

All proposed 2022 RTP/SCS transportation projects listed in Section 2, *Project Description*, would have the potential to result in noise impacts described in Impacts N-1, N-2, N-3, N-4, and N-5. All projects that involve construction activities would result in temporary increases in noise and vibration associated with Impacts N-1 and N-3. The individual projects that would accommodate additional roadway or freeway traffic could create significant noise and vibration impacts associated with Impact N-2 and N-3. In addition, road widening/extension projects or construction of new roadways have the potential to place roadway traffic noise closer to sensitive receptors. With the number of projects meeting those categories few, this potential impact would be minimal. Land use projects that would include TOD, infill, or other land use development may create significant impacts associated with Impact N-4. Additional specific analysis described in the above mitigation measures would need to be conducted as individual projects are implemented in order to determine the magnitude of project-specific impacts.

4.12.4 Cumulative Impacts

Noise resulting from roadway improvement projects envisioned in the proposed 2022 RTP/SCS could influence ambient noise levels in adjoining counties, if and where the projects are located in proximity to adjoining counties. Therefore, the cumulative impact analysis area for noise consists of the TCAG region and the adjoining counties. Future development in this region that would result in cumulative significant and unavoidable noise impacts is considered in the analysis.

Construction of the transportation projects and the land use scenario envisioned in the proposed 2022 RTP/SCS would generate temporary noise impacts. The transportation projects are generally far enough away from adjoining counties that construction noise would generally not combine with ambient noise levels in these counties. The proposed 2022 RTP/SCS concentrates development in urban areas of the TCAG region, which is also generally far enough from adjoining counties that construction noise would not affect these counties. However, construction noise resulting from either the transportation projects or the land use scenario could combine with other ongoing noise or additional construction noise within the TCAG region, resulting in localized construction noise levels exceeding local standards. Cumulative impacts of construction noise would be significant. Implementation of Mitigation Measure N-1 would reduce some construction noise impacts; however, the proposed 2022 RTP/SCS contribution to the cumulative impact would be cumulatively considerable pre- and post-mitigation.

Operation of the transportation projects would generate noise. Noise would predominantly be from vehicles, such as the noise of engines or the noise generate from the friction between tires and the roadway surface. Generally, these noises affect ambient noise levels near the roadways. However, some of the proposed 2022 RTP/SCS transportation projects would increase inter-regional travel, because the proposed 2022 RTP/SCS addresses accommodating projected growth and because some projects are on regional roadways, such as Interstate 5 or SR 99. Therefore, the proposed 2022 RTP/SCS would contribute to traffic noise outside the region. The cumulative impact would be significant, and the overall contribution of the proposed 2022 RTP/SCS to significant cumulative traffic noise impacts, despite implementation of Mitigation Measures N-2 and N-4, would be cumulatively considerable pre- and post-mitigation.

Impacts associated with noise and vibration related to implementation of the proposed 2022 RTP/SCS would be generally experienced locally and are not cumulative in nature. These effects occur independently of one another, related to site-specific and project-specific characteristics and conditions. However, increased traffic from implementation of the proposed 2022 RTP/SCS could contribute to a significant increase in traffic noise levels on roadway segments throughout the cumulative impact analysis area, beyond accepted thresholds in various communities outside of the region. With implementation of Mitigation Measures N-3(a) and N-3(b) the proposed 2022 RTP/SCS contribution to this cumulative impact would be cumulatively considerable pre- and post-mitigation.

Transportation projects of the proposed 2022 RTP/SCS would not entail habitable structures or other facilities in which people would work or visit. However, construction of transportation projects in close proximity to existing airports would temporarily expose construction personnel to excessive noise levels. Due to the temporary nature of construction of transportation projects, impacts would be less than significant.

Given the regional scale of the proposed 2022 RTP/SCS, it is possible that the plan’s forecasted land use development pattern could result in exposure to exterior and interior noise levels from existing airports or airstrips that exceed applicable thresholds. People residing or working in close proximity to existing airports could be exposed to excessive noise levels. Therefore, the proposed 2022 RTP/SCS would contribute to the exposure of people residing or working in the area to excessive noise levels. The cumulative impact would be significant, and the overall contribution of the proposed 2022 RTP/SCS to exposure of people residing or working in the area to excessive noise levels, despite implementation of Mitigation Measure N-5. Impacts would be cumulatively considerable pre- and post-mitigation.

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4.13 Population and Housing

This section analyzes the impacts of the proposed 2022 RTP/SCS relative to population and housing. In addition, this section includes a discussion of employment, as it pertains to population and housing factors in the region.

4.13.1 Setting

a. Existing Population, Housing, and Employment

Existing population, housing units and employment for unincorporated Tulare County and the eight cities in the TCAG region are shown in Table 4.13-1. As of 2021, the region contains 481,649 residents, 154,436 housing units and 187,137 jobs, with a jobs to housing ratio of 1.32 (TCAG 2021). From 2017 to 2021, the number of housing units in the region increased by approximately four percent and is estimated to increase approximately 20 percent through 2046. There are an estimated 3.38 persons per household in Tulare County as of 2021 (TCAG 2021). The median housing price in Tulare County is $300,514 and home values have increased 21 percent from 2020 to 2021 (Zillow 2021).

Table 4.13-1 2021 Population, Housing and Employment for the TCAG Region

Jurisdiction	Population	Housing Units	Jobs
Dinuba	26,085	6,982	11,315
Exeter	11,068	3,747	5,111
Farmersville	11,439	2,875	5,363
Lindsay	13,200	3,612	5,719
Porterville	59,863	18,594	27,498
Tulare	68,070	21,730	32,001
Visalia	139,132	49,326	71,181
Woodlake	7,800	2,267	3,650
Unincorporated County	144,992	45,299	25,308
TCAG Region Total	**481,649**	**154,436**	**187,137**

Source: TCAG 2022 RTP/SCS RHNA Committee Demographic Forecast

b. Growth Forecasting

TCAG developed a new forecast for the proposed 2022 RTP/SCS based on the most comprehensive and up-to-date regional forecasts and projections available. The growth forecast for the proposed 2022 RTP/SCS incorporates substantial data available from projections published by the California Department of Finance, Demographic Research Office (DOF) in 2021. The growth forecast, based on the DOF projection, is much more conservative than in previous RTPs.

TCAG’s proposed new growth forecast is summarized in Tables 4.13-2 and 4.13-3 in Section 4.13.3, Impact Analysis.

4.13.2 Regulatory Setting

a. Federal Laws, Regulations, and Policies

Federal Uniform Relocation and Real Property Acquisition Policies Act of 1970

The Federal Uniform Relocation and Real Property Acquisition Policies Act (Uniform Act), 42 U.S.C. § 4601 et seq., passed by Congress in 1970, is a federal law that establishes minimum standards for federally funded programs and projects that require the acquisition of real property (real estate) or displace persons from their homes, businesses, or farms. The Uniform Act's protections and assistance apply to the acquisition, rehabilitation, or demolition of real property for federal or federally funded projects.

b. State Laws, Regulations, and Policies

California Relocation Assistance Act

The California Relocation Assistance Act of 1971 (Government Code § 7260 et seq.) is similar to the Uniform Relocation Assistance Act of 1970. However, it applies to State and local programs and projects that receive State funding, regardless of whether they receive federal funding. The Act requires notification, counseling, social services, and financial assistance for persons displaced by transportation and land redevelopment projects. These procedural protections and benefits apply when the project causing the displacement has received State funding during any phase of the program or project, even if it did not receive federal funding.

California Government Code, Section 65583

California Government Code Section 65583 specifies the State Housing Element requirements. The Housing Element is one of the State-mandated elements of the General Plan and is updated every eight years. The State Department of Housing and Community Development (HCD) is responsible for reviewing Housing Elements to ensure compliance with State law.

Housing Element Law

First enacted in 1969, housing element law (Government Code §§ 65580–65589.8) mandates that local governments adequately plan to meet the existing and projected housing needs of all economic segments of the community. The law acknowledges that in order for the private market to adequately address housing needs and demand, local governments must adopt land use plans and regulatory systems that provide opportunities for, and do not unduly constrain, housing development. As a result, housing policy in the State rests largely upon the effective implementation of local general plans and, in particular, local housing elements. Housing element law also requires HCD to review local housing elements for compliance with State law and to report its written findings to the local government.

Regional Housing Needs Allocation

California Government Code Sections 65583(a)(1) and 65584 require that each Council of Government (COG) consult with the California Department of Housing and Community Development (HCD) who determine each region’s existing and projected housing need through preparation of a Regional Housing Needs Determination (RHND). The COG is then responsible for allocating a share of the regional housing need to each city and county based on a COG approved methodology. The Regional Housing Needs Allocation (RHNA) Plan documents the preparation of the RHNA methodology and each jurisdiction's housing allocation. The existing and future need for housing is determined primarily by the forecasted growth in households in a community, based on historical growth patterns, job creation, household formation rates, and other factors to estimate how many households will be added to each community over the projection period. The housing need for new households is then adjusted to account for an ideal level of vacancy needed to promote housing choice, maintain price competition, and encourage acceptable levels of housing upkeep and repair. The RHND also accounts for units expected to be lost because of demolition, natural disaster, or conversion to non-housing uses. The sum of these factors—household growth, vacancy need, overcrowding, cost burden, and replacement need—form the "determination" assigned to each region. Finally, RHNA considers how each jurisdiction might grow in ways that will decrease the concentration of low-income households in certain communities. The need for new housing is distributed among income groups so that each community moves closer to the regional average income distribution. TCAG prepares the RHNA Plan for Tulare County.

Senate Bill 375

Senate Bill 375 (SB 375) (Chapter 728, Statutes of 2008) focuses on aligning transportation, housing, and other land uses to achieve regional greenhouse gas (GHG) emission reduction targets established under the California Global Warming Solutions Act. SB 375 requires California metropolitan planning organizations to develop a SCS as part of the RTP, Among other things, the SCS must:

- Identify the general location of land uses, residential densities, and building intensities within the region;
- Identify areas within the region sufficient to house all the population of the region;
- Identify areas within the region sufficient to house an 8-year projection of the regional housing need; and
- Consider the State housing goals; set forth a forecasted development pattern for the region; and allow the RTP to comply with the federal Clean Air Act of 1970 (42 U.S. Code Section 7401 et seq.).

SB 375 now synchronizes the schedules of the RHNA and RTP processes. The RHNA, which is adopted concurrently with the RTP, must also allocate housing units within the region consistent with the development pattern included in the SCS.

Existing law requires local governments to adopt a housing element as part of their general plan. Unlike the rest of the general plan, where updates sometimes occur at intervals of 20 years or longer, under previous law the housing element was required to be updated as frequently as needed and no less than every five years. Under SB 375, this period has been lengthened to eight years and timed so that the housing element period begins no less than 18 months after adoption of the RTP to encourage closer coordination between the housing and transportation planning completed by local governments and metropolitan planning organizations. SB 375 also changes the implementation schedule required in each housing element. Previous law required the housing element to contain a program that set forth a five-year schedule to implement the goals and objectives of the housing element. SB 375 instead requires this schedule of actions to occur during the eight-year housing element planning period and requires that each action have a timetable for implementation.

c. Local Laws, Regulations, and Policies

General plans can be described as a city or county's "blueprint" for future development. They represent the community's view of its future; a constitution made up of the goals and policies upon which the planning commission and the city council and/or board of supervisors will base their land use decisions. To illustrate its importance, all subdivisions, public works projects, and zoning decisions (except in charter cities) must be consistent with the general plan. State law requires that each city and each county adopt a general plan containing the following seven components or "elements": land use, circulation, housing, conservation, open-space, noise, and safety (California Code sections 65300 et seq.). At the same time, each jurisdiction is free to adopt a wide variety of additional elements covering subjects of particular interest to that jurisdiction such as recreation, urban design, or public facilities.

Pursuant to SB 375, Housing Elements are required to be updated every eight years. Within the TCAG region, Tulare County and the incorporated cities within each contain a periodically updated housing element. Each city emphasizes an array of affordable housing units that allow every resident of the County to attain a safe and sanitary living environment. Though each city differs regarding specific land use strategies to attain these goals, the lack of affordable housing is a common theme throughout the County; a plan to address this issue is a common theme throughout the region and addressed in the County's and incorporated cities' housing element updates.

Tulare County Blueprint

TCAG is an active participant in the development of the San Joaquin Valley Regional Blueprint, which developed a cohesive regional framework that defines and offers alternative solutions to growth related issues for the Valley. This process was led by the San Joaquin Valley Policy Council with the Tulare County Blueprint led by TCAG. The process involves the integration of transportation, housing, land use, economic development, and the environment to produce a preferred growth scenario to the year 2050. This represents Tulare County's local vision and goals as a participant in the San Joaquin Valley Regional Blueprint process aimed at guiding planning for the cities and County in the TCAG region; recommendations, not required policies (San Joaquin Valley Regional Policy Council 2010). Goals and objectives contained in the Tulare County Regional Blueprint include the following:

- **Housing Vision:** A variety of housing options available to all income, age, and cultural groups.
- **Goal:** Provide a variety of affordable and quality housing choices throughout the region for people of all income levels and abilities.
- **Objectives**
  - Promulgate and promote adoption of community design guidelines that will ensure strong neighborhoods, increase efficiency by promoting green building practices, integrate housing with jobs and schools, improve mobility and health by promoting walking and biking, improve air quality by reducing the trip generation, and increase infrastructure cost-effectiveness through efficient land use.
  - Increase the overall average density of new development. Ensure safe and healthy communities that provide a variety of housing types with increased opportunities for homeownership.
  - Provide incentives for local jurisdictions to meet their housing needs.

- Provide an adequate supply of housing for our region's workforce and adequate sites to accommodate business expansion and retention to minimize interregional and long-distance commuting.
- Conserve and rehabilitate the existing housing stock, while minimizing the displacement of lower income and minority residents as redevelopment and revitalization occurs.

Tulare County General Plan

The County General Plan is a policy document with planned land use maps and related information that are designed to give long-range guidance to those County officials making decisions affecting the growth and resources of the unincorporated Tulare County jurisdiction (Tulare County 2012). This document helps to ensure that decisions are in conformance with the long-range program designed to protect and further the public interests related to Tulare County's growth and development. It lays out specific policies to guide and improve employment in the County, such as increasing the viability of agriculture production, maintaining an Economic Development Strategy, and the encouragement of new industries. The General Plan also serves as a guide to the private sector of the economy, so that the private sector may relate its development initiatives to the public plans, objectives, and policies of the County. The County General Plan contains principles, policies and implementations that aim to improve the housing supply and the range of housing types and housing affordability levels. These include:

- **Guiding Principle 1.1.** Endeavor to improve opportunities for affordable housing in a wide range of housing types in the communities throughout the unincorporated area of the County.
- **Policy 1.11.** Encourage the development of a broad range of housing types to provide an opportunity of choice in the local housing market.
- **Policy 1.12.** Encourage Federal and State governments to expand and adequately fund housing programs for very low-, low-, and moderate-income households to stimulate mortgage financing for such programs, and to revise program requirements that preclude certain programs from being utilized.
- **Policy 1.14.** Pursue an equitable distribution of future regional housing needs allocations, thereby providing a greater likelihood of assuring a balance between housing development and the location of employment opportunities.
- **Policy 1.16.** Review community plans and zoning to ensure they provide for adequate affordable residential development.
- **Guiding Principle 1.6.** Assess and amend County ordinances, standards, practices and procedures considered necessary to carry out the County's essential housing goal of the attainment of a suitable, affordable and satisfactory living environment for every present and future resident in unincorporated areas.
- **Guiding Principle 2.1.** Encourage the development, improvement, and expansion of necessary public infrastructure serving the unincorporated communities.
- **Policy 2.13.** When land is purchased by the County in conjunction with installation of new public facilities, the County will endeavor to make any excess land available to housing agencies for development of affordable housing.
- **Guiding Principle 2.2.** Require proposed new housing developments located within the development boundaries of unincorporated communities to have the necessary infrastructure and capacity to support the development.

- **Policy 2.21.** Require all proposed housing within the development boundaries of unincorporated communities is either (1) served by community water and sewer, or (2) that physical conditions permit safe treatment of liquid waste by septic tank systems and the use of private wells.
- **Guiding Principle 3.2**. Encourage development towards communities already served by infrastructure, seeking to utilize the resources that already exist while conserving the open space and irreplaceable agricultural resources in the bordering urban fringe.

City General Plans

Incorporated cities within the TCAG region are Dinuba, Exeter, Farmersville, Lindsay, Porterville, Tulare, Woodlake, and Visalia. Visalia, Tulare, and Porterville are the most urbanized cities in the region. However, those cities, along with the vast majority of Tulare County, include areas of farmland. Population growth in Tulare County has led to, and will continue to lead to, land use conflicts between conflicting uses. This has led to several cities in the TCAG region to incorporate policies within their general plans to address this growing issue.

Therefore, most cities have incorporated policies in their general plan updates that acknowledge population growth while protecting agricultural lands. Some cities have incorporated “greenbelts”, while others have adopted Urban Growth Boundaries. In conjunction with an emphasis on infill development, avoiding land use conflicts when possible, and the conversion of farmland when no other option is available, cities within the TCAG region have been able to manage to balance this issue with similar goals and policies. Noise, safety, circulation, and open space are common to each city’s general plan and work towards this goal.

4.13.3 Impact Analysis

a. Methodology and Significance Thresholds

Appendix G of the State CEQA Guidelines identifies the following criteria for determining whether a project’s impacts would have a significant impact to population and housing:

1. Induce substantial unplanned 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); or
2. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.

b. Project Impacts and Mitigation Measures

The following section discusses potential impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. Section 4.12.3.c summarizes the impacts associated with capital improvement projects in the proposed 2022 RTP/SCS. Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time. In general, however, implementation of proposed transportation improvement projects and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1:	Induce substantial unplanned 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)

Impact POP-1 TRANSPORTATION AND LAND USE PROJECTS IMPLEMENTING THE PROPOSED 2022 RTP/SCS WOULD NOT INDUCE SUBSTANTIAL UNPLANNED POPULATION GROWTH, EITHER DIRECTLY OR INDIRECTLY. THIS IMPACT WOULD BE LESS THAN SIGNIFICANT.

From 2021 to 2046, the region's total population is forecasted to increase by 85,734 residents to 567,383 total residents. Table 4.13-3 shows the forecasted population growth for the region as a whole.

Table 4.13-2 Forecasted 2046 Population, Housing and Employment TCAG Region

Year	Population	Housing Units	Jobs
2021	481,649	154,436	187,137
2025	500,134	163,135	192,262
2030	520,428	172,550	199,678
2035	535,463	181,012	206,681
2040	551,563	187,952	212,582
2046	567,383	195,210	218,846

Source: Proposed 2022 RTP/SCS (RHNA Committee Demographic Forecast)

The proposed new growth forecast across jurisdictions is summarized in Table 4.13-3. The general distribution of land uses in the SCS used to develop the forecast is based on the existing, adopted general plans of Tulare County and the eight cities. The principles of the proposed SCS guided the allocation of future development sufficient to accommodate the forecasted growth in population, households, and employment through 2046. Most notable of these principles is an increase in average densities county-wide by generally 30 percent over the status quo densities. This is articulated in a growth pattern that is reflective of the proposed 2022 SCS's (refer to Section 2, Project Description) potential for increasing multi-modal travel and transit-oriented development.

The theme of the SCS is that moderately higher density, applied thoughtfully as an element of urban design and development, would improve regional jobs-housing fit. This, in turn, would leverage the ability of local agencies to implement projects that achieve better air quality and improved mobility options. This type of planned growth would minimize unplanned population growth by providing sufficient land throughout the TCAG region to accommodate the anticipated growth through 2046, reducing pressure to develop in non-urban lands not currently planned for urban development.

Table 4.13-3 Forecasted 2046 Population, Housing and Employment by Jurisdiction

Jurisdiction	Population	Housing Units	Employment
Dinuba	30,728	8,826	13,233
Exeter	13,039	4,736	5,977
Farmersville	13,475	3,634	6,260
Lindsay	15,549	4,565	6,688
Porterville	70,518	23,503	32,158

Jurisdiction	Population	Housing Units	Employment
Tulare	80,187	27,468	37,423
Visalia	163,898	62,349	83,242
Woodlake	9,188	2,866	4,269
Balance of County	170,801	57,259	29,596
TCAG Region Total	**567,383**	**195,210**	**218,846**

Source: Proposed 2022 RTP/SCS (RHNA Committee Demographic Forecast)

The proposed 2022 RTP/SCS would accommodate planned population growth directly through the development of the SCS land use scenario and indirectly as a result of the transportation projects included in the proposed 2022 RTP/SCS. Between 2021 and 2046, the TCAG region would grow by 85,734 people; 40,774 housing units; and 31,709 jobs. The land use scenario envisioned by the proposed 2022 RTP/SCS would encourage infill, mixed-use, and TOD within existing urbanized areas and along transit routes. This type of development would promote the development of existing vacant or underutilized properties and would locate people closer to existing employment, goods, and services within established communities. In addition, investments in alternative modes of transportation and an emphasis on infill and TOD would result in land use developments with higher densities, mixed-use land uses and an emphasis on transit use, bike and walk over single occupancy vehicle use, while investments in capacity increasing roadway improvements may indirectly lead to land use developments that have been historically typical for suburban development with lower densities.

Government Code Section 65080(b)(2)(B)(ii) requires that an RTP/SCS must accommodate all the population of the region, including all economic segments of the population, over the course of the planning period of the regional transportation plan. In compliance with the requirements, the proposed 2022 RTP/SCS includes strategies to accommodate new housing units through 2046. The housing strategies would continue the TCAG region's commitment to growth in infill areas but are also intended to protect current residents from displacement, preserve existing affordable housing, and produce new housing to secure long-term affordability for lower income populations. As mandated by State Housing Law as part of the periodic (every eight years) process of updating local General Plan Housing Elements, the California Department of Housing and Community Development provided a regional housing need determination (RHND) to TCAG. TCAG is responsible for developing a methodology for the allocation of the RHND to jurisdictions in Tulare County. The proposed SCS has enough housing capacity to accommodate the current RHNA allocations for the current (5th Cycle), and local governments will be responsible for accommodating their 5th Cycle RHNA allocations in their housing element updates.

Implementation of the proposed 2022 RTP/SCS land use development pattern would in some cases result in greater density/intensity of growth than included in current adopted local general plans. However, the proposed 2022 RTP/SCS would not change local land use policies; individual jurisdictions retain land use authority. As such, implementation of the proposed 2022 RTP/SCS would require the local jurisdiction to consider and resolve those differences through appropriate amendments to local planning documents, including Housing Element updates, and appropriate environmental review. Any growth associated with land use projects would therefore be, by definition, planned at the local level, and subject to appropriate environmental review.

The proposed 2022 RTP/SCS would accommodate planned growth through implementation of the envisioned proposed 2022 RTP/SCS land use strategies to intensify density in developed areas, rather than induce unplanned growth. Transportation projects included in the proposed 2022 RTP/SCS would not induce population growth as these projects would be planned-growth accommodating and are generally intended to improve existing transportation networks and improve safety. Expanded transit fleets would support more compact development and more sustainable and efficient development without inducing the type of population growth that would require development of more land for urban purposes.

The land use and transportation projects implementing the proposed 2022 RTP/SCS would therefore not result in substantial unplanned population growth. Impacts from implementation of the proposed 2022 RTP/SCS would be less than significant.

Mitigation Measures

No mitigation measures are required.

Threshold 2:	Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere

Impact POP-2 TRANSPORTATION AND LAND USE PROJECTS IMPLEMENTING THE PROPOSED 2022 RTP/SCS WOULD TEMPORARILY DISPLACE EXISTING HOUSING AND PEOPLE BUT WOULD NOT NECESSITATE THE CONSTRUCTION OF REPLACEMENT HOUSING ELSEWHERE. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Land use development implementing the proposed 2022 RTP/SCS would likely displace some existing housing and people, primarily low and medium density single family, multi-family, or mobile home dwelling units, as existing housing units are demolished to make way for new development. However, new residential development would generally occur at higher densities and be more modern, frequently as part of mixed-use development. During construction of individual projects, residents may be temporarily displaced. However, there are normal factors in the marketplace to offset this impact. Historically, vacancies within the existing housing stock absorb displacement of residents.

Transportation project under the proposed 2022 RTP/SCS would also not result in any significant impacts. Existing laws and regulations would provide assistance in relocating households for federally funded transportation projects. As described in Section 4.12.2, *Regulatory Setting,* the Federal Uniform Relocation and Real Property Acquisition Policies Act requires public agencies to provide relocation assistance when an action by the agency displaces residences. Thus, impacts from short-term displacement would be reduced through both existing regulation and normal market factors.

In the long run, the proposed 2022 RTP/SCS would result in a net increase in housing units. Between 2021 and 2046, the projected increase in housing capacity in the region would be 40,774 units, or an increase of 26 percent. The proposed 2022 RTP/SCS would result in a net increase in housing units, but would displace existing housing or people temporarily, as some residential structures are demolished to make way for new development. However, displacement would not be substantial, and would be minimized through existing housing programs within the TCAG region. Displacement would not necessitate the construction of substantial replacement housing. In effect, the proposed 2022 RTP/SCS includes the replacement housing that would be necessitated by individual projects.

Some transportation network improvements, such as road widening or extension projects, would require acquisition of right-of-way in areas with high density housing or business along transportation corridors and may displace residential or commercial units. Specific projects would be required to undergo separate environmental review under CEQA. The corresponding project specific environmental documentation would identify potentially significant impacts with regard to displacement of private property, if any, and provide the appropriate mitigation measures. Impacts from transportation improvements would implement relocation assistance in accordance with the Federal Uniform Relocation and Real Property Acquisition Policies Act of 1970. In addition, as noted above, the proposed 2022 RTP/SCS would result in a net increase of 40,774 housing units in the region. Therefore, in effect, the proposed 2022 RTP/SCS includes any replacement housing that would be necessitated by individual projects.

As a result, impacts of the proposed 2022 RTP/SCS related to housing and population displacement would be less than significant.

Mitigation Measures

No mitigation measures are required.

c. Specific Projects That May Result In Impacts

As discussed above, the proposed 2022 RTP/SCS would result in less than significant impacts related to displacement of housing or people. Although some transportation network improvements, such as road widening or extension projects, would require acquisition of right-of-way in areas with high density housing or business along transportation corridors, it cannot feasibly be determined whether such widening or right-of-way acquisition would displace housing units or residents without project specific design details not currently available.

4.13.4 Cumulative Impacts

The cumulative impact analysis area for population and housing consists of the TCAG region and adjoining counties. Information regarding these adjoining counties can be found in Section 3.1 – *Environmental Setting,* Table 3-1. However, in the cumulative impact analysis, please note that there is no direct transportation route between Tulare County, Kings County, and Fresno County to Inyo County as there is no direct passage through the Sierra Nevada Mountains. This cumulative extent is used to evaluate potential unplanned population growth or displacement of housing, within the context of region.

Development in the cumulative impacts analysis area would result in population growth. Generally, the population growth in the cumulative impacts analysis area is planned for in general plans developed and adopted by counties and cities in the area. For example, Fresno County is currently updating its General Plan to accommodate growth expected in the County through 2040. The general plans and zoning ordinances of counties and cities also designate areas for housing development to accommodate planned population growth. While some development may require the demolition of existing housing, each county and city in the cumulative impacts assessment area must continue to demonstrate it can meet housing requirements established through the RHNA program, enacted throughout the state. Therefore, cumulative induced growth impacts, and population and housing displacement impacts, would be less than significant.

Additional population, housing, and employment, as forecasted, would occur with or without implementation of the proposed 2022 RTP/SCS. The proposed 2022 RTP/SCS provides a strategy to accommodate growth in such a way as to achieve a more balanced jobs/housing ratio and to optimize transportation projects that support those land uses. The land use growth footprint assumes a number of residential units adequate to meet the forecasted demand, taking into account localized displacement of some households within the region. Therefore, implementation of the proposed 2022 RTP/SCS would not result in displacement at the regional scale, and localized displacement would not be expected to increase development in areas surrounding the TCAG region. Cumulative induced growth impacts, and population and housing displacement impacts, would be less than significant, and the contribution of the proposed 2022 RTP/SCS to cumulative population and housing displacement impacts would not be cumulatively considerable.

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4.14 Public Services and Recreation

This section analyzes the impacts of the proposed 2022 RTP/SCS on public services and recreational facilities.

4.14.1 Setting

a. Fire Protection Services

Tulare County is served by a variety of fire protection services, which include federal, state, county, and local fire protection services. On the local level, the County's three largest cities (Visalia, Tulare, and Porterville) all have their own fire departments which serve within their own area of responsibilities. Unincorporated portions of Tulare County are generally served by the Tulare County Fire Department; however, mutual aid agreements with the County's Fire Department and other fire protection services can be called upon for fire support. Generally, fire departments take proactive and preventative measures to provide fire suppression and emergency response services for all private, institutional, and public facilities within their area of responsibility. A discussion of wildfire hazard severity zones in the TCAG region is included in Section 4.16, *Wildfire*.

Bureau of Land Management

The Bureau of Land Management (BLM) is a federal agency which manages the nation's subsurface mineral resources under the U.S. Department of the Interior. The land and minerals under BLM authority include, but are not limited to, forests, mountains, and rangelands. BLM operates the Fire and Aviation program which works with state and field offices to provide a fire and aviation management program. BLM's fire and aviation program has three organizational levels: (1) the national office which provides leadership and oversight, and develops policy, procedures and budgets for the fire and aviation program; (2) state offices which are responsible for coordinating policies and interagency activities within their state; and (3) field offices which are responsible for on-the-ground fire management and aviation activities, often partnering with other agencies to maximize rapid initial attack.

BLM plays a primary role in the nation's wildland fire management efforts and undertakes a broad range of activities to protect the public, natural landscape, wildlife habitat, and recreational areas. BLM trains firefighters in fire suppression, preparedness, predictive services, vegetative fuels management, prescribed fire, community assistance and protection, and education.

U.S. Forest Service

The National Forest Service (USFS) is a federal agency under the U.S. Department of Agriculture and works with other agencies to manage wildland fires that threaten lives, homes, communities, and natural and cultural resources (USFS 2021). The USFS provides assistance with fire protective services, especially within the Sequoia National Forest.

Division of Forestry and Wildland Fire Management

The Division of Forestry and Wildland Fire Management (DFWFM) oversees the National Indian Forestry and Wildland Fire Management Program which is an effort between the U.S. Department of the Interior, the Bureau of Indian Affairs, and other federal agencies and tribal governments (U.S.

Department of Indian Affairs 2021). The Tule River Tribe and Reservation is a federally recognized tribe of Native Americans located on the eastern side of Tulare County and the Tule River Fire Department (TRFD) supports fire protection services within the Reservation (Tule River Fire Department 2018).

California Department of Forestry and Fire Protection

The California Department of Forestry and Fire Protection (CAL FIRE) provides fire protection services to California's privately-owned wildlands and works in collaboration with counties and local governments to provide emergency services. CAL FIRE maintains eight fire stations throughout Tulare County as listed in Table 4.14-2. CAL FIRE responds to medical aids; hazardous material spills; swift water rescues; search and rescue missions; civil disturbances; train wrecks; floods; earthquakes and more (CAL FIRE 2022).

County and City Fire Departments

The Tulare County Fire Department responds to regional based needs across the County and provides services such as, but not limited to, responding to fires, medical emergencies, motor vehicle collisions, technical rescues, and other life threatening or dangerous conditions. The Tulare County Fire Department maintains goals consistent with National Fire Protection Association (NFPA) Standards, as shown in Table 4.14-1.

Table 4.14-1 Tulare County Fire Department Response Time Goals – NFPA Standards

Demand Zone	Demographics (persons/mile)	Staffing/Response Time (FF/min.)[1]	Percent of Calls (%)
Urban	Greater than 1000	15 FF/9 min.	90
Suburban	500-1000	10 FF/10 min.	80
Rural	Less than 500	6 FF/14 min.	80
Remote[2]	Travel distance less than 8 mi.	4 FF	90

Source: Tulare Fire Department. 2021

Notes:

[1] FF/min. = Firefighter per minute

[2] Upon assembling the necessary resources at the emergency scene, the fire department should have the capability to safely commence an initial attack within two minutes 90% of the time.

Tulare County Fire Department maintains and operates out of 26 fire stations throughout the County.

The Visalia Fire Department, Porterville Fire Department, and Tulare Fire Department operate out of six, two, and three stations, respectively. Visalia's average response time for fires is 5 minutes, 37 seconds and for emergency medical services (EMS) is 5 minutes, 18 seconds with a yearly call volume of 15,229 (Visalia Fire Department 2018). Porterville Fire responded to 5,102 incidents meeting the 5 minute, 30 second response time 90 percent of the time (Porterville Fire Department 2018). The City of Tulare Fire Department responded to 337 fire calls, 3,255 EMS calls, and 1,913 various other type calls in 2019 for a total of 5,505 calls for service. The department's goal is to arrive on scene of emergency incidents within a total response time of under 6 minutes 90 percent of the time (Tulare County Fire Department 2021). Other cities in the TCAG region with City fire departments have similar response time goals. The names and locations of fire stations in the TCAG region are listed in Table 4.14-2.

Table 4.14-2 Fire Service Providers and Stations in the TCAG Region

Name	Location
CAL Fire Tulare Unit	
Visalia Station	1968 S Lovers Ln. Visalia, CA 93292
Air Attack-Helitack – Porterville	1893 S. Newcomb Street, Porterville, CA 93257
Bear Creek Station	39582 Balch Park Rd., Springville, CA 93265
Station 12	35802 Olivera Dr., Woodlake, CA 93286
Station 32	45122 Manter Meadow Drive, California Hot Springs, CA 93207
Station 35	40900 Sierra Dr., Three Rivers, CA 93271
Station 37	26488 Ave 140, Porterville, CA 93257
Station 38	560 Old Stage Rd., Porterville, CA 93257
Tulare County Fire Department	
Tulare County Fire Station #1	25456 Road 140, Visalia, CA 93292
Kings River Fire Station # 2	3811 Avenue 400, Kingsburg CA 93631
Dinuba Fire Station #3	40404 Road 80, Dinuba, CA 93618
Cutler-Orosi Fire Station #4	40779 Road 128, Cutler, CA 93615
Cal Hot Springs Station #6	45122 Manter Meadow Drive, Cal Hot Springs 93207
Goshen Fire Station #7	30901 Road 67, Goshen, CA 93291
Ivanhoe Fire Station #8	32868 Hawthorne Road, Ivanhoe, CA 93235
Alpaugh Fire Station #9	3939 Avenue 54, Alpaugh, CA 93201
Richgrove Fire Station #10	20890 Grove Drive, Richgrove, CA 93261
Exeter Fire Station #11	137 North “F” Street, Exeter, CA 93291
Woodlake Fire Station #12	216 East Naranjo Boulevard, Woodlake, CA 93286
Lemon Cove Fire Station #13	32490 Highway 198, Lemon Cove, CA 93244
Three Rivers Fire Station #14	41412 South Fork Drive, Three Rivers, CA 93271
Lindsay Fire Station #15	19603 Avenue 228, Lindsay, CA 93247
Strathmore Fire Station #16	22908 Avenue 196, Strathmore, CA 93267
Badger Fire Station #17	51345 Eshom Valley Drive, Badger, CA 93603
West Olive Fire Station #19	22315 Avenue 152 Porterville, CA 93257
Doyle Colony Fire Station #20	551 East Success Drive, Porterville, CA 93257
Terra Bella Fire Station #21	23658 Avenue 95, Terra Bella, CA 93270
Springville Fire Station #22	35659 Highway 190, Springville, CA 93265
Camp Nelson Fire Station #23	1500 Nelson Drive, Camp Nelson, CA 93208
Tulare Fire Station #25	2082 Foster Drive, Tulare, CA 93274
Pixley Fire Station #27	200 North Park Drive, Pixley, CA 93256
Earlimart Fire Station	808 East Washington, Earlimart, CA 93219
Posey Fire Station #5	45656 Old Stage Road, Posey, CA 93260
Kennedy Meadow Fire Station #18	99075 Goman Road, Inyo-Kern, CA 93527
Visalia Fire Department	
Fire Station #51	309 South Johnson Street, Visalia, CA 93291
Fire Station #52	2224 West Monte Vista, Visalia, CA 93277

Name	Location
Fire Station #53	Walnut/Atwood, Visalia, CA 93277
Fire Station #54	440 West Ferguson Street, Visalia, CA 93291
Fire Station #55	6921 West Ferguson Avenue, Visalia, CA 93291
Fire Station #56	1968 South Lovers Lane, Visalia, CA 93292
Porterville Fire Department	
Fire Station #1	40 West Cleveland Avenue, Porterville, CA 93257
Fire Station #2	500 North Newcomb Street, Porterville, CA 93257
Tulare Fire Department	
Fire Station #61	800 South Blackstone Street, Tulare, CA 93274
Fire Station #62	138 North E Street, Tulare, CA 93274
Fire Station #63	2900 North M Street, Tulare, CA 93274

Sources:
CAL Fire 2021
Tulare County Fire Department. 2021.
City of Visalia. 2021.
City of Porterville. 2021.
Tulare Fire Department. 2021.

b. Police Protective Services

Primary law enforcement is at the community level, with city police and County Sheriff's departments providing this service. Additionally, there are more specialized law enforcement agencies that assist in law enforcement at the community or resource level. These specialized agencies include, but are not limited to the California Highway Patrol, School Police, Airport Police, Park Rangers (federal, State, County, and city), and a wide variety of federal agencies (e.g., FBI, ATF). Each agency has its own responsibilities, some of which may overlap with other law enforcement agencies. State Park Rangers may call upon Sheriff's Deputies for assistance.

California Highway Patrol

The California Highway Patrol (CHP) enforces state and local regulations along interstate and state highways. While monitoring the roadways the CHP provides traffic regulation enforcement, accident management, and assistance to stopped motorists. The CHP maintains two offices in Tulare County, located at 861 West Morton Avenue in Porterville and 5025 West Noble Avenue in Visalia. When necessary, the CHP coordinates with both the Tulare County's Sheriff Department and the six local police departments (Dinuba, Exeter, Porterville, Tulare, Visalia, and Woodlake Police Departments).

Tulare County Sheriff's Department

The Tulare County Sheriff's Department provides police services to unincorporated portions of the County. The County Sheriff's headquarters is located at 833 S. Akers Street in Visalia. The County's Sheriff's substations (Cutler-Orosi Substation, Headquarter Patrol, Pixley Substation, and Porterville Substation) are located throughout the County to provide further localized support and safety to the surrounding communities. As of 2018, the Sheriff's department employed approximately 592 sworn and 252 civilian employees. Within those employed by the Sheriff's department, staff members are deployed at substations, at court services, and with detention operations. The Sheriff is an elected position, all other positions are County employees.

The Sheriff's administrative services include personnel and training; court services; and patrol services. The court services main responsibilities are to ensure the safety of judges, attorneys, witnesses, defendants, jurors, and the general public at Tulare County Superior Court locations. The Civil unit serves a variety of court document through the collection of fees for the general public. The Personnel and Training unit is tasked with hiring, training, promoting, and equipment of Sheriff staff members. This unit also includes Internal Affairs for allegations of misconduct by Sheriff's deputies and civilian staff. The Patrol Services unit provides the Sheriff's office with a variety of services to assist in investigations, cooperation with other law enforcement agencies, administrative tasks, and public relations.

City Police Departments

Each of the cities, excluding Farmersville and Lindsay, operate their own police department with specific rules and regulations which residents and visitors must abide by when in the local jurisdictions. A majority of the Tulare County Sheriff's substations are located in or adjacent to the eight incorporated cities. Similar to other public services, various cities within the County are contracted with the Tulare County Sheriff's Department to secure police services for the residents living in each jurisdiction. Dinuba, Porterville, Tulare, Visalia, and Woodlake each operate their own police departments (Tulare County Sheriff's Department 2022).

c. Schools/Educational Facilities

Several institutions within Tulare County provide public education facilities and services to residents including elementary schools, middle schools, secondary schools, and community colleges, as well as special and adult education.

Tulare County's Office of Education

The Tulare County Superintendent of Schools (TCSOS), Tulare County's Office of Education, oversees, governs, and supports all of the Tulare County kindergarten through 12th grade (K–12) school districts. During the 2019-2020 school year, the Office of Education (TCOE) oversaw 33 elementary school districts, nine unified districts, and one high school district (TCOE 2021). Charter schools and private schools are also located throughout the County. There are over 100,000 students enrolled in 234 public schools county-wide in school districts range from small to large. Hot Springs School District has 19 students and 3 teachers, whereas Visalia Unified has over 29,000 students and 1,359 teachers (TCOE 2021). Despite the range in size, 85 percent of the districts within the county are considered small with less than 2,500 students and 70 percent of the districts have less than 1,000 students each (TCOE 2021).

TCSOS leads the Office of Education through staff development and trainings, new curriculum and instructional procedures, as well as library and media technology services. The County is third in the State with the most districts served behind Kern and Los Angeles counties. The services vary and are geographically spread out throughout rural and urban areas.

Facility planning for public schools is generally based on student generation rates. The student generation rates are compared against current capacity of individual school facilities that would be affected by the growth. Historical data and future plans for an area are used to project the number of students that will eventually be a part of the community. Student generation rates vary by jurisdiction and type of development.

Community Colleges

There are two community colleges in Tulare County. The College of the Sequoias is part of the California Community College system. College of the Sequoias is a two-year California community college offering educational and enrichment programs for the residents of its district in Tulare and Kings counties. The college was established in 1926 and moved to its current 62-acre main campus in Visalia in 1940. The second campus in the TCAG region is located in the City of Tulare. The Sequoias District opened The Tulare College Center in January 2013. It is a full-service college center and the home of COS' agriculture programs (COS 2022).

Porterville College was established in 1927 is located in southeastern Tulare County and has been part of Kern Community College District since 1967. It is also a two-year California Community College located on approximately 85 acres. It offers educational programs for business, liberal arts, science, sports, and features a horticulture complex (Porterville College 2022).

County Libraries

Tulare County operates 17 libraries throughout the TCAG region. Libraries are located in Alpaugh, Dinuba, Earlimart, Exeter, Farmersville, Ivanhoe, Lindsay, London, Orosi, Pixley, Springville, Strathmore, Terra Bella, Three Rivers, Tipton, Visalia, and Woodlake.

d. Recreational Facilities

The diverse resources located in Tulare County provide a wide range of recreational opportunities for residents and tourists alike. Within the County there are approximately 5,701 square miles of forests, parks, trails, and wildlife areas providing multiple opportunities for recreation (Tulare County 2010). The eastern half of the County is comprised primarily of public lands within Sequoia National Park; Inyo, Sierra, and Sequoia National Forests; and Mineral King, Golden Trout, and Domelands Wilderness areas. Recreational lands in the County are governed by a variety of agencies, including municipal park departments, independent park districts, counties, cities, community service districts, and federal and state agencies. Each City maintains parks of different types to benefit their residents.

Federal Parks and Recreation

There are seven parks and recreation areas under federal jurisdiction within Tulare County, as listed in Table 4.14-3. Tulare County contains substantial portions of federal public lands, largely Sequoia National Forest and Sequoia National Park, which are maintained by the USFS and the National Park Service, respectively. Sequoia National Forest lies in the southeastern corner of Tulare County and Sequoia National Park is in the northeastern portion of the County. Both national forests and parks provide camping facilities, hiking, and an extensive range of other outdoor recreation opportunities.

Table 4.14-3 National Parks and Recreation Areas in Tulare County

Name	Location	Acres
Lake Kaweah	25 miles east of Visalia on Highway 198	2,558
Lake Success	10 miles southeast of Porterville on Highway 198	2,450
Sequoia National Forest	Southeastern portion of Tulare County	n/a
Giant Sequoia National Monument	Covers areas north and south of Sequoia and Kings Canyon National Parks	n/a

Name	Location	Acres
Sequoia and Kings Canyon National Parks (SEKI)	Northeastern portion of Tulare County	n/a
Inyo National Forest	Northeastern Tulare County	n/a
Sierra National Forest	Northeastern Tulare County	n/a

Note: Giant Sequoia National Forest, Sequoia National Monument, Inyo National Forest, Sierra National Forest and Sequoia and Kings Canyon National Parks span several counties. The parks extend across county boundaries so exact number of acres in Tulare County is not readily available.

Source: Tulare County 2010

Lake Kaweah and Lake Success are two federally maintained recreational areas. Lake Kaweah was built and is maintained by the U.S. Army Corps of Engineers (USACE) and features recreational activities like biking, boating, and hiking. Lake Success was also built and is maintained by USACE, primarily for flood control of the Tule River, however the lake features activities such as boating and camping.

State Parks and Forests

There is one state park and one state forest in Tulare County. Colonel Allensworth State Historic Park is managed by the California Department of Parks and Recreation and preserved for its significance to the history and culture of one of the first African American settlements in Tulare County. Today, the park, located outside of Earlimart, features a museum and variety of buildings that are restored to show the original lifestyle of the community. In addition, the state park provides nearby camping facilities as well as outdoor recreational activities such as biking. Tulare County also contains the Mountain Home State Forest which provides opportunities for forestry education, research, and recreation, and consists of 4,807 acres of parkland outside of the City of Porterville.

Tulare County Parks

The Tulare County Parks and Recreation Department (TCPRD) maintains over 490 acres of parks and open space at 13 sites, as listed in Table 4.14-4. The County’s facilities include fishing lakes, veterans and senior community and recreation buildings, group and individual campgrounds, boating, and museums.

Table 4.14-4 Tulare County Parks

Name	Location	Acres
Alpaugh Park	Located in Alpaugh on Road 40	3.0
Balch Park Campgrounds	20 miles NE of Springville in the Sierras	160.0
Bartlett Park	8 miles east of Porterville on North Drive	127.5
Camp COTYAC	Near Ponderosa in Eastern Tulare County	8.0
Cutler Park	5 miles east of Visalia on Highway 216 to Ivanhoe	50.0
Elk Bayou Park	6 miles SE of Tulare on Avenue 200	60.0
Kings River Nature Preserve	2 miles east of Highway 99 on Road 28	85.0
Ledbetter Park	1 mile northwest of Cutler on Road 124/Hwy 63	11.0
Mooney Grove Park	2 miles south of Caldwell Avenue on Mooney Blvd. in South Visalia	143.0
Pixley Park	1 mile NE of Pixley on Road 124	22.0
Tulare County Museum	In Mooney Grove Park, South Visalia	8.5

Name	Location	Acres
Woodville Park	Located in Avenue 166 in Woodville	10.0
West Main Street Park	2 blocks west of County Courthouse on Main Street in Downtown Visalia	5.0
Total		**693.0**
Source: TCPRD 2021		

City Parks

All eight incorporated cities in Tulare County operate parks and recreation departments, which maintain parks, recreation facilities, and open space in their respective jurisdictions. The cities of Tulare and Visalia have the most parks in the County, 18 and 43 respectively, while smaller cities such as Lindsay and Woodlake, have as few as three to four parks. City parks in the four largest jurisdictions in Tulare County are listed in Table 4.14-5.

Table 4.14-5 City Parks in the TCAG Region

Name	Location	Acres (if provided)
Dinuba		
Alice Park	500 Alice Avenue	<1
Centennial Park	1591 W. Sierra Way	8..0
Felix Delgado Park	1350 Greene Avenue	6.0
Gregory Park	1133 College Avenue	<1
KC Vista Park	1851 E. Kamm Avenue	18.2
Nebraska Park	1000 Nebraska Avenue	9.0
Pamela Park/Basin	1106 W. Pamela Lane	<1
Roosevelt Park/Dinuba Community Center	1390 E. Elizabeth Way	4.2
Rose Ann Vuich Park	855 E. El Monte Way	8.0
Rotary Park	Saginaw & Lincoln	<1
Peachwood Basin	Alice Avenue and Lillie Avenue	4.0
Entertainment Plaza	289 S. L Street	2.0
Exeter		
Dobson Field	East Rocky Hill Drive	17
City Park	Chestnut & D Street	2.5
Brickhouse Park	Palm & Filbert	1
Joyner Park	Pine & C Street	<1
Water Tower Park	Pine & B Street	<1
Rose Garden Park	Palm & A Street	<1
Schelling Park	Pine & Filbert	<1
Planter Park	Maple & B Street	<1
Scroth Park	Vine & Belmont	5
Unger Park	Belmont & Glaze	4.7

Name	Location	Acres (if provided)
Porterville		
Centennial Park	296 N. Main Street	–
Fallen Heroes Park	356 E. Chase Avenue	–
Lime Street Park	Lime Street and Brightwood Court	–
Lions Mini Park	191 W. Orange Avenue	–
Murray Park	500 E. Putnam Avenue	20
North Park	756 N. Main Street	–
Veterans Park	1501 W. Henderson Avenue	26
Zalud Park	700 N. El Granito Street	15
Tulare		
Bender Park	600 N. Milner Street	–
Blain Park	2300 N. M Street	–
Centennial Park	900 N. H Street	–
Cesar E. Chavez	900 E. Bardsley Avenue	–
Cypress Park	1610 Cypress Avenue	–
Del Lago Community Park	1700 N. Laspina Street	–
Live Oak Park	600 N. Laspina Street	–
Mulcahy Park	1100 W. Sonora Ave.	–
Parkwood Meadows Park	1200 S. E Street	–
Prosperity Sports Park	846 W. Prosperity Avenue	–
Rotary Skate Plaza at Topham Park	85 W. Tulare Avenue	–
Santa Fe Trail	390 N. M Street	–
Sayre Park	493 Descanso Bay Court	–
Sunrise Park	2915 Sunrise Street	–
Tyler Park	140 N. E Street	–
Zumwalt Park	400 E. Tulare Avenue	–
Visalia		
Alejandro R. Ruiz Sr. Park	639 E Buena Vista Avenue	–
Blain Park	3101 S. Court Street	7
Burke Park	S. Burke Street	–
Cherry Meadow Park	2242 S Pinkham Street	–
John Combs Park	S. Parkwood Street	–
Constitution Park	1139 S. Crenshaw Street	–
Crestwood Park	W. Whittendale Avenue	–
Fairview Village Park	2695 North Conyer Street	–
Garden Street Plaza	300 E. Main Street	–
Houk Park	2640 Royal Oaks Drive	–
Kiwanis Park	1301 S. McAuliff	–
Jefferson Park	701 S. Watson Street	–
Lincoln Oval Park	N. Court St & NW 2nd Ave	–

Name	Location	Acres (if provided)
Lions Park	6500 W Ferguson Avenue	–
Mayor's Park	W. Main Street	–
Memorial Park	N. Hall Street	–
Mill Creek Garden Park	N. Lovers Lane & Mill Creek Parkway	–
Modoc Ditch Trail	S. Akers Street	–
Packwood Creek Trail	W. Packwood Drive	–
Perry Family Park	4013 S. County Center Drive	–
Plaza Park	Plaza Drive	–
Pinkham Park	S. Pinkham Street	–
Provident Skate Park	1035 W Murray Avenue	.55
Recreation Park	345 N. Jacob Street	–
Riverbend Park	2430 N. Court Street	–
Riverway Sports Park	3611 N. Dinuba Boulevard	80
Rotary Park	1200 S. Divisadero Street	–
Santa Fe Trail	N. Santa Fe Street	–
Seven Oaks Park	942 S. Edison Street	–
Soroptimist Park	W. Buena Vista Avenue	–
St. John's River Trail	E. St. Johns Parkway	–
Stonebrook Park	1200 W. Hemlock Avenue	–
Summers Park	Ferguson Street	3.7
Sunset Park	5743 W. Lisendra Drive	–
West Main Park	2825 W. Main Street	–
Whitendale Park	W. Beech Avenue	–
Willow Glen Park	W. Hurley Avenue	–
Wittman Village Park	315 Pearl Street	–
Woodland Park	1701 N. Woodland	–

Source: Dinuba 2021; Exeter 2021; Porterville 2021; Tulare 2021; Visalia 2022

Private Recreational Resources

Private recreational resources within the County provide for various facilities and programs to the community. Providers include organizations such as the Boys & Girls Club and the YMCA, along with various sports leagues, clubs, and other organizations.

4.14.2 Regulatory Setting

a. Federal Regulations

National Fire Protection Association, Standard 901

The National Fire Protection Association Standard 901 provides the latest guidelines to help fire departments and other fire protection organizations effectively share data with other agencies. This standard provides common language and definitions that define and describe elements and classifications used by many fire departments in the United States and other countries to describe fire damage potential and experience during incidents.

California Building Standards Code (Title 24, CCR)

Title 24 applies to all buildings throughout the State of California, and includes requirements for structural, mechanical, electrical, and plumbing systems, and requires measures for energy conservation, green design, construction and maintenance, fire and life safety and accessibility. Cities and counties are required by state law to enforce Title 24. More restrictive ordinances can also be adopted by cities and counties due to specific geographical conditions. Included among the twelve parts of Title 24 are Part 9, which includes the 2019 California Fire Code, and is based on the 2018 International Fire Code.

Department of Transportation Act Section 4f

Passed in 1966, the Department of Transportation Act includes Section 4(f), which states that FHWA and other USDOT agencies cannot approve the use of land from public state parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless certain conditions apply. These exceptions are as follows: If there is no feasible and prudent avoidance alternative to the use of land, and if the action includes all possible planning to minimize harm to the property resulting from such use; or if the Administration determines that the use of the property will have a de minimis impact (49 USC Section 303).

b. State Regulations

Quimby Act

As a condition of approval of a final tract or parcel map, the Quimby Act allows a city or town to require dedication of land, the payment of in-lieu fees, or a combination of both to be used for the provision of parks and recreational services. Under the act, cities and towns can require land or in-lieu fees for a minimum of three acres per 1,000 residents, with the possibility of increasing the requirement to a maximum of five acres per 1,000 residents if the city or town already provides more than three acres per 1,000 residents.

Senate Bill 50 – Leroy F Greene Schools Facilities Act of 1998

SB 50, or the Leroy F. Greene School Facilities Act of 1998, restricts the ability of local agencies to deny project approvals on the basis that public school facilities (classrooms, auditoriums, etc.) are inadequate. School impact fees are collected at the time when building permits are issued. Payment of school fees are also collected at the time when building permits are issued. Payment of school fees is required by SB 50 for all new residential development projects and is considered “full and complete mitigation” of any school impacts. School impact fees are payments to offset capital cost impacts associated with new developments, which result primarily from costs of additional facilities, related furnishings and equipment, and projected capital maintenance requirements. As such, agencies cannot require additional mitigation for any school impacts (Chapter 407, Statutes of 1998).

c. Local Regulations

County and City General Plans and Safety Elements

Local planning policies related to public services and recreation are established in each jurisdiction's general plan. In general, jurisdictions have policies in place that indicate that public services must be provided as the need for those services arises. In addition to these general policies, jurisdictions may have more specific policies tailored to performance objectives. Policies and strategies for fire protection services generally include language pertaining to the maintaining specific response times and adding facilities as needed to maintain those response times and proper staffing for new facilities. Policies for the development of law enforcement programs are to reduce and control crime, the planning of future law enforcement facilities concurrently with growth, and the prevention of crime through education and maintaining proper staffing. Many jurisdictions do this through specific goals, such as a maintaining a certain ratio of sworn officers to citizens, reducing response times, or reducing the overall number of crimes in the community.

Specifically, Tulare County's General Plan Public Facilities and Services Goal PFS-1 intends to establish and maintain acceptable levels of service, minimize costs, and provide criteria for determining the location, capacity, and timing of existing and future public facilities and services (Tulare County 2012). Policy PFS-1.2 intends to ensure that new growth and developments do not create significant adverse impacts on existing County-owned and operated facilities and Policy PFS-1.3 states that the County shall review development proposals for their impacts on infrastructure and that new development shall be required to pay its proportionate share of the costs of infrastructure improvements required. Specific goals and policies relate to fire and police protection, including Policy PFS-7.6, which states that the County shall strive to provide sheriff and fire station facilities, equipment (engines and other apparatus), and staffing necessary to maintain the County's service goals. The County shall continue to cooperate with mutual aid providers to provide coverage throughout the County.

Furthermore, City and County general plans also include policies to maintain specific ratios of park acreage per 1,000 in population for the jurisdiction along with policies for the location, type, and size of parks. Tulare County General Plan (Tulare County 2012) policy ERM-5.6 identifies the types of parks to be provided in the County. Visalia General Plan (City of Visalia 2014) section 5.1 identifies specific park classifications, Figure 5-1 identifies location of the parks and recreation facilities, with the General Plan providing for a park ratio of 5.0 acres per 1,000 residents. The Porterville General Plan (City of Porterville 2008) also identifies types of parks, their typical size, and anticipated service area for each type of park. Policy PSCF-I-3 identifies a target of five acres of neighborhood and community parks per 1,000 residents. This is a sample of recreation and park policies; other cities have similar goals and policies as just described.

Tulare County and City Codes (Fire)

In addition to following the rules and regulations of the California Penal Code, Tulare County maintains the Tulare County Code which explains the existing laws and regulations throughout the County. Ordinances 2907, 3124 and 3227 all govern the Uniform Fire Code within the County. The California Fire Code is under Part VII Chapter 15 Article 3 relating to building regulations and land use development. City fire codes are also required to conform to the California Fire Code. City of Visalia has adopted the 2016 California Fire Code along with the supporting technical codes and Porterville has adopted the 2019 version.

School Districts

Although the California public school system is under the policy direction of the Legislature, the California Department of Education relies on local control for the management of school districts. In allocating resources among the schools of the district, school district governing boards and district administrators must follow State law, but also set the educational priorities for their schools.

4.14.3 Impact Analysis

a. Methodology and Significance Thresholds

Appendix G of the State CEQA Guidelines identifies the following criteria for determining whether a project's impacts would have a significant impact on public services:

1. 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; or
   e. Other public facilities.

In the below analysis, schools are analyzed separate from the other public services.

In addition, Appendix G of the State CEQA Guidelines identifies the following criteria for determining whether a project's impacts would have a significant impact to recreation:

1. 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; or
2. Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

This analysis includes a program-level, qualitative assessment of impacts related to public services and recreation. Impacts related to these resource areas are more localized in nature, and therefore the analysis is qualitative and focuses on the existing regulations, standards, and policy measures to address these localized impacts. This evaluation of public facilities and services impacts assumes that construction and development under the proposed 2022 RTP/SCS would adhere to applicable federal, state, and local regulations and would conform to appropriate standards in the industry, as relevant for individual projects. Where existing regulatory requirements or permitting requirements exist that are law and binding on responsible agencies and project sponsors, it is reasonable to assume that they would be implemented, thereby reducing impacts.

b. Project Impacts and Mitigation Measures

The following section discusses potential impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. Section 4.13.3.c summarizes the impacts associated with capital improvement projects in the proposed 2022 RTP/SCS. Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time. In general, however, implementation of proposed transportation improvement projects and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1:	Result in substantial adverse physical impacts associated with the provision of new of 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, d. Parks, or e. Other public facilities

Impact PS-1 TRANSPORTATION AND LAND USE PROJECTS IMPLEMENTING THE PROPOSED 2022 RTP/SCS WOULD RESULT IN NEW OR EXPANDED GOVERNMENTAL FACILITIES, THE IMPLEMENTATION OF WHICH WOULD RESULT IN SUBSTANTIAL PHYSICAL IMPACTS. THIS IMPACT WOULD BE SIGNIFICANT AND UNAVOIDABLE.

As described in Section 4.12, *Population and Housing*, between 2020 and 2046, the TCAG region is forecasted to grow by 85,734 people; 40,774 housing units; and 31,709 jobs. The proposed 2022 RTP/SCS designates growth geographies and identifies a set of land use strategies to accommodate the projected growth that results in focused housing and job growth concentrated primarily in or adjacent to already developed areas and along existing transit corridors. The proposed 2022 RTP/SCS was designed to accommodate the people, households, and jobs identified in the regional growth forecast. The overall growth would result in increased demand for services. As the number of households grows, demand for fire protection and police services, parks, and other general government services and facilities (e.g., libraries) would increase.

The proposed 2022 RTP/SCS includes land use strategies that would allow for denser or more compact development in designated growth geographies. Implementation of the SCS would result in more dense and intense development than existing conditions, largely as infill development. Therefore, service areas for existing service providers may not substantially expand. This type of growth pattern would allow jurisdictions to leverage existing facilities and absorb some of the increased demand more efficiently than if new development were more dispersed.

Overall, with implementation of the proposed 2022 RTP/SCS, the higher density and intensity of new growth in the TCAG region, particularly in developed areas, would limit the need to expand service boundaries for law enforcement and fire protection. As a function of distance, these services would not need to expand. However, as function of response time, implementation of the proposed 2022 RTP/SCS could result in the need to construct new or expanded facilities, as well to accommodate new equipment needed to accommodate taller buildings. In order to maintain adequate response times, existing emergency service providers may need to expand their facilities if additional population growth results in substantial increases in the volume of requests for services or a decrease in response times. In cases where future demand and types of demand exceeds current capacity, new facilities may be required.

The County and city general plans include goals, policies, and programs which intend to ensure the protection and that supply of services meets local demand. For example, Tulare County's General Plan Public Facilities and Services chapter contains several policies to the maintain service levels of public facilities and minimize the costs associated with population growth within the TCAG region. With the SCS focusing development in urban centers, the increased development in cities would trigger the need for additional police and fire protection to stay consistent with city general plan policies regarding response times and proper coverage. This could include building new or expanded stations or other facilities.

However, at the regional scale, the addition 85,734 people; 40,774 housing units; and 31,709 jobs would place increased demand on existing resources to the extent that the construction of new or expanded facilities would be required, the construction of which would cause significant environmental impacts. Impacts to fire protection, police services, parks, and other public service facilities resulting from land use development envisioned in the proposed 2022 RTP/SCS would be significant.

Transportation projects included in the proposed 2022 RTP/SCS would not generate substantial demand for public services, such a fire protection, police, parks, or other public facilities requiring new or expanded facilities. The proposed 2022 RTP/SCS does not include major transportation projects that would generate demand outside of the TCAG region, such as widening roadways to national parks or other public uses outside of the TCAG region. Transportation projects would not generate substantial demand for these services because the identified transportation projects in the RTP would not increase the population of the TCAG region, either directly or indirectly. Transportation projects would also not require the removal and replacement of existing public services, such as police stations or fire departments. Therefore, transportation projects included in the proposed 2022 RTP/SCS would result in less than significant impacts to fire protection, police services, parks, and other public service facilities.

Mitigation Measures

Tulare County and incorporated cities within the County can and should implement the following mitigation measure where relevant to land use projects implementing the proposed 2022 RTP/SCS, and where feasible and necessary based on project and site-specific considerations. Project specific environmental documents may adjust this measure as necessary to respond to site specific conditions.

PS-1 Increased Public Service Demand

During the CEQA review process for individual public services facilities, the implementing agency with responsibility for construction of new public service facilities or the expansion of existing facilities, including those of fire and police services, parks, and other public facilities, can and should apply necessary mitigation measures to avoid or reduce significant environmental impacts associated with the construction or expansion of such facilities. Cities and the County can and should recognize the need for these measures in CEQA reviews of land use projects. The environmental impacts associated with such construction or expansion of public services facilities should be avoided or reduced through the imposition of conditions required to be followed by those directly involved in the construction or expansion activities. Such conditions should include those necessary to avoid or reduce significant impacts associated with air quality, noise, transportation, biological resources, cultural resources, greenhouse gas emissions, hydrology and water quality, and others that apply to specific construction or expansion of new public or expanded public service facilities.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies are cities, Tulare County, and other public service providers. This mitigation measure can and should be applied during project permitting and environmental review.

Significance After Mitigation

Mitigation Measure PS-1 would reduce impacts related to the provision of new of physically altered governmental facilities because it would require implementing agencies to apply necessary mitigation measures to avoid or reduce significant environmental impacts associated with the construction or expansion of such facilities. However, these mitigation measures may not be feasible or effective for every project. Therefore, this impact would be significant and unavoidable. No additional mitigation measures to reduce this impact to less than significant levels are feasible.

Threshold 1:	Result in substantial adverse physical impacts associated with the provision of new of 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: c. Schools

Impact PS-2 **LAND USE PROJECTS IMPLEMENTING THE PROPOSED 2022 RTP/SCS WOULD REQUIRE THE PROVISION OF NEW SCHOOLS, THE CONSTRUCTION OF WHICH WOULD RESULT IN SUBSTANTIAL PHYSICAL IMPACTS. IMPACTS WOULD BE LESS THAN SIGNIFICANT.**

As discussed above, the proposed 2022 RTP/SCS would accommodate the people, households, and jobs identified in the regional growth forecast. The overall growth would result in increased demand for services, including school services. The proposed composition of residential land uses would vary as future development occurs and the total number of households would increase. Alongside this, the projected population growth in the region would result in more school-age children brought into school districts within each county. The generation of additional primary and secondary school-age children and the ability of individual schools to accommodate them is dependent on the type of housing, demographics, and the available capacity of the elementary, middle, and high schools that would accommodate them. This is a dynamic condition that changes over time as population characteristics and other variables change. In the cases where increased growth exceeds the capacity of schools, implementation of the proposed 2022 RTP/SCS would require additional or modified facilities to ensure acceptable levels of service.

Future project sponsors would be required by law to pay development impact fees at the time building permits are issued. These fees are used by the applicable school district to mitigate impacts associated with long-term operation and maintenance of school facilities. The fees would be determined at the time of the building permit issuance and would reflect the most current fee amount requested by the school district. Pursuant to Section 65996(3)(h) of the California Government Code (SB 50), payment of these fees "is deemed to be full and complete mitigation of impacts of any legislative or adjudicative act, or both, involving but not limited to, the planning, use, or development of real property, or any change in government organization or reorganization." Impacts of the proposed 2022 RTP/SCS on schools would therefore be less than significant.

Mitigation Measures

No mitigation measures are required.

Threshold 2:	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
Threshold 3:	Include recreational facilities or require construction or expansion of recreational facilities which might have an adverse physical effect on the environment

Impact PS-3 TRANSPORTATION AND LAND USE PROJECTS IMPLEMENTING THE PROPOSED 2022 RTP/SCS WOULD INCREASE THE USE OF EXISTING PARKS AND RECREATIONAL FACILITIES, RESULTING IN SUBSTANTIAL PHYSICAL DETERIORATION, AND WOULD INCLUDE RECREATIONAL FACILITIES THAT WOULD HAVE AN ADVERSE PHYSICAL EFFECT ON THE ENVIRONMENT. THIS IMPACT WOULD BE SIGNIFICANT AND UNAVOIDABLE.

Implementation of the proposed 2022 RTP/SCS would increase demand on existing public parks and other recreational facilities in the region and could cause accelerated physical deterioration of parks and recreational facilities as a result.

The proposed 2022 RTP/SCS would accommodate the people, households, and jobs identified in the regional growth forecast. The overall growth would result in increased demand for services, including recreational facilities. Implementation of the proposed 2022 RTP/SCS would result in an increased use of existing recreational facilities, and the need for new recreational facilities, associated with increases in regional growth. Transportation projects would improve access to recreational facilities, which would result in additional use. Combined, the land use growth and transportation projects included in the proposed 2022 RTP/SCS would likely increase use of existing facilities, which would result in a substantial physical deterioration of the facilities or require expanded or new recreational facilities.

Development of the individual land use projects in the proposed 2022 RTP/SCS would be required on a project-by-project basis to pay development fees towards to the applicable jurisdiction. Since the passage of the 1975 Quimby Act (Government Code § 66477 *et seq*.), cities and counties have been authorized to adopt ordinances requiring that developers set aside land, donate conservation easements, or pay fees that can be used for purposes of acquiring parkland to maintain identified parkland acreages per 1,000 in population. In accordance with this regulation, each City in the TCAG region, in addition to Tulare County, requires that new residential development provide parkland and/or pay in lieu fees for the provision of parkland in their general plans and/or Code of Ordinances. All future development included in the proposed 2022 RTP/SCS would be required to comply with these regulations. The payment of these fees or provision of parkland would go toward maintaining parks or providing new park space, which would also reduce use of existing recreational facilities. Reduced use of existing facilities would result in a corresponding decrease in deterioration of existing facilities.

Payment and utilization of Quimby Act fees would not entirely prevent or remediate deterioration of parks and recreational facilities. While land use development would increase demand on recreational services, existing State requirements regarding development of a complete general plan, including Open Space and Conservation Elements, require local jurisdictions to address impacts on recreational facilities. Compliance with State requirements, which would result in long-range planning for recreation facilities, would benefit existing facilities by ensuring they are properly maintained despite regional growth. However, these regulations may not fully reduce potential impacts. Regional land use development, and the resulting new users at regional parks and recreational facilities, could lead to physical deterioration of existing facilities. Thus, land use development under the proposed 2022 RTP/SCS would have a significant impact on deterioration of regional recreational resources. The construction of new or expanded recreational facilities itself may result in significant environmental impacts. Therefore, this impact is significant. The following mitigation measures would reduce this impact.

Mitigation Measures

The County, cities, and recreation agencies can and should implement the following measures where relevant to land use projects implementing the proposed 2022 RTP/SCS, and where feasible and necessary based on project and site-specific considerations. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site specific conditions.

REC-1 Impact Reduction from New Recreational Facilities

During project specific design and CEQA review, the County and cities, and other agencies with responsibility for the construction of new or expanded recreation facilities, can and should apply necessary mitigation measures to avoid or reduce significant environmental impacts associated with the construction of such facilities. The environmental impacts associated with such construction should be avoided or reduced through the imposition of conditions required to be followed by those directly involved in the construction or expansion activities. Such conditions should include those necessary to avoid or reduce significant impacts associated with air quality, noise, transportation, biological resources, cultural resources, greenhouse gas emissions, hydrology and water quality, and others that apply to specific construction of new or expanded recreation facilities, including recreational trails.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are cities, Tulare County, and recreation agencies. This mitigation measure can and should be applied during project permitting and environmental review.

Significance After Mitigation

Implementation of Mitigation Measure PS-1 would reduce impacts associated with the construction of additional parks and recreation facilities because it would require implementing agencies to apply necessary mitigation measures to avoid or reduce significant environmental impacts associated with the construction or expansion of such facilities. However, these mitigation measures may not be feasible or effective for every project. Therefore, this impact would be significant and unavoidable. No additional mitigation measures to reduce this impact to less than significant levels are feasible.

c. Specific Projects That May Result In Impacts

Public service standards, performance measures, and policies related to public services and recreation are established by local jurisdictions and regulatory agencies. At a regional scale, it is not feasible to quantify separate effects of specific projects on each type of public service in separate jurisdictions, each with a different standard for service. Therefore, it cannot feasibly be determined which of the proposed 2022 RTP/SCS transportation projects would potentially result in impacts to public services or recreation without project specific design details.

4.14.4 Cumulative Impacts

The cumulative impact analysis area for public services and recreation consists of the TCAG region and adjoining counties. Information regarding these adjoining counties can be found in Section 3.1 – *Environmental Setting,* Table 3-1. However, in the cumulative impact analysis, please note that there is no direct transportation route between Tulare County, Kings County, and Fresno County to Inyo County as there is no direct passage through the Sierra Nevada Mountains. Future development in this region that could impact public services and recreation and is considered in the analysis. This cumulative extent is used to evaluate l impacts from the expansion of public services and recreation facilities within the context of regional development.

As described in Section 4.12, *Population and Housing*, between 2020 and 2046, the TCAG region is forecasted to grow by 85,734 people; 40,774 housing units; and 31,709 jobs. Similar growth is anticipated in the surrounding Valley counties. This combined level of growth would generate demand for fire protection, police services, parks and recreational facilities, schools, and other public facilities to the extent that the construction of new or expanded facilities would be required, the construction of which would cause significant environmental impacts. It would also increase the use of existing parks and recreational facilities. Cumulative impacts to public services and recreation would therefore be significant, and proposed 2045 RTP/SCS contribution to these impacts would be cumulatively considerable. The above mitigation measures would reduce these impacts. However, it cannot be guaranteed that all future project level impacts can be mitigated to a less than significant level. The proposed 2022 RTP/SCS contribution to cumulative public services and recreation impacts would therefore remain cumulatively considerable after mitigation.

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4.15 Transportation

This section examines the impacts of the proposed 2022 RTP/SCS on transportation conditions.

4.15.1 Setting

The environmental setting is a description of existing conditions relevant to transportation within the TCAG region, including eight incorporated cities (Dinuba, Exeter, Farmersville, Lindsay, Porterville, Tulare, Visalia, and Woodlake) as well as the unincorporated communities in Tulare County. The existing transportation system in the TCAG region consists of a complex network of State highways, County-maintained roads, and local streets; transit services; a series of bicycle paths and pedestrian walkways; railroad lines; and a number of aviation facilities. Roadway Transportation

Roadway Network

The regional roadway network in the TCAG region consists of over 4,000 miles of maintained roadways within Tulare County, including State highways, County-maintained roads, and local city streets. There are no Interstates or U.S. Highways within Tulare County. However, there are ten State Routes (SRs) within the region, including two major regional highways, SR 99 and SR 198. Highway traffic in Tulare County is primarily related to the movement of goods, farm-to-market, commuter, business, and recreational trips. Other major State Routes within Tulare County include SRs 43, 63, 65, 137, 190, 201, 216, and 245. Figure 4.15-1 identifies the major roadways within the TCAG region, while Table 4.15-1 provides a description of each.

The functional classification system of roadways within the TCAG region is generally based upon the Federal Highways Administration (FHWA) Functional Classifications System of Streets and Highways, which includes a variety of existing arterial and collector streets in addition to the State Routes identified above. The local classifications used by each of the eight major incorporated cities in the TCAG region also generally follow the FHWA functional classification system, with each city maintaining a variety of arterials, collectors, and local streets along with some alleyways. The design standards, geometrics, and the overall specific design criteria for each street classification varies slightly between each jurisdiction.

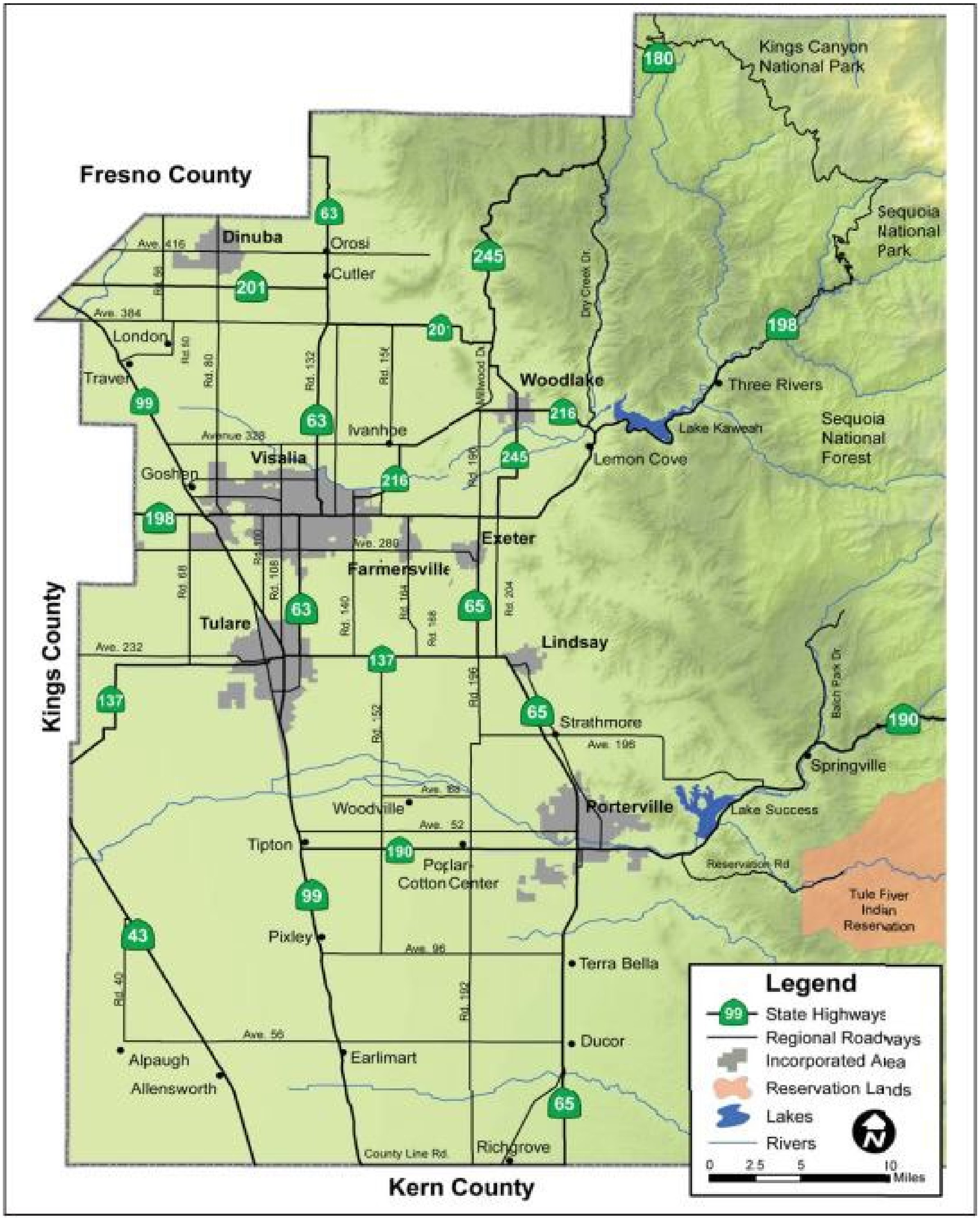
Operations

A variety of performance measures are used to assess transportation systems. Depending on the type of performance evaluation required, performance measures may be very specific and focus on intersections or roadway segments, or performance measures may be aggregated to evaluate the overall operation of a regional transportation system. A regional travel model typically only contains information on the number of lanes, posted speed and link capacity on roadway segments and lacks information detailed enough to calculate accurate intersection information.

Because of the programmatic nature of the proposed 2022 RTP/SCS, the performance measures discussed herein are aggregated as a region to evaluate the overall performance of the transportation system. Roadway transportation performance measures that address performance goals include:

- Total vehicle miles traveled (VMT); and,
- VMT per capita.

Figure 4.15-1 TCAG Region Roadway Network



Source: TCAG 2018a

Table 4.15-1 TCAG Region State Highway Descriptions

Highway	Approximate Length within TCAG Region	Description
SR 43	22 miles	Runs along the southwest edge of the County and connects Bakersfield to Selma; connects to SR 137; intersected by SR 198 west of Tulare County (in Kings County).
SR 63	33 miles	Also known as Mooney Boulevard and North Dinuba Boulevard; connects the urbanized areas of Visalia and Tulare; portions contain 4-6 lanes, high volume, and high frequency transit in Visalia; intersected by SR 137, SR 201 and SR 198. SR 137 stretches from SR 137 in the City of Tulare to the Fresno County line located near American Avenue (Avenue 480).
SR 65	40 miles	Connects the eastern cities of Porterville, Lindsay, and Exeter; includes portions of freeway in Porterville; intersected by SR 190 and SR 198, connects to SR 137.
SR 99	54 miles	Also known as the Golden State Highway; connects Tulare County to Fresno and Sacramento to the north and Bakersfield to the south; provides access to most major Central Valley cities from the Grapevine to Sacramento; intersected by SR 137 and SR 198, connects to SR 190.
SR 137	30 miles	Runs east to west and connects the cities of Tulare and Lindsay; intersected by SR 99, connects to SR 65 and SR 43.
SR 190	51 miles	Runs east to west through Porterville into to the Sequoia National Forest; includes portions of freeway; currently contains a single roundabout and has multiple planned roundabouts; intersected by SR 65, connects to SR 99.
SR 198	28 miles	Runs east to west and connects the California Central Coast to the Central Valley; outside of Tulare County, SR 198 intersects with Interstate 5 and U.S. Highway 101 and continues eastward through Tulare County, passing through the City of Visalia into Sequoia National Park; includes portions of expressway and freeway; intersected by SR 99, connects to SR 216, SR 65, SR 63, and SR 245.
SR 201	27 miles	Runs east to west, north of Visalia; intersected by SR 63, connects to SR 245 and SR 99.
SR 216	18 miles	Runs east to west and connects Visalia to Woodlake; intersected by SR 245 and connects to SR 198.
SR 245	31 miles	Runs north to south through Woodlake; intersected by SR 216 and connects to SR 198.

Source: TCAG 2018a; Google Earth Pro 2021

The basic measure of the amount of roadway transportation generated is VMT. One vehicle traveling one mile constitutes one vehicle mile traveled, regardless of the size of the vehicle or the number of passengers in the vehicle. Increases in VMT are associated with regional growth that would occur with or without implementation of the proposed 2022 RTP/SCS. Thus, VMT data may not reflect deficient traffic operations,[1] although VMT may have a strong correlation with congestion.

Baseline VMT data for the TCAG region is shown in Table 4.15-2. The 2021 Base Year is used as the baseline for analysis within this EIR. Regional VMT data accounts for all vehicle types and all travel within the region, including trips that originate and/or end outside of the TCAG region (pass-through trips). SB 375 data only includes automobile, light truck, and motorcycle vehicle types, and only accounts for trips that both originate and end within the TCAG region.

[1] Traffic operational measures such as roadway congestion and delay are not considered CEQA impacts.

An area's per capita (or per person) VMT, as applied in this EIR, is the total VMT divided by the population of that area and is a measure of the average vehicle miles each person travels on a typical weekday. Per capita VMT tends to increase as a result of greater overall economic activity in the region, higher levels of per-household automobile ownership, and/or a jobs-housing imbalance that contributes to longer average commute distances.

Table 4.15-2 Baseline VMT for TCAG Region

Base Year	Regional VMT	VMT per Capita
2021 (2022 RTP/SCS Base Year)	10,617,248	19.05

Source: TCAG Model, Appendix E
[1] Total VMT per capita is based on a population size of 481,649 persons (see Section 4.13, *Population and Housing*)

Comprehensive documentation of the modeling methodology, assumptions, calibration, and inputs used for the TCAG Model is provided in Appendix E of this EIR.

Movement of Goods

Tulare County is located at the core of California's agricultural industry and contains many of the State's key corridors for the movement of goods. Tulare County, and much of the Central Valley region, serve as the primary trade corridor for Los Angeles and San Francisco, California's two largest metropolitan areas. The movement of goods through the TCAG region is dominated by truck transfer. Tulare County has identified specific Farm to Market routes in order to prioritize the rehabilitation needs of over 40 routes to bring them into a good state of repair. Overall, the TCAG Farm to Market Routes are a network of roads that see at least 300 trucks per day and make up the backbone of goods movement through Tulare County (TCAG 2018b). Many of the incorporated cities of Tulare County maintain roadway systems with designated truck routes that allow truck traffic to pass through urban areas (City of Porterville 2007; City of Visalia 2014).

Many of the agricultural and manufacturing products from the TCAG region also utilize the Port of Oakland, the Port of LA/Long Beach, and the Port of Stockton for access to national and international markets. Products from the TCAG region are also shipped to Canada and other export facilities throughout the United States by Union Pacific rail and the BNSF rail lines (TCAG 2018b).

Public Transportation[2]

Tulare County Area Transit (TCaT) provides reliable and convenient fixed-route services throughout the TCAG region, connecting the communities of Tulare, Visalia, Dinuba, Porterville, and Delano. The latest routes are shown on the TCaT website (https://ridetcat.org/system-map/). Additional fixed-route services are available within the TCAG region, including Visalia Transit, Porterville Transit, Tulare Intermodal Express, and Dinuba Area Rural Transit. However, TcaT is the most extensive transit system in the TCAG region and provides connections with all other public transit providers. Cities with public transit centers within the TCAG region include Visalia, Tulare, Porterville, Dinuba, and Woodlake.

TCaT's fixed-route transit service includes nine routes, described below (TCaT 2022):

[2] In 2020, the Tulare County Regional Transit Authority (TCRTA) was formed. As of July 1, 2022, all of the transit operators in the County with the exception of Visalia Transit will be owned, operated, and administered by the TCRTA.

- **Route 10** serves North County, including the communities of Visalia, Seville, Cutler, East Orosi, Orosi, Sultana, and Dinuba. This route runs weekdays from 6:15 a.m. to 7:05 p.m. and weekends from 10:25 a.m. to 5:47 p.m. and provides connections to the Visalia Transit Center, Route 30, and Route 50.
- **Route 20** serves South County, including the communities of Tulare, Tipton, Pixley, Teviston, Earlimart, Richgrove, and Delano. This route runs weekdays from 5:45 a.m. to 8:14 p.m. and weekends from 8:40 a.m. to 6:42 p.m and provides connections to the Delano Transit Center and the Tulare Transit Station.
- **Route 30** serves Northeast County, including the communities of Three Rivers, Lemon Cove, Woodlake, Ivanhoe, and Visalia. This route runs weekdays from 5:15 a.m. to 8:15 p.m. and weekends from 8:50 a.m. to 6:00 p.m and provides connections to the Visalia Transit Center and Route 10.
- **Route 40** serves Southeast County, including the communities of Porterville, Strathmore, Lindsay, Tulare, and Visalia. This route runs weekdays from 5:25 a.m. to 7:53 p.m. and weekends from 9:45 a.m. to 6:40 p.m and provides connections to the Porterville Transit Center, Route 60, Route 90, Route 70, and Route 30.
- **Route 50** serves Dinuba, London, Traver, and Delft Colony, and includes service to both Walmart and KMart. This route runs weekdays from 8:20 a.m. to 6:16 p.m. and Saturdays from 9:30 a.m. to 3:20 p.m. and provides a connection to Route 10.
- **Route 60** serves the City of Lindsay. This route runs weekdays only from 9:00 a.m. to 3:00 p.m. and provides a connection to Route 90.
- **Route 70** serves the communities of Porterville and Springville and can be accessed by a Park and Ride facility at the intersection of SR 190 and Road 284. This route runs weekdays only from 8:45 a.m. to 4:00 p.m. and provides connections to the Porterville Transit Center, Route 40, Route 60, Route 90, and Route 80.
- **Route 80** serves the communities of Porterville and Terra Bella. This route runs weekdays only from 9:55 a.m. to 4:45 p.m. and provides connections to the Porterville Transit Center, Route 40, Route 60, Route 90, and Route 70.
- **Route 90** serves the communities of Lindsay, Strathmore, Plainview, Woodville, Poplar, and Porterville. This route runs weekdays only from 6:20 a.m. to 6:30 p.m. and provides connections to the Porterville Transit Center, Route 40, Route 70, and Route 80.

TCaT also provides curb-to-curb and door-to-door Dial-A-Ride services to accommodate Americans with Disabilities Act (ADA)-eligible riders within 0.75-mile of all routes, as well as free transportation for at-risk youth to free activities throughout the county through The Loop Bus services (TCaT 2022).

Visalia Transit offers 13 fixed-route bus lines throughout the City of Visalia serving over 120,000 residents seven days a week. Visalia Transit also operates a V-Line that provides shuttle service between Visalia and Fresno seven days a week, the Sequoia Shuttle Service that provides direct access to multiple locations within Sequoia National Park in the summer season, and ADA-compliant Dial-A-Ride services (City of Visalia 2022). Porterville Transit offers six fixed-route bus lines, serving over 60,000 residents seven days a week, throughout the City of Porterville with a total fleet of over 20 buses, along with complementary ADA paratransit and On-Demand transPORT services that allow riders to request travel as-needed (City of Porterville 2022). Tulare Intermodal Express operates seven fixed-route bus lines six days a week, along with ADA-compliant Dial-A-Ride services, that serve the Cities of Tulare and Visalia (City of Tulare 2022). Dinuba Area Rural Transit offers four fixed-route bus lines along with ADA-compliant Dial-A-Ride services and a DART Flexroute that combines fixed-route and dial-a-ride services. Dinuba Area Rural Transit provides access to destinations in and around Dinuba and connects to Fresno County at the City of Reedley, providing access for residents to jobs, shopping, and Reedley College. DART also offers free service on its Jolly Trolley, which connects the western part of the city to the eastern part, to major shopping destinations (Dinuba 2022). Finally, the City of Woodlake provides ADA-compliant Dial-A-Ride services with access to the Woodlake-Whitney Transit Center for connection to TCaT bus routes (City of Woodlake 2022).

Other public transportation carriers within the TCAG region include Amtrak Thruway Buses, Greyhound, Orange Belt Stage Lines, and Kings Area Rural Transit (KART). Amtrak is California's only operational interregional passenger rail service and does not directly serve Tulare County with a rail line. However, the Amtrak Thruway Buses are available from Visalia to Hanford, which is the closest available Amtrak rail line. Similarly, Kings County Area Transit offers a fixed- route service from Visalia to the Hanford rail line. Amtrak's San Joaquin route passes through the Hanford Station in Kings County eight times a day, providing a connection for Tulare and Kings County residents to the San Francisco Bay Area and Sacramento to the north, and Bakersfield to the south. Amtrak provides additional bus services and partners with third party buses to provide connections to other major cities throughout California (Amtrak 2021).

Existing transit ridership data for the TCAG region was provided by the TCAG Model and is shown in Table 4.15-3. Comprehensive documentation of the modeling methodology, assumptions, calibration, and inputs used for the TCAG Model is provided in Appendix E of this EIR.

Table 4.15-3 Existing Transit Ridership

Base Year	Transit Ridership
2021	15,665

Source: TCAG Model, Appendix E

Active Transportation (Bicycle and Pedestrian Facilities)

Bikeways are facilities that provide primarily for, and promote, bicycle travel. The five types of bikeways identified by the California Department of Transportation (Caltrans) in the Highway Design Manual are identified below (Caltrans 2020a).

- **Shared Roadway (No Bikeway Designation).** A majority of bicycle travel throughout California occurs on streets and highways without specific bikeway designations.
- **Class I Bikeway (Multi-Use/Bike Path).** A Class I bikeway is a multi-use facility that provides travel on a paved right-of-way completely separated from a street or highway. Cross flow by motor vehicles is minimized to avoid conflict with bicycles and pedestrians.
- **Class II Bikeway (Bike Lane).** A Class II bikeway provides a striped and stenciled lane for one-way travel on a street or highway and is intended to delineate the right of way, creating more predictable movements from both bicyclists and motorists. These bike lanes are usually established along streets in corridors where there is significant bicycle demand in order to improve conditions for bicyclists.
- **Class III Bikeway (Bike Route).** A Class III bikeway is a shared use facility (normally with motor vehicles) which serve to either provide continuity to other bicycle facilities or designate preferred routes through high demand corridors.

- **Class IV Bikeway (Cycle Tracks or Separated Bikeway).** A Class IV bikeway is intended for the exclusive use by bicycles and features a separation between the bikeway and the through vehicular traffic.

In addition to bicycling, walking is another active transportation option in the TCAG region. Both bicycling and walking within the TCAG region are attractive transportation alternatives due to the relatively flat topography and temperate climate during much of the year. Common pedestrian facilities include sidewalks, crosswalks, trails, bus shelters for transit usage, trees for shade, and ADA access ramps. TCAG adopted the Tulare County Regional Bicycle Transportation Plan in 2010, which ensures that the facilities planned within all eight local jurisdictions are integrated and compatible. TCAG also adopted a Regional Active Transportation Plan in 2016, known as "Walk 'n Bike Tulare County (TCAG 2016)." This document includes an inventory of existing bicycle and pedestrian facilities and conditions as well as planned expansions for active transportation facilities. The document is currently in the process of being updated. Final approval of the updated plan is anticipated in April 2022.

The City of Dinuba has developed a city-wide bicycle and pedestrian path system, and actively promotes bicycle safety education programs in elementary schools through the police and recreation departments. Pedestrian facilities in the City of Dinuba include sidewalks, paths, crosswalks, street lighting, and pedestrian signals at traffic intersections (City of Dinuba 2008).

Pedestrian facilities in the City of Exeter include sidewalks, medians, roundabouts, bulbouts, entryways, and crosswalks. The City of Exeter also maintains the Locust-Grove Trail, which allows residents to walk or ride a bike from one end of the Southwest Exeter Specific Plan planning area to the other with minimal interference from motorized vehicles (City of Exeter 2005).

At the time of its General Plan adoption in 2007, the City of Porterville had recently completed eight miles of bikeway segments, added eleven bicycle parking facilities, and was developing a Class 1 bicycle and pedestrian path along with a rail-to-trail bicycle and pedestrian path. In addition to the improvements made by the City, the 2002 TCAG Bicycle Transportation Plan identified 110.5 miles of existing and proposed bikeways in the Porterville area. As part of the proposed street standards within the Porterville 2030 General Plan, up to 75 miles of new Class II and Class III bikeways were anticipated to be added to the bikeway network as new arterial and collector streets were built. However, the pedestrian system in Porterville is limited to sidewalks (City of Porterville 2007).

The City of Visalia is the only incorporated City in the TCAG region with its own Active Transportation Plan, which was adopted in 2017 with the intent to guide bikeway policies, programs, and facility improvements to improve safety, comfort, and convenience for all users. Although the City has yet to fully finalize implementation of the network outlined in the Plan, many Class I, II and III bicycle facilities are fully functional within the City. Completion of the planned bicycle network would provide the City of Visalia with a robust bicycle and pedestrian network that links neighborhoods to parks, schools, employment centers, and other desirable destinations. In addition to the bicycle infrastructure, Visalia offers bicycle racks on buses for most of the Visalia Transit fleet, which extend the bicycles ranges and offer connections to other cities in the TCAG region (City of Visalia 2014). Similar to the City of Porterville, the pedestrian system in Visalia is mainly comprised of sidewalks. In addition to standard sidewalks that have been developed in residential and non-residential areas, several multi-use trails can be used throughout the City. The Visalia Unified School District, along with the City of Visalia, are also actively pursuing federal and state Safe Routes to School grant program funding that promotes the development of adequate pedestrian facilities in neighborhoods near schools. The City of Visalia is also committed to complying with ADA standards with new development and are working to bring non-standard ADA bicycle and pedestrian facilities into ADA compliance (City of Visalia 2014).

The City of Woodlake maintains a Class I bike path that was established in the abandoned Visalia Electric Railroad right-of-way. Additionally, the City maintains a Class I bike path on top of the bank surrounding Bravo Lake. The two bike paths are linked at the Bravo Lake Botanical Garden, near SR 216. These bike paths also serve as a pedestrian pathway (City of Woodlake 2007).

At the time of its General Plan adoption in 2002, the City of Farmersville did not have established bike lane or pedestrian facilities. However, Farmersville was actively participating in the preparation of a TCAG region bike plan that would designate bicycle routes on multiple roadways within the City's jurisdiction (Collins and Schoettler 2002). The City of Farmersville adopted the Tulare County Regional Bicycle Transportation Plan for use in 2010. The adopted plan proposed a variety of Class I Bike Paths along the Tulare Irrigation District Main Intake Canal, Extension Ditch, Blain Ditch, Deep Creek, the railroad frontage, and Walnut Avenue between Farmersville Boulevard and Extension Ditch as well as Class II Bike Lanes along Farmersville Boulevard, Visalia Road, Walnut Avenue, Oakland Street west of Farmersville Boulevard and a portion of Ventura Avenue south of Visalia Road. Class III Bicycle Routes were also proposed along local roadways to provide continuity between bikeway facilities and to connect neighborhoods to retail, schools and parks (City of Farmersville 2012). The City of Farmersville 2012 Comprehensive Infrastructure Master Plan also identified a Waterway Trails Master Plan, adopted in 2010, that established a network of multi-purpose trails and open space corridors along numerous waterways within the City (City of Farmersville 2012). According to the 2016 Walk 'n Bike Tulare County, the state of the pedestrian system within Farmersville in generally sufficient, and a program is currently in place to satisfy the need for ADA curb ramps. Additionally, the City of Farmersville recently completed the Liberty Park pedestrian exercise trail and a Safe Routes to School project on Walnut Avenue, west of Farmersville Boulevard (TCAG 2016).

The City of Lindsay adopted its General Plan Circulation Element in 1989. At the time of its adoption, the City did not have established bike lanes. Instead, the General Plan suggests that the relatively compact character of the community would allow bicyclists to use collector and local streets as the principal routes for bicycle transportation due to their sufficient continuity that would allow for safe bicycle travel (Lindsay City Council 1989). According to the 2016 Walk 'n Bike Tulare County, the downtown area of Lindsay is well served by pedestrian facilities. Many intersections in the City have ADA accessible ramps, and all recent repairs or new construction includes ADA accessible ramps. Tulare Road within the City of Lindsay features a Class II bike lane, and multiple Class I multi-use paths exist in City Park. The City of Lindsay also recently completed the Sequoia Ave pedestrian pathway project to provide curb, gutter, and sidewalk facilities to Roosevelt Elementary School (TCAG 2016).

Finally, the City of Tulare does not describe the existing bicycle and pedestrian network in its General Plan. However, the Tulare General Plan Transportation and Circulation Element does define bikeways similar to the Caltrans definitions and includes a variety of goals and policies related to maintaining an efficient and safe non-vehicular circulation system throughout the City (City of Tulare 2014). According to the 2016 Walk 'n Bike Tulare County, there are still roadway segments within the City of Tulare that do not have sidewalk facilities. Key intersections do typically have marked crosswalks, but there is not currently a specific program being implemented for adding curb ramps at such crosswalks. However, the City has recently completed a variety of projects to enhance the existing pedestrian system, such as flashing beacons, the Santa Fe Trail lighting projects, and sidewalk improvements along segments of key routes to schools (TCAG 2016).

Air Transportation

The TCAG region has seven publicly owned general aviation airports, which include the following:

- Exeter Airport
- Porterville Municipal Airport
- Eckert Field Airport
- Mefford Field Airport
- Sequoia Field Airport
- Visalia Municipal Airport
- Woodlake Airport

None of the airports listed above provides scheduled air carrier service. The nearest airport providing scheduled air carrier service is Fresno-Yosemite International Airport in Fresno. There are several private airports in the region that are used primarily for agricultural or business purposes. Overall, Tulare County's airports primarily serve hobbyists, pilots who own aircraft, the agricultural industry, police, and medical services.

In addition to general aviation airports, several private heliports are maintained for helicopter use in the TCAG region. These heliports include San Joaquin Helicopters Heliport and San Joaquin Sprayers Inc. Heliport in Delano, Ash Mountain Heliport in Three Rivers, SCE San Joaquin Heliport and two Tulare Motor Sports Heliports in Tulare, and Gilbert Aviation Heliport in Visalia.

Emerging Travel and Mobility Options and Technology

New transportation technologies can have an important influence on regional and national transportation systems, and some have already started to change longstanding transportation behaviors. Several new options that affect vehicle trips have begun emerging around the nation in the last decade. For example, transportation network companies (TNCs), such as Uber and Lyft, provide ridesharing opportunities, similar to taxi for-hire services but are reserved for on-demand users who can request a ride through a smartphone app. Such services contract drivers using their personal vehicles to provide on-demand rides. These services began operations in roughly 2013 and operations continue today.

Micromobility, in the form of application-reservation-based e-scooters and bikeshare, is another emerging trend that was largely introduced in 2017. The micromobility industry has been highly volatile as many startup companies have emerged, consolidated, and/or discontinued operations over the last few years. Other transportation innovations include the following: connected and autonomous vehicles; mobility aggregation applications that provide users with one source for mobility services (e.g., Moovel, CityMapper); coordinated and adaptive traffic signals; active traffic management, which provides the ability to dynamically manage traffic through use of strategies such as adaptive ramp metering and adaptive traffic signal control; and unmanned aircraft systems. These and other emerging technologies have the potential to transform mobility choices and alter the transportation landscape.

Application-based food delivery services, such as UberEats, Grubhub, Doordash, and Postmates, have also expanded dramatically in recent years. Such services were fueled by the COVID-19 pandemic which limited or periodically closed dining at restaurants through most of 2020 and early 2021. Drivers for such food delivery services may operate trips for multiple food delivery and passenger applications simultaneously, depending on where demand is highest. Delivery of packages and parcels through traditional methods such as the Postal Service, UPS, FedEx, and newcomers like Amazon Prime also saw expansion as a result of the COVID-19 pandemic with trends increasing towards online shopping, resulting in fewer trips to traditional retail centers.

Beyond new travel options, emerging vehicle technology is beginning to influence travel behavior and safety. For example, smartphone applications such as Google Maps and Waze better inform travelers regarding route options, comparative costs and offering dynamic routing to avoid significant delays. Safety technology on newer vehicles can include assisted braking, lane guidance, and attentiveness alerts, all of which could reduce risk of collisions. Such features will likely become standard on most vehicles in the coming years. As collisions decline, some congestion-related collisions could be reduced over time.

Transportation Demand Management/Transportation System Management

Transportation Demand Management (TDM) refers to all programs and strategies that are intended to reduce the number of vehicle trips required over the transportation network or shift the distribution of trips between time periods across the network (FHWA 2012). Transportation System Management (TSM) represents a variety of management techniques designed to improve the efficiency and effectiveness of the transportation system. These techniques improve operations and/or services of existing and future transportation networks (FHWA 2012).

Vehicle Flow Management

The Department of Energy's Fuel-Efficient Traffic Signal Management Program has assisted in increasing the number of synchronized traffic signals within the region to promote free flowing vehicle transportation conditions, less use of vehicle fuel, and decreased pollution due to less vehicle miles traveled. In the past, some jurisdictions have implemented minor design improvements to the existing transportation infrastructure in lieu of costly capital construction or reconstruction. In the future, signalization, channelization, and the construction of acceleration and deceleration lanes with ramp metering at key interchanges are expected to achieve roadway vehicle flow improvements.

Intermodal Transportation

Transportation engineers and planners in the TCAG region have employed one or more of the following methods of enhancing intermodality to increase the use of the existing transportation capacity more efficiently:

- Coordinate transit routes and schedules with those of inter-city rail and bus service;
- Provide amenities and facilities for bicycle and pedestrian access to transit stops;
- Facilitate and encourage access to the regional air carrier airport by paratransit, transit, taxi, transportation network companies and bicycle; and
- Provide park and ride facilities with bicycle, pedestrian and transit access amenities.

Ridesharing

Rideshare programs help reduce congestion and improve traffic flow. Rideshare and carpool programs in the TCAG region are limited to Valleyrides, a cooperative effort between Fresno Council of Governments, Tulare County Association of Governments, and California State University Fresno to serve residents commuting to Fresno and Tulare Counties. Valleyrides acts as a ridematching database to assist in forming or finding a carpool, vanpool or bikepool. Valleyrides provides contact information on air, rail, bus, taxi, and other transportation services as well as downloadable maps of nearby bicycling and walking trails (Fresno Council of Governments 2021).

Preferential Transit/Carpool Treatment/Electric Vehicle Charging

Methods employed by local jurisdictions to encourage people to reduce their use of single-occupant vehicles include preferential parking for carpools and vanpools; subsidized transit passes; use of agency vans for vanpooling; and provision of an on-site transportation coordinator. Regional transit agencies strive to ensure that major developments within their service areas are transit accessible and that transit stops are located to promote transit use.

Shared Parking Facilities

Parking management refers to programs that result in more efficient use of parking resources and can either provide an incentive or disincentive to single occupant vehicle use. Parking facilities that are shared between multiple users and destinations are found within the region. Park and ride lots are a form of off-site shared parking facilities and facilitate ridesharing. Park and ride lots within the region have been placed in locations where people can easily meet and form carpool trips, such as the park and ride facility associated with TCAT’s Route 70 that serves the communities of Porterville and Springville. Parking garages are also associated with shared parking in the TCAG region and are often located near destinations attracting a large number of visitors. Parking regulations which control when and how long vehicles may park and the cost of the parking in a location is another form of parking management.

4.15.2 Regulatory Setting

a. Federal Laws, Regulations, and Policies

Moving Ahead for Progress in the 21st Century Act

The Moving Ahead for Progress in the 21st Century Act (MAP-21), was enacted in 2012. Through the medium-term plan development process, MAP-21 encourages Metropolitan Planning Organizations (MPOs), such as TCAG, to consult with officials responsible for other types of planning activities that are affected by transportation in the area (including State and local planned growth, economic development, environmental protection, airport operations and freight movements) or to coordinate its planning process, to the maximum extent practicable, with such planning activities (23 U.S.C. §134(g)(3)(A)).

Specifically, MAP-21 requires that the medium-term planning process provide for consideration of projects and strategies that will:

- Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity and efficiency;
- Increase the safety of the transportation system for motorized and non-motorized users;
- Increase the security of the transportation system for motorized and non-motorized users;
- Increase the accessibility and mobility of people and for freight;
- Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;

- Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
- Promote efficient system management and operation; and
- Emphasize the preservation of the existing transportation system (23 U.S.C. §134(h)(1)).

Fixing America's Surface Transportation Act

Fixing America's Surface Transportation (FAST) Act builds on the changes made by MAP-21 and was signed into law in December 2015 (Public Law 114-94). The FAST Act authorizes $305 billion through fiscal year 2020 for highways, highway and motor vehicle safety, public transportation, rail and research and technology programs and provides a dedicated source of federal funds for freight projects. The FAST Act expands the scope of consideration of the metropolitan planning process to include consideration of intercity transportation, including intercity buses, intercity bus facilities and commuter vanpool providers; improving transportation system resiliency and reliability; reducing or mitigating the stormwater impacts of surface transportation; and enhancing travel and tourism. In addition, it requires strategies to reduce the vulnerability of existing transportation infrastructure to natural disasters.

Under the FAST Act, the U.S. Department of Transportation requires that MPOs, such as TCAG, prepare long-range transportation plans and update them every four years if they are in areas designated as "nonattainment" or "maintenance" for federal air quality standards. Before enactment of the FAST Act and its predecessor, MAP-21, the primary federal requirements regarding long-range transportation plans were included in the metropolitan transportation planning rules (23 CFR Part 450 and 49 CFR Part 613). The FAST Act makes a number of changes to the statutes that underpin these regulations. Per federal requirements, long-range transportation plans must:

- Be developed through an open and inclusive process that ensures public input; seeks out and considers the needs of those traditionally under served by existing transportation systems; and consults with resource agencies to ensure potential problems are discovered early in the planning process;
- Be developed for a period of not less than 20 years into the future; long-range transportation plans must reflect the most recent assumptions for population, travel, land use, congestion, employment and economic activity;
- Have a financially constrained element, transportation revenue assumptions must be reasonable, and the long-range financial estimate must take into account construction-related inflation costs;
- Include a description of the performance measures and performance targets used in assessing the performance of the transportation system;
- Include a system performance report evaluating the condition and performance of the system with respect to performance targets adopted by the state that detail progress over time;
- Include multiple scenarios for consideration and evaluation relative to the state performance targets as well as locally-developed measures.
- Conform to the applicable federal air quality plan, called the State Implementation Plan, for ozone and other pollutants for which an area is not in attainment; and
- Consider planning factors and strategies in the local context.

On September 30, 2020, the United States Senate approved H.R. 8337, which provides fiscal-year 2021 appropriations to federal agencies for continuing projects and activities of the federal government. Included in this act is a 1-year, $13.6 billion extension of the FAST Act.

Infrastructure Investment and Jobs Act

The Infrastructure Investment and Jobs Act (IIIJA) replaced the expired FAST Act and was signed into law in November 2021 (Public Law 117-58). The IIJA authorizes $973 billion through Fiscal Year 2022 for investment in all modes of transportation as well as investment in water, power and energy, environmental remediation, public lands, broadband, and overall resilience. The Act distributes the federal funds in three ways (National Association of Counties [NACO] 2021):

- Authorizations from the federal Highway Trust Fund for highway and transit programs;
- Authorizations of appropriations from the General Fund of the U.S. Treasury, subject to annual appropriations process; and
- Advanced appropriations over five years, independent of the regular appropriations process.

Of the $973 billion, $550 billion is to be allocated for new investments, such as funding provided through a surface transportation authorization law. Of the $550 billion dedicated to new investments, $284 billion will be distributed to the U.S. Department of Transportation in order to modernize and make improvements across all modes of transportation. Those funds are reserved for the following (NACO 2021):

- Roads & Bridges: $110 billion
- Transit: $39 billion
- Rail: $66 billion
- Safety: $11 billion
- Airports: $25 billion
- Ports & Waterways: $17 billion
- Electric vehicle chargers: $7.5 billion
- Electric buses: $7.5 billion
- Reconnecting Communities: $1 billion

Counties and Metropolitan Planning Organizations (MPOs), such as TCAG, can access the IIJA funds competitively, through federal grant programs and competitive processes run by state departments of transportation and MPOs, through suballocations based on populations from state departments of transportation, and through federal formulas such as transit formulas and the formula (entitlement) component of the Airport Improvement Program. Overall, the IIJA establishes a new, long-term surface transportation reauthorization and significantly increases the number of competitive grant opportunities via supplemental appropriations to the U.S. Department of Transportation (NACO 2021).

Specifically, California can expect to receive approximately $29.5 billion over five years in Federal highway formula funding for state highway and bridge projects. The IIJA will assist in repairing and rebuilding roads and bridges with a focus on climate change mitigation, resilience, equity, and safety for all users, including cyclists and pedestrians. Additionally, the IIJA will improve healthy, sustainable transportation options for millions of Americans; California can expect to receive approximately $10.3 billion over five years to improve public transportation options across the state. Finally, the IIJA is expected to help modernize and expand passenger rail in California while improving freight rail efficiency and safety (U.S. Department of Transportation 2022).

Congestion Management Process

Congestion can generally be described as a condition in which the demand for road space exceeds the supply of road space, preventing the free movement of both vehicles and people (TCAG 2015). The enactment of MAP-21, described above, required all MPOs serving a transportation management area (TMA) maintain a congestion management process (CMP). A CMP is a systematic and regionally accepted approach for managing congestion that provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meet state and local needs. A TMA is an area with a population of over 200,000, such as Tulare County. Federal requirements state that in all TMAs, including Tulare County, the CMP must be developed and implemented as an integrated part of the metropolitan transportation planning process. The Moving Ahead for Progress in the 21st Century bill expired in 2014 and was replaced by the FAST Act, which subsequently expired in September 2021. Tulare County adopted their Final Congestion Management Process in 2015, outlining the following specific objective (TCAG 2015):

- Support projects which result in the development of an efficient and connected regional circulation system that provides maximum achievable mobility and accessibility for all modes of travel;
- Support circulation projects that maintain and improve performance, safety, and security;
- Support projects which improve the operation and efficiency of public transportation in Tulare County, such as transit, bicycling, pedestrian and passenger rail systems; and,
- Support projects which improve the efficiency of goods movement in Tulare County (including farm to market products) such as improved truck circulation projects, road rehabilitation, and highway interchange improvements.

b. State Laws, Regulations, and Policies

California Transportation Plan

The California Transportation Plan is prepared by the California State Transportation Agency every five years to provide a long-range policy framework to meet the State’s future mobility needs and reduce greenhouse gas (GHG) emissions to goals set by the California Global Warming Solutions Act of 2006 (Assembly Bill [AB 32], discussed in Section 4.8, *Greenhouse Gas Emissions/Climate Change*) and implementing legislation SB 375 (discussed below). The most recent California Transportation Plan was adopted in 2021 (Caltrans 2021). The California Transportation Plan defines goals, performance-based policies, and strategies to achieve the State’s collective vision for California’s future statewide, integrated, multimodal transportation system by envisioning a sustainable system that improves mobility and enhances quality of life. The California Transportation Plan is developed in collaboration with transportation stakeholders such as TCAG. Through ongoing engagement, the California Transportation Plan is intended to provide goals and visions to support a fully integrated, multimodal, sustainable transportation system that supports the quality of life, prosperous economy, human and environmental health, and social equity.

California Transportation Commission Regional Transportation Plan Guidelines

The California Transportation Commission (CTC) publishes and periodically updates guidelines for the development of long-range transportation plans, such as TCAG's proposed 2022 RTP/SCS. Pursuant to Government Code Section 65080(d), each regional transportation planning agency (RTPA) is required to adopt and submit an updated RTP to CTC and Caltrans every four years. TCAG is the designated RTPA for Tulare County.

Under Government Code Section 14522, the CTC is authorized to prepare guidelines to assist in the preparation of RTPs. The most recent update to the RTP guidelines was published in 2017 and includes separate guidance for RTPAs and MPOs and new checklists for RTP content (CTC 2017).

Climate Action Plan for Transportation Infrastructure

The Climate Action Plan for Transportation Infrastructure was adopted on July 12, 2021 (CalSTA 2021). The Climate Action Plan for Transportation Infrastructure details how the state recommends investing billions of discretionary transportation dollars annually to aggressively combat and adapt to climate change while supporting public health, safety, and equity. The Climate Action Plan for Transportation Infrastructure builds on executive orders signed by Governor Gavin Newsom in 2019 and 2020 targeted at reducing GHG emissions in transportation, which account for more than 40 percent of all emissions, to reach the state's ambitious climate goals (CalSTA 2021).

State Regional Transportation Plan Requirements

Government Code Sections 65080 et seq. state that MPOs must prepare and adopt a long-range transportation plan, such as an RTP, directed at achieving a coordinated and balanced regional transportation system, including, but not limited to, mass transportation, highway, railroad, maritime, bicycle, pedestrian, goods movement and aviation facilities and services. The plan must be action-oriented and pragmatic, considering both the short-term and long-term planning, and shall present clear, concise policy guidance to local and state officials. Each transportation planning agency must consider and incorporate, as appropriate, the transportation plans of cities, counties, districts, private organizations and state and federal agencies.

Pursuant to Government Code section 65080(d), MPOs, such as TCAG, that are located in nonattainment and monitoring areas must update their long-range transportation plans at least every four years.

The CTC has developed RTP guidelines to assist MPOs with developing their RTPs so that they are consistent with federal and state transportation planning requirements. The guidelines are updated and adopted periodically, as needed. For the first time, two separate guidelines were adopted in January 2017 to guide RTP development in MPOs and RTPAs. Both documents incorporate new legislation and the associated goals, particularly related to reducing GHG emissions and improving air quality. Both the 2017 RTP Guidelines for MPOs and the 2017 RTP Guidelines for RTPAs specify that the requirements outlined in the documents apply to all RTP updates begun following adoption (CTC 2017).

The 2017 RTP Guidelines include guidelines for regional travel demand modeling. The regional travel demand model guidelines are "scaled" to different sizes of MPOs. The guidelines also describe the methods for projecting of future travel demand, as well as the key assumptions typical of transportation demand models. In addition, the guidelines describe the consultation and coordination process, which are designed to foster involvement by all interested parties including air quality agencies, discuss the environmental considerations of an RTP, and list the general contents of an RTP document (CTC 2017).

Senate Bill 375

The Sustainable Communities and Climate Protection Act of 2008 (Chapter 728, Statues of 2008) (SB 375) diversified the areas of study from past RTPs to include land use impacts and climate change issues. Specifically, SB 375 requires MPOs to prepare a SCS that demonstrates how the region will meet its GHG reduction targets through integrated land use, housing, and transportation planning. The SCS must identify a transportation network that, when integrated with the forecasted development pattern for the TCAG region, will reduce GHG emissions from automobiles and light trucks in accordance with targets set by the California Air Resources Board (CARB).

Under SB 375, some development and transportation projects assumed as a part of the proposed 2022 RTP/SCS may be eligible to use a streamlined version of the environmental review process. Among other criteria, these projects must be consistent with the land use designation, density, intensity, and policies of the proposed 2022 RTP/SCS, and fall within the identified criteria for development and transportation projects. Streamlining under SB 375 is described in more detail in Section 1.4.1, *Streamlining Under SB 375*.

Senate Bill 743

SB 743 (2013) changed the way that public agencies evaluate the transportation impacts of projects under CEQA, recognizing that roadway congestion, while an inconvenience to drivers, is not itself an environmental impact. (See PRC Section 21099(b)(2) ["automobile delay, as described solely by level of service or similar measures of vehicular capacity or traffic congestion shall not be considered a significant impact on the environment pursuant to [CEQA]"].)

Under SB 743, the Governor's Office of Planning and Research (OPR) established VMT as the preferred metric for measuring transportation impacts of most projects in place of vehicle level of service (LOS) or related measures of congestion as the primary metric. The use of VMT for determining significance of transportation impacts has become commonplace since the certification of this provision and the release of OPR's Technical Advisory on Evaluating Transportation Impacts in CEQA in December 2018 and, as of July 1, 2020, is the required metric statewide (OPR 2018).

For land use projects, SB 743 provides opportunities to streamline transportation analysis under CEQA for qualifying urban infill development near major transit stops in metropolitan regions statewide, as described in more detail in Section 1.4.1, *Streamlining Under SB 743*. Additionally, the legislation establishes that aesthetic and parking impacts of these projects are not considered significant impacts on the environment.

SB 743 can also substantially affect the review of transportation projects under CEQA. Some projects, such as expanding facilities for bicycle, pedestrian, or transit only use, will not result in adverse transportation impacts because they are assumed not to substantially increase automobile trips. However, for roadway capacity projects, the CEQA guidelines (Section 15064.3) give lead agencies some discretion over what metric is used to evaluate transportation impacts, as some roadway expansion projects can induce vehicle travel. If using a metric besides VMT, however, the change in vehicle travel should still be reported. A program-level assessment of roadway projects in a regional plan may also be used to streamline project level analysis (OPR 2018).

Caltrans has provided two guidance documents to address VMT impacts on the state highway system consistent with the requirements of SB 743 and the OPR Technical Advisory:

- The Transportation Analysis under CEQA (TAC) provides information to support CEQA practitioners in making CEQA significance determinations for transportation impacts of projects on the state highway system. These could include land use projects or transportation projects (Caltrans 2020b).
- The Transportation Analysis Framework (TAF) guides the preferred approach for analyzing the VMT attributable to proposed projects (induced travel) in various project settings, with particular focus on the analysis of induced travel associated with transportation projects which would add road capacity to the transportation system (Caltrans 2020c).

State CEQA Guidelines Section 15064.3 and OPR Technical Advisory

State CEQA Guidelines Section 15064.3 implements SB 743 and establishes VMT as the most appropriate measure of transportation impacts. The primary components of Section 15064.3 include:

- Identifies VMT as the most appropriate measure of transportation impacts;
- Declares that a project's effect on automobile delay shall not constitute a significant environmental impact (except for projects increasing roadway capacity);
- Creates a rebuttable presumption of no significant transportation impacts for (a) land use projects within one-half mile of either an existing major transit stop or a stop along an existing high quality transit corridor, (b) land use projects that reduce VMT below existing conditions, and (c) transportation projects that reduce or have no impact on VMT;
- Allows a lead agency to qualitatively evaluate VMT if existing models are not available; and
- Gives lead agencies discretion to select a methodology to evaluate a project's VMT but requires lead agencies to document that methodology in the environmental document prepared for the project.

CEQA lead agencies were required to comply with the State Guideline Section 15064.3 no later than July 1, 2020. Tulare County adopted specific thresholds for the purposes of evaluating VMT impacts of projects within their jurisdiction in 2020 as an Amendment to the Transportation & Circulation Element of the County's General Plan (Tulare County 2012). Other municipalities and agencies in the TCAG region have not formally adopted thresholds for evaluating VMT impacts, but instead generally use a threshold of 15 percent less VMT per capita than existing average VMT for the area. The 15 percent below existing VMT threshold for land use projects is based on guidance provided by the OPR in its *Technical Advisory on Evaluating Transportation Impacts in CEQA* (OPR 2018), specifically, the following language:

> Based on OPR's extensive review of the applicable research, and in light of an assessment by the CARB quantifying the need for VMT reduction in order to meet the State's long-term climate goals, OPR recommends that a per capita or per employee VMT that is 15 percent below that of existing development may be a reasonable threshold. [¶] Fifteen percent reductions in VMT are achievable at the project level in a variety of place types. [¶] Moreover, a 15 percent reduction is consistent with SB 743's direction to OPR to select a threshold that will help the State achieve its climate goals. As described above, section 21099 states that the criteria for determining significance must "promote the reduction in greenhouse gas emissions." In its document the CARB 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals,

> CARB assesses VMT reduction per capita consistent with its evidence-based modeling scenario that would achieve State climate goals of 40 percent GHG emissions reduction from 1990 levels by 2030 and 80 percent GHG emissions reduction levels from 1990 by 2050. Applying California Department of Finance population forecasts, CARB finds per-capita light-duty vehicle travel would need to be approximately 16.8 percent lower than existing, and overall per-capita vehicle travel would need to be approximately 14.3 percent lower than existing levels under that scenario. Below these levels, a project could be considered low VMT and would, on that metric, be consistent with 2017 Scoping Plan Update assumptions that achieve climate state climate goals… [¶] In summary, achieving 15 percent lower per capita (residential) or per employee (office) VMT than existing development is both generally achievable and is supported by evidence that connects this level of reduction to the State's emissions goals (OPR 2018).

Assembly Bill 1358

AB 1358, also known as the Complete Streets Act of 2008, amended the California Government Code Section 65302 to require that any substantive revisions to a city or county's Circulation Element include provisions for accommodations of all roadway users, including bicyclists and pedestrians.

California Bicycle Transportation Act

The California Bicycle Transportation Act of 1994 requires all cities and counties to have an adopted bicycle master plan to apply for Bicycle Transportation Account funding source. Existing bicycle master plans and other modal plans adopted within the TCAG region are described below.

c. Regional Laws, Regulations, and Policies

Regional Transportation Planning Agency Transportation Plans

As described in Section 1.2, *Project Background*, TCAG functions as both the federally-designated MPO and the State-designated regional transportation planning agency RTPA for Tulare County. Under federal regulations (23 CFR 450.322(c)) and State law (Government Code 65080(d)), TCAG is required to prepare a long-range (at least 20-year) transportation planning document, known as the RTP. The RTP must be updated every four years and must be consistent with the California Transportation Plan. The RTP is generally an action-oriented document used to achieve a coordinated and balanced regional transportation system.

Complete Streets

TCAG adopted a Complete Streets document in 2017 that is intended to reduce traffic congestion, improve air quality, and increase the quality of life of residents by providing safe, convenient, and comfortable routes for walking, bicycling, and public transportation within the TCAG region. The County's major goals, as outlined in the Complete Streets document, are as follows (TCAG 2017):

- Tulare County's transportation network will be supported through a variety of feasible transportation choices, which allows for sustainable growth.
- The livability of neighborhoods and commercial centers located along the County's transportation corridors will be enhanced by a safe and inviting pedestrian environment.
- The design of multimodal roadway facilities will not compromise the needs of larger vehicles such as transit vehicles, fire trucks and freight delivery trucks.

- Inclusion of Complete Streets design elements will allow for design flexibility on different street functions and neighborhood contexts.
- Inclusion of Complete Streets design elements will improve the integration of land use and transportation, while encouraging economic revitalization through infrastructure improvements.

The County's major objectives, as outlined in the Complete Streets document, are as follows (TCAG 2017):

- To create an integrated and connected transportation network that supports transportation choices and sustainable growth.
- To ensure that all transportation modes are accommodated to the extent possible in all public roadway facilities in the County.
- To develop and use the latest design standards and guidelines in the design of Complete Streets.
- To provide flexibility in the implementation of this policy so that streets chosen for implementation of Complete Streets elements can be developed to fit within the context of their principal purpose and surroundings without compromising the safety of users and needs of larger vehicles.

d. Local Laws, Regulations, and Policies

General Plans

State law requires cities and counties to adopt general plans, which must incorporate a circulation element, also often called a transportation element. A general plan's transportation element (also sometimes circulation element) is an infrastructure plan and policy document used to determine the needed expansion or modification of the transportation network (including services) to accommodate planned population and employment growth. The elements generally address expectations for transportation network operations and safety based on goals and policies of the city or county. The elements also often address goods movement, public transit, bicycle facilities and pedestrian facilities.

Transportation provisions in applicable county and city general plans for the TCAG region are discussed below.

Tulare County General Plan

The Tulare County General Plan's Transportation and Circulation Chapter includes goals that focus on promoting an efficient roadway and highway system for the movement of people and goods, which enhances the physical, economic, and social environment while being safe, environmentally friendly, and cost-effective; improving and enhancing current rail services that stimulate economic growth and meet the needs of freight and human transportation; enhancing airports in the County to meet the County's changing needs and demands while minimizing adverse airport related environmental impacts and safety hazards; supporting the development of a public transportation system that provides an alternative to the private automobile and meets the needs of those considered "transit dependent;" encouraging the development of safe, continuous, and easily accessible bicycle and trail systems that facilitate the use of viable transportation alternatives in a safe and financially feasible manner; and, addressing the transportation system from a multimodal perspective and identify how to provide for routine accommodation of all roadway users, including motorists, pedestrians, bicyclists, people with disabilities, seniors, and users of public transportation in a manner suitable to the rural, suburban, or urban context of the general plan (Tulare County 2012).

Dinuba General Plan

The Dinuba General Plan Circulation Element focuses on designing and maintaining a fully integrated local network that provides for safe and convenient circulation using a variety of transportation modes. This goal is achieved by implementing policies that develop a circulation network of local roads, collectors, arterials that will meet projected traffic needs; efficiently manage the construction and maintenance of the street and highway system; maximize the use of site planning techniques to improve traffic safety; promote the use of alternative modes of transportation; encourage the use of bicycles as a viable means of transportation; provide a safe walking environment for pedestrians; assure the continuation of railroad freight service to the City of Dinuba; upgrade and maintain existing transportation corridors to meet urban safety standards; encourage the development of strategies for maximizing the efficiency of the existing street system; promote a variety of public transit connections with other nearby cities and locations; develop adequate maintenance programs for the community’s transportation networks; and, provide safe and efficient truck routes into and within the community (City of Dinuba 2008).

Exeter General Plan

The City of Exeter General Plan has a circulation element that contains a profile of existing conditions in the community, and then a series of goals, policies, and action plans to achieve the City’s transportation objectives during the life of the General Plan (City of Exeter 2012).

Farmersville General Plan

The Farmersville General Plan Circulation Element includes goals, objectives, and policies related to ensuring streets in Farmersville are not congested, ensuring traffic on Farmersville’s streets operates in an efficient and safe manner, providing efficient and safe circulation access to all parts of Farmersville, improving connectivity in Farmersville’s street system, establishing truck routes through Farmersville that are safe and not disruptive, promoting opportunities for residents to increase mobility within Farmersville, encouraging persons to ride bikes for good health as well as for environmental reason, and encouraging residents to walk in Farmersville (Collins and Schoettler 2002).

Lindsay General Plan

The City of Lindsay General Plan, Part IV, Section B (Circulation Element), focuses on guiding and providing for the development of an integrated system of internal circulation and access to serve all citizens of the Lindsay area, including the young, the elderly, and the physically handicapped. This is achieved by policies that increase the efficient movement of people and goods, lower VMT and therefore lower quantities and impacts of vehicle emissions, and minimizing and (where possible) avoiding the disruption of residential areas caused by through traffic (Lindsay City Council 1989).

Porterville 2030 General Plan

The Porterville General Plan Circulation Element includes goals, objectives, and policies promote safe and efficient vehicular circulation, provide a wide variety of transportation alternatives and modes to service all residents and businesses to enhance the quality of life, make efficient use of existing transportation facilities to reduce total VMT per household, promote the use of public transit for daily trips to schools and work and for other purposes, promote the use of bicycles to alleviate vehicle traffic and improve public health, promote pedestrian activity, and improve commercial goods movement (City of Porterville 2007).

2035 Tulare General Plan

The City of Tulare General Plan Transportation Element focuses on developing an integrated transportation system that provides for the safe and efficient movement of people and goods. This goal is achieved by maintaining an efficient, affordable, and safe roadway system throughout Tulare in a way that is economically sustainable. The City strives to maintain and develop an adequate transit system that provides for the local and regional transit needs of Tulare residents, maintain an efficient and safe non-vehicular circulation system through Tulare, improve the City's transportation system through the use of TSM and TDM strategies, provide an efficient system for goods movement that adequately serves the industrial and commercial areas of Tulare, and maintains adequate general aviation air service to business, recreation, and agricultural enterprises in Tulare (City of Tulare 2014).

Visalia General Plan

The Visalia General Plan Circulation Element includes goals and objectives related to transportation, traffic, and emergency access. The Circulation Element objectives focus on developing and maintaining a road system that is convenient, safe, efficient, and cost effective; maximizing the use and efficiency of the existing transportation system through application of TSM strategies; promoting ways to reduce the number of peak hour trips and vehicle-miles traveled; and, ensuring that new development pays its fair share of the costs of new and improved transportation facilities. The Circulation Element also provides a variety of policies related to system planning, level of service standards, engineering and safety standards, right of way acquisition and construction, traffic studies and mitigation measures, and coordination with the College of the Sequoias (City of Visalia 2014).

Woodlake General Plan

The City of Woodlake General Plan Circulation Element includes goals, objectives, and policies related to transportation, traffic and emergency access that ensure streets in Woodlake are not congested, ensure traffic on Woodlake's streets operates in an efficient and safe manner, maximize roadway connectivity throughout the community, promote alternative modes of transportation, ensure that bike and pedestrian pathways are properly located, safe and well designed, increase the opportunities for persons in Woodlake to utilize public transportation, and establish truck routes through Woodlake that are safe and not disruptive (City of Woodlake 2007).

Bicycle Master Plans and Other Modal Plans

City- and countywide bicycle and pedestrian master plans, active transportation plans and other mode-specific plans serve as policy documents to guide the development and maintenance of the transportation network, support facilities and non-infrastructure programs. These plans describe the acceptable operating service standards, facility classifications, opportunity sites, and mode-specific goals and policies of a given city or county.

Numerous existing bicycle and other modal plans have been adopted for the TCAG region. For example, the Tulare County Regional Bicycle Transportation Plan, currently being updated, was adopted by TCAG in 2010, and the Regional Active Transportation Plan for the Tulare County Region was adopted by TCAG in 2016. The Tulare County Regional Bicycle Transportation Plan focuses on providing a Regional Bicycle Plan that ensures that the facilities planned within all eight local jurisdictions are integrated and compatible, as well as providing “stand-alone” bicycle plans for each jurisdiction which are independent and can be used by each agency to secure funding and implement individual bicycle plans (TCAG 2010). The Regional Active Transportation Plan for the Tulare County Region was adopted with the intent of being the foundation for the pedestrian and bicycle component of the 2018 TCAG RTP/SCS, and to position the high-priority projects to better compete for funding from federal, state and regional sources (TCAG 2016). Another example of an applicable plan in the TCAG region is the City of Visalia Active Transportation Plan that aims to provide the means to support active transportation, specifically bicycling and walking, as an alternative mode of transportation for work, daily activities, and recreational trips (City of Visalia 2017).

4.15.3 Impact Analysis

a. Methodology and Significance Thresholds

The criteria for determining whether the RTP/SCS would have significant environmental impacts related to transportation and traffic were based in part on the environmental checklist in Appendix G of the State CEQA Guidelines (14 CCR 15000 et seq.) and on performance measures established by TCAG. Significant impacts to transportation would occur if the plan would:

1. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities;
2. Conflict with or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b), specifically
   a. An overall increase in total regional VMT above baseline (2021) conditions;
   b. A change in VMT per capita in the region that fails to reach 15 percent below baseline (2021) VMT per capita conditions; or
   c. A substantial increase in induced travel due to roadway capacity expansions;
3. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment); or
4. Result in inadequate emergency access.
5. Impair implementation or physically interfere with an adopted emergency response plan or emergency evacuation plan

VMT was estimated with the TCAG Regional Travel Demand Model (MIP2; Appendix E) using an RTP baseline year 2021 and an RTP horizon year 2046. The model uses land use, socioeconomic, and road network data, auto operation costs, and other inputs to estimate travel patterns, roadway traffic volumes and performance measures.

The VMT analysis consists of two parts: evaluating the change in total VMT and evaluating the change in VMT per capita. The change in total VMT (region-wide) was evaluated for the proposed 2022 RTP/SCS against both the existing conditions baseline and future no project scenario. This methodology is consistent with the OPR Technical Advisory on Evaluating Transportation Impacts in CEQA and the CEQA Guidelines (OPR 2018).

b. Project Impacts and Mitigation Measures

The following section describes transportation impacts associated with the transportation projects and land use scenario included in the proposed 2022 RTP/SCS. Section 4.15.3.c summarizes the impacts associated with capital improvement projects in the proposed 2022 RTP/SCS. Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with each individual transportation and land use project is not possible. In general, however, implementation of proposed transportation projects and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in the transportation impacts as described in the following sections.

Threshold 1:	**Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.**

Impact T-1 TRANSPORTATION PROJECTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD NOT CONFLICT WITH ANY PROGRAM, PLAN, ORDINANCE OR POLICY ADDRESSING THE CIRCULATION SYSTEM, INCLUDING TRANSIT, ROADWAY, BICYCLE AND PEDESTRIAN FACILITIES. THIS IMPACT WOULD BE LESS THAN SIGNIFICANT.

The proposed TCAG 2022 RTP/SCS is intended to improve the circulation system for all modes of transportation so that motor vehicles and non-motorized vehicles can use the streets simultaneously and safely. The proposed 2022 RTP/SCS includes goals and objectives that aim to: serve regional goals, objectives, policies, and plans; respond to community and regional transportation needs; promote energy efficient, environmentally sound modes of travel, facilities, and services; provide an efficient, integrated, multi-modal transportation system for the movement of people and goods that enhances the physical, economic, and social environment in the TCAG region; provide a safe, secure, coordinated, and efficient public transit system that can reasonably meet the needs of residents; support the development of a regional system of airports that meets the air commerce and general aviation needs of the county; promote safe, economical, and convenient rail systems and schedules that meet the needs of passenger and freight services in the region; and, improve, enhance, and expand the region’s bicycle and pedestrian systems and connectivity to those systems, while keeping them safe and convenient. Overall, the goals and objectives included in the proposed 2022 RTP/SCS are intended to ensure that future transportation projects would not conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.

Transportation projects included under the proposed 2022 RTP/SCS consist of widening existing roadways, on/off ramps, and bridge structures; constructing interchanges and roundabouts; and improving turn lanes, intersections, and on/off ramps. Such projects would result in congestion relief, safety improvements, and overall circulation improvements. Therefore, the proposed 2022 RTP/SCS would be consistent with the California Transportation Plan and individual jurisdiction General Plans, as well as the goals and objectives outlined within the proposed 2022 RTP/SCS, which are described above. Active Transportation Projects included under the proposed 2022 RTP/SCS would add new pedestrian and bicycle facilities, including sidewalks, on-street bikeways, off-street trails and paths, street crossing improvements, bicycle/pedestrian bridges, and safe routes to school. Bicycle and pedestrian improvement projects identified in the proposed 2022 RTP/SCS are aimed primarily at improving bicycle and pedestrian safety and expanding facilities such as bike lanes. Pedestrian and bicycle facilities would be designed and constructed in compliance with applicable safety regulations, such as the California Manual of Uniform Traffic Control Devices (Caltrans 2014).

Transit projects are included in the proposed 2022 RTP/SCS as identified in the report by reference.

Projected transit ridership with and without the proposed 2022 RTP/SCS is shown in Table 4.15-4. As shown therein, the proposed 2022 RTP/SCS would increase transit ridership in the TCAG region in 2046 compared to the baseline 2021 conditions. Specifically, between 2021 and 2046, daily transit ridership would increase by 7,037 trips in the TCAG region with implementation of the proposed 2022 RTP/SCS. For comparative purposes, transit ridership would only increase by 2,931 trips between 2021 and 2046 without implementation of the proposed 2022 RTP/SCS.

The proposed 2022 RTP/SCS goals, objectives, and projects would be consistent with the bicycle and pedestrian mode encouragement, provision, convenience, and safety goals included in the County and City general plans that are discussed in Section 4.12.2, *Regulatory Setting*, above.

Since the proposed 2022 RTP/SCS would result in additional and improved facilities to accommodate pedestrian, bicycle, and transit travel modes, there would not be substantial disruption of bicycle, pedestrian, and transit facilities. In addition, the proposed 2022 RTP/SCS would result in congestion relief, safety improvements, and overall circulation improvements. Therefore, the proposed 2022 RTP/SCS would not conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities. This impact would be less than significant.

Table 4.15-4 Projected Transit Ridership

Scenario	Transit Ridership
Baseline Conditions (2021)	15,665
2046 Conditions with proposed 2022 RTP/SCS	22,702
2046 Conditions without proposed 2022 RTP/SCS	18,596

Source: TCAG Model, Appendix E

Mitigation Measures

No mitigation measures are required.

Threshold 2:	Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)
	a. An overall increase in total regional VMT above baseline (2021) conditions would be considered a significant impact;
	b. A change in VMT per capita in the region that fails to reach 15 percent below baseline (2021) VMT per capita conditions would be considered a significant impact; or
	c. A substantial increase in induced travel due to roadway capacity expansions would be considered a significant impact.

Impact T-2 THE PROPOSED 2022 RTP/SCS WOULD RESULT IN AN OVERALL INCREASE IN REGIONAL VMT ABOVE BASELINE (2021) CONDITIONS. THE PROPOSED 2022 RTP/SCS WOULD RESULT IN A SMALL DECREASE IN VMT PER CAPITA BELOW BASELINE (2021) CONDITIONS. REGIONAL VMT AND VMT PER CAPITA IMPACTS FROM IMPLEMENTATION OF THE PROPOSED 2022 RTP/SCS WOULD BE SIGNIFICANT AND UNAVOIDABLE. THE INDUCED TRAVEL IMPACT AT THE REGIONAL LEVEL WOULD BE LESS THAN SIGNIFICANT.

Table 4.15-5 below compares the daily VMT and VMT per capita for baseline conditions in 2021 and for anticipated 2046 conditions with implementation of the proposed TCAG 2022 RTP/SCS on all roadways for the TCAG region as a whole. The daily VMT and VMT per capita anticipated in 2046 without implementation of the proposed 2022 RTP/SCS are also provided in Table 4.15-5 for informational and comparative purposes.

Overall Increase in Regional VMT

The TCAG Model used to estimate VMT includes an operational analysis of the regional transportation system under the conditions shown in Table 4.15-5. As described in Section 14.12.1, *Setting*, regional VMT data accounts for all vehicle types and all travel within the region, including trips that originate and/or end outside of the TCAG region (pass-through trips), while an area's VMT per capita is the total VMT divided by the population of that area and is a measure of the average vehicle miles each person travels on a typical weekday.

Table 4.15-5 VMT Results Summary

Scenario	Regional VMT	VMT per Capita[1]
Baseline Conditions (2021)	10,617,248	19.05
2046 Conditions with proposed 2022 RTP/SCS	12,241,939	21.58
2046 Conditions without proposed 2022 RTP/SCS	12,465,620	21.97

[1] VMT per capita is derived by dividing total regional VMT by the 2021 population size of 481,649 persons or the 2046 population size of 567,383, as appropriate.
Source: TCAG Model, Appendix E

As shown in Table 4.15-5, the proposed 2022 RTP/SCS is projected to increase the total regional VMT above 2021 baseline conditions. As the table shows, total regional VMT would increase by 1,624,691 miles with implementation of the proposed 2022 RTP/SCS, which would be an approximately 15 percent increase from the baseline 2021 conditions. Therefore, this impact would be significant.

For informational purposes, Table 4.15-5 shows that total regional VMT would increase by 1,848,372 miles without implementation of the proposed 2022 RTP/SCS, which would be an approximately 17 percent increase from the baseline 2021 conditions. This demonstrates that population growth in the TCAG region would increase daily VMT, regardless of implementation of the proposed 2022 RTP/SCS, and that VMT in 2046 with the proposed 2022 RTP/SCS would be lower than without the proposed 2022 RTP/SCS. Nevertheless, because total regional VMT would increase above baseline (2021) conditions, the impact is considered significant.

Per Capita Vehicle Miles Traveled

Table 4.15-5 shows that daily VMT per capita would increase from 19.05 to 21.58 miles by 2046 with implementation of the proposed 2022 RTP/SCS, an increase of approximately 13 percent. As such, the proposed 2022 RTP/SCS would fail to reach 15 percent below baseline (2021) VMT per capita conditions in 2046. Therefore, this impact would be significant.

For informational purposes, Table 4.15-5 shows without implementation of the proposed 2022 RTP/SCS, daily VMT per capita would increase from 19.05 to 21.97 miles by 2046. This would be a increase of approximately 15 percent. As such, VMT per capita in 2046 with the proposed 2022 RTP/SCS would be lower than without the proposed 2022 RTP/SCS. Nevertheless, because VMT per capita would fail to reach 15 percent below baseline (2021) conditions, the impact is considered significant.

Induced Travel

It should be noted that although this is a program-level analysis, and not project specific, some of the proposed 2022 RTP/SCS projects include expanding the capacity of State highways in the region. These include adding additional travel lanes to SR 99 at multiple locations, adding additional travel lanes to SR 65 near Lindsay, and adding additional travel lanes to SR 190 near Porterville. Other proposed 2022 RTP/SCS projects include expanding the capacity of county and locally maintained roads in Visalia, Farmersville, and Exeter.

Numerous studies and research suggest that an expansion of highway capacity may induce travel (OPR 2018) According to OPR, the initial reduction in traffic congestion and travel times from increased capacity is attractive to travelers, resulting in more trips on the facility and increasing the total VMT. These types of projects may result in the following trip-making changes, which have implications for total VMT (OPR 2018):

- **Longer Trips.** The ability to travel a long distance in a shorter time increases the attractiveness of destinations that are further away, increasing trip length and VMT.
- **Changes in Mode Choice.** When transportation investments are devoted to reducing automobile travel time, travelers tend to shift toward automobile use from other modes, which increases VMT.
- **Route Changes.** Faster travel times on a route attract more drivers to that route from other routes, which can increase or decrease VMT depending on whether it shortens or lengthens trips.
- **Newly Generated Trips.** Increasing travel speeds can induce additional trips, which increases VMT. For example, an individual who previously telecommuted or purchased goods on the internet might choose to accomplish those ends via automobile trips as a result of increased speeds.
- **Land Use Changes.** Faster travel times along a corridor lead to land development further along that corridor; that development generates and attracts longer trips, which increases VMT. Over

several years, this component of induced VMT can be substantial, e.g., approximately half of the total effect on VMT.

Regarding land use changes, the proposed 2022 RTP/SCS coordinates land use and transportation projects through the 2046 horizon year. The SCS identifies a land use strategy that supports the objectives of SB 375 to achieve, among other things: increased roadway optimization, increased modes of travel other than single occupancy automobiles, increased access to jobs and amenities, minimized increases in VMT and reduced GHG emissions. Among the strategies to meet these goals is a mix of land uses balanced to minimize VMT and maximize the ability for residents and visitors of the region to conduct everyday activities without the need to travel by car. As a consequence, the transportation system performance results discussed in the EIR's transportation impact analysis capture the effects of land use changes on overall travel demand in the region.

Given the rural nature of Tulare County, without suppression, induced vehicle travel effects of roadway expansion projects will be substantially dampened. Although the TCAG Model does not specifically evaluate induced travel from the perspective of longer trips, changes in mode choice, route changes or newly generated induced trips, at the regional level these effects may also be negligible compared to the overall amount of travel. As discussed in the Federal Highway Administration's "HERS-ST Highway Economic Requirements System - State Version: Technical Report - Appendix B: Induced Traffic and Induced Demand" (2002), "If the demand is for a single facility, then induced traffic will appear large relative to previous volumes, because most of the change in trips will be from diverted trips. At the regional level, induced traffic would be a smaller share of total traffic growth, because only trips diverted from other regions, plus substitutions between transportation and other goods, make up the induced share." Therefore, although individual capacity-increasing roadway projects included in the proposed 2022 RTP/SCS may induce travel, at the regional level additional VMT resulting specifically from induced travel demand would not be substantial, and the induced travel impact at the regional level would be less than significant.

The following mitigation measures would reduce VMT impacts.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures developed for the proposed 2022 RTP/SCS where applicable for transportation projects. For land use projects under their jurisdiction, the County and incorporated cities in the TCAG region can and should implement the following mitigation measures. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site specific conditions.

T-2(a) Regional VMT Reduction Programs

Implementing agencies shall require implementation of VMT reduction strategies through TDM programs, impact fee programs, mitigation banks or exchange programs, in-lieu fee programs, and other land use project conditions that reduce VMT. Programs shall be designed to reduce VMT from existing land uses, where feasible, and from new discretionary residential or employment land use projects. The design of programs and project specific mitigation shall focus on VMT reduction strategies that increase travel choices and improve the comfort and convenience of sharing rides in private vehicles, using public transit, biking, or walking. Modifications may include but are not limited to:

- Provide car-sharing, vanpool, bike sharing, and ride-sharing programs

- Implement or provide access to commute reduction programs
- Provide a bus rapid transit system
- Improve pedestrian or bicycle networks, or transit service
- Provide transit passes
- Encourage telecommute programs
- Incorporate affordable housing into the project
- Increase density
- Increase mixed uses within the project area
- Incorporate improved pedestrian connections within the project/neighborhood
- Incentivize development in low VMT communities
- Incentivize housing near commercial and offices
- Increase access to goods and services, such as groceries, schools, and daycare
- Incorporate neighborhood electric vehicle network
- Orient the project toward transit, bicycle, and pedestrian facilities
- Provide traffic calming
- Provide bicycle parking
- Limit parking
- Separate out parking costs
- Provide parking cash-out programs

Implementing Agencies and Timing

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and counties. This mitigation measure shall, or can and should, be applied during project permitting and environmental review and implemented during project operation, as applicable.

T-2(b) Project Level VMT Analysis and Reduction

Transportation project sponsor agencies shall evaluate transportation projects that involve increasing roadway capacity for their potential to increase VMT. Where project-level increases are found to be potentially significant, implementing agencies shall, or can and should, identify and implement measures that reduce VMT. Examples of measures that can reduce the VMT associated with increases in roadway capacity include tolling new lanes to encourage carpools and fund transit improvements; converting existing general-purpose lanes to high occupancy vehicle lanes; VMT banks; and implementing or funding offsite travel demand management.

Implementing agencies shall evaluate VMT as part of project specific CEQA review and discretionary approval decisions for land use projects. Where project level significant impacts are identified, implementing agencies shall identify and implement measures that reduce VMT. Examples of measures that reduce VMT include infill development, mixed use and transit-oriented development, TDM strategies, complete streets, reduced parking requirements, and providing alternative transportation facilities, such as bike lanes and transit stops.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and counties. This mitigation measure shall, or can and should, be applied during project permitting and environmental review and implemented during project operation, as applicable.

Significance After Mitigation

If implementing agencies adopt and require the mitigation measures outlined above, impacts would be reduced because less VMT would be added to the TCAG region. However, the implementation of project-level VMT-reducing measures, such as mixed uses and TOD, may not be feasible and cannot be guaranteed on a project-by-project basis. Regional VMT-reduction programs, such as VMT banks, may also not be feasible as there are currently no procedures or policies in place to establish such facilities. Therefore, this impact would remain significant and unavoidable. No additional mitigation measures to reduce this impact to less than significant levels are feasible.

Threshold 3:	Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible use (e.g., farm equipment)

Impact T-3 PROPOSED TRANSPORTATION AND LAND USE PROJECTS IMPLEMENTING THE PROPOSED 2022 RTP/SCS WOULD NOT SUBSTANTIALLY INCREASE HAZARDS DUE TO GEOMETRIC DESIGN FEATURES OR INCOMPATIBLE USES. THIS IMPACT WOULD BE LESS THAN SIGNIFICANT.

Transportation Design Features

The regional growth pattern of the proposed 2022 RTP/SCS does not define design level features of roadways. While the proposed 2022 RTP/SCS expands development and increases density in growth geographies, this growth would not impact geometric design features or roadway uses in a consistent way, as those design standards and uses are established and enforced at the local jurisdictional level. Specific transportation projects identified in the proposed 2022 RTP/SCS include widening of existing roadways and construction of interchanges and roundabouts, as well as turn lane, intersection, and ramp improvements, all of which would result in improved circulation and safety. Future transportation projects would also be subject to design guidelines established by the State or the local jurisdiction with authority over the project, including curve radii on curving road segments, maximum road grade/slope, and minimum separating distance between intersections and driveways.

Construction activities from implementation of the proposed 2022 RTP/SCS would be short term, intermittent, and geographically dispersed. At the regional level, these disruptions would be localized, and impacts would be limited and would not represent a significant impact to the operations of the regional transportation system. At the local level, construction activities could increase travel on local roads and result in detours or increased congestion in certain locations. The actual construction details of land use development projects and proposed transportation projects are not known, because the projects are in the early stages of planning. Construction impacts would be evaluated at the project level as more information about the timing, design, scope, and construction program are available. Generally, construction activities for land use development and transportation projects would be required to be conducted in accordance with, and subject to review by, all applicable State and/or local jurisdictions with authority over the project; thus, ensuring projects would be designed to minimize the potential for hazardous conditions and to ensure safe travel by all modes.

Future transportation projects would be required to conform to the design standards of the public agency responsible for implementation, including safety standards. For projects planned within the unincorporated communities of Tulare County, Tulare County's Complete Streets policies and programs, discussed under Section 4.12.2, *Regulatory Setting*, above, would also support reducing hazards on roadways and preventing incompatible uses by designing roads for all trip purposes, including for more vulnerable users such has cyclists and pedestrians. As such, the proposed 2022 RTP/SCS is would not negatively impact the design of transportation facilities by increasing hazards. Rather, investments would incentivize design improvements to make roadways safer. Therefore, the proposed 2022 RTP/SCS would not substantially increase hazards due to geometric design features or incompatible land uses, and the impact would be less than significant.

Similarly, the proposed TCAG 2022 RTP/SCS would not adversely impact the compatible use of transportation facilities. Rather, investments would incentivize design improvements to make roadways safer. The SCS does not introduce new agricultural uses or other similar uses that would result in increased incompatible vehicle uses on roadways in the region, such as slow-moving farm equipment. In addition, specific transportation projects under the proposed 2022 RTP/SCS would be subject to and follow the allowable uses established by the State or the local jurisdiction with authority over the project. Therefore, the proposed 2022 RTP/SCS would not substantially increase hazards due to incompatible uses would be less than significant.

Mitigation Measures

No mitigation measures are required.

Threshold 4:	Result in inadequate emergency access
Threshold 5:	Impair implementation or physically interfere with an adopted emergency response plan or emergency evacuation plan

Impact T-4 PROPOSED TRANSPORTATION AND LAND USE PROJECTS IMPLEMENTING THE PROPOSED 2022 RTP/SCS WOULD NOT RESULT IN INADEQUATE EMERGENCY VEHICLE ACCESS OR INTERFERE WITH AN ADOPTED EMERGENCY RESPONSE PLAN OR EMERGENCY EVACUATION PLAN. THIS IMPACT WOULD BE LESS THAN SIGNIFICANT.

Transportation infrastructure plays a key role in providing access to destinations during emergencies. These systems must be able to accommodate emergency response vehicles, personnel, and equipment. According to the Tulare County Office of Emergency Services (OES), response to large-scale emergencies or disasters within the TCAG region are guided by the Tulare County Emergency Operations Plan, which was adopted by the Tulare County Board of Supervisors and implements the California Standardized Emergency Management Systems (OES 2022). In the event of such an emergency or disaster, the TCAG region's roads and other transportation networks can determine the success or failure of the region during the emergency and in recovery. The proposed 2022 RTP/SCS would not implement specific design features or specifications for new project-level development or other transportation facilities. However, the planned and programmed projects identified in the proposed 2022 RTP/SCS would entail upgrades and improvements to existing transportation infrastructure, resulting in increased roadway capacity, congestion relief, circulation improvements, and overall roadway safety improvements. As such, implementation of the proposed 2022 RTP/SCS would improve performance of the transportation system in the TCAG region, which would improve emergency response and facilitate more effective emergency evacuation. Therefore, the proposed 2022 RTP/SCS would not interfere with an adopted emergency response plan or emergency evacuation plan.

The design details of land use development projects and proposed transportation projects are not known, because the projects are in the early stages of planning. However, both Caltrans and local jurisdictions have design standards for new and existing development and roadways to ensure adequate passage of emergency vehicles. Standards include specifications related to clear width, effective turning radius and turnouts, curve radii on curving road segments, maximum road grade/slope, and minimum separating distance between intersections and driveways. Transportation projects would be subject to review with regard to emergency vehicle requirements by State and/or local jurisdictions with authority over the project as well as responsible emergency service agencies; thus, ensuring projects would be designed to meet all applicable emergency design standards.

Construction activities could temporarily impair emergency access points used for emergency vehicle access. However, standard construction procedures for development of a construction management plan would address these conditions and would require provision of alternative emergency vehicle access points. Specifically, in accordance with Caltrans permitting requirements, a traffic control plan would be required that adheres to the standards set forth in the California Manual of Uniform Traffic Control Devices (Caltrans 2014). In addition, while implementation of proposed 2022 RTP/SCS's land use scenario and transportation projects could temporarily impede emergency access at project locations during construction periods, construction projects would conform to State, regional, and local regulations requiring maintenance of emergency access during construction.

Based on the above analysis, the impacts of the proposed 2022 RTP/SCS on emergency vehicle access and on interference with an adopted emergency response plan or emergency evacuation plan would be less than significant.

Mitigation Measures

No mitigation measures are required.

c. Specific Proposed 2022 RTP/SCS Project That May Result in Impacts

The analysis within this section discusses the transportation impacts associated with the transportation improvement projects included in the proposed 2022 RTP/SCS. The projects within the proposed 2022 RTP/SCS are evaluated herein in their entirety and are intended to improve circulation rather than cause adverse impacts. However, as described above, the proposed 2022 RTP/SCS would increase baseline 2021 regional VMT by approximately 1,624,691 miles, or 15 percent, in 2046. This effect has been found to be a significant and unavoidable impact, as described above. The TCAG Model used for this analysis does not have the capability to distinguish which project or projects would specifically result in increased regional VMT. However, any number of the proposed 2022 RTP/SCS projects that expand roadway capacity or improve traffic flow and circulation could presumably increase VMT. Thus, there are no specific transportation projects that can be listed in this section related to the adverse impacts of increased regional VMT in the TCAG region.

4.15.4 Cumulative Impacts

The cumulative impact analysis area for transportation consists of the TCAG region and adjoining counties. Information regarding these adjoining counties can be found in Section 3.1 – *Environmental Setting,* Table 3-1. However, in the cumulative impact analysis, please note that there is no direct transportation route between Tulare County, Kings County, and Fresno County to Inyo County as there is no direct passage through the Sierra Nevada Mountains.

The federal, State, and regional laws, regulations, and policies outlined in Section 4.12.2, *Regulatory Setting,* apply to surrounding counties in the same manner as they apply to projects within the TCAG region, thereby avoiding potential for cumulative conflict between the transportation planning for the TCAG region and the surrounding counties. Therefore, the potential cumulative impacts resulting from the implementation of the proposed 2022 RTP/SCS related to conflict with programs, plans, and ordinances or policies addressing the circulation system would be less than significant, and the proposed 2022 RTP/SCS contribution would not be cumulatively considerable.

Development in the cumulative impact analysis area would result in significant and unavoidable increase in regional VMT as well as daily VMT per capita from baseline (2021) conditions, partially due to commuters travelling to and from employment in the adjoining counties. One example is the City of Fresno that attracts workers from the surrounding counties choosing to live in more rural and affordable regions in the Valley. Likewise, people residing outside of but close to the TCAG region may commute into the TCAG region for outdoor recreation. For example, Sequoia National Forest and Sequoia National Park are very popular recreational weekend destinations for residents throughout California and beyond. These trips contribute to VMT in the cumulative impact analysis area.

As shown in Table 4.15-5 , the proposed 2022 RTP/SCS would increase daily VMT by 1,624,691 miles compared to the baseline 2021 conditions, which would be an approximately 15 percent increase over baseline conditions. While the majority of the VMT would be expected to remain within the TCAG region, some portion of the VMT would inevitably extend to areas within adjoining counties, such as Kern County, Kings County, and Fresno County. The most reasonable assumption is that VMT to adjoining counties would be concentrated to the most heavily traveled roadways in the counties with the highest relative employment, such as SR 99 and SR 65 into Kern County, SR 43 and SR 198 into Kings County, and SR 99 into Fresno County. The increased VMT in adjoining areas would be in addition to the VMT generated from the increased population growth of these counties into the future. Per capita VMT in the cumulative impact area would be unlikely to reach 15 percent below the baseline VMT per capita by 2046 due to increased VMT in the region even without implementation of the proposed 2022 RTP/SCS. The implementation of project-level VMT-reducing measures, such as mixed uses and transit-oriented development (TOD), may not be feasible and cannot be guaranteed on a project-by-project basis. Regional VMT reduction programs, such as VMT banks, may also not be feasible as there are no procedures or policies in place to establish such facilities. Thus, cumulative impacts on VMT would be significant, the proposed 2022 RTP/SCS contribution to cumulative VMT impacts would be cumulatively considerable, and this contribution would remain cumulatively considerable post-mitigation.

Some types of transportation impacts are related to site- and project-specific characteristics and conditions and would not be significantly affected by other development outside of the TCAG region. As discussed in Impacts T-3 and T-4, there are existing federal, State, and local regulations that govern transportation hazards and emergency access associated with development and infrastructure projects. Regulations and oversight, as outlined in the impact analysis above, would effectively reduce the potential for individual projects to create a transportation hazards or emergency access impact within the TCAG region and surrounding counties. Thus, cumulative impacts related to the transportation hazards and emergency access would not be significant and the proposed 2022 RTP/SCS contribution would not be cumulatively considerable.

Abbreviations and Acronyms

AB	Assembly Bill
ADA	Americans with Disabilities Act
CARB	California Air Resources Board
CMP	Congestion Management Process
CTC	California Transportation Commission
FHWA	Federal Highways Administration
IIJA	Infrastructure Investment and Jobs Act
HSR	High Speed Rail
MPO	Metropolitan Planning Organization
NACO	National Association of Counties
OES	Office of Emergency Services
OPR	Office of Planning and Research
RTP	Regional Transportation Plan
RTPA	Regional Transportation Planning Agency
SB	Senate Bill
SCS	Sustainable Communities Strategies
SR	State Route
TCAG	Tulare County Association of Governments
TCaT	Tulare County Area Transit
TDM	Transportation Demand Management
TIP	Transportation Improvement Plan
TMA	Transportation Management Areas
TSM	Transportation System Management
VMT	Vehicle Miles Travelled

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4.16 Tribal Cultural Resources

This section evaluates effects on tribal cultural resources in the TCAG region that would result from implementation of the 2022 RTP/SCS.

4.16.1 Setting

a. Ethnographic Context

The TCAG region is a large and geographically diverse region; the western half of the county lies within the San Joaquin Valley and the eastern half covers the foothills and mountain peaks of the southern Sierra Nevada range. Tulare County was inhabited by several aboriginal California Native American groups including the Southern Valley Yokuts, Foothill Yokuts, Tübatulabal, Monache, and the Owens Valley Paiute[1]. Of the main groups inhabiting the TCAG region, the Southern Valley Yokuts occupied the largest territory.

Yokut (Southern Valley and Foothill)

The project area is partially located in the San Joaquin Valley, an area historically occupied by the Penutian-speaking Yokuts (Kroeber 1925, Wallace 1978, Latta 1999). Three geographical divisions of the Yokuts are the Northern Valley, Southern Valley, and Foothill Yokuts. The distinction between the three groups is primarily based on language dialect (Mithun 2001).

The Yokuts established large permanent village settlements, or closely associated smaller settlements, such as the Tulamniu village. Residential structures were most often of two types: single-family dwellings and larger communal residences that housed ten families or more. Villages frequently included mat-covered granaries and a sweathouse (Mithun 2001; Sutton et al. 2016).

The basic economic unit among the Yokuts was the nuclear family. The nuclear family was linked to totemic lineages based on patrilineal descent. Totem symbols were passed from father to offspring. Families that shared the same totem formed an exogamous lineage. Totems were associated with one of two moieties. This moiety division played a role during ceremonies and other social events (Wallace 1978).

Yokuts were split into self-governing local groups that included several villages. Each group had a chief who directed ceremonies, mediated disputes, handled punishment of those doing wrong, hosted visitors, and provided aid to the impoverished. In certain cases, settlements had two chiefs, one for each moiety. Other political positions included the chief's messenger and the spokesman (Wallace 1978).

Shamans were an important part of Yokut village life. A Yokut Shaman gained power through a dream or vision. If, after this vision, the man accepted the role as shaman, he would pray, fast, and acquire talismans to aid him in his future work. Shamans had the ability to heal the sick and served a primary role in religious life (Wallace 1978).

Yokuts subsistence strategy was based on a mixed economy focused on fishing, collecting, and hunting small game. Fishermen employed tule rafts and caught fish with nets, spears, basket traps, and bow and arrow. They often gathered mussels and hunted turtles in lakes, rivers, and streams.

[1] The territory of the Western Shoshone overlaps just slightly on the southeastern edge of the county on the crest of the Sierra Nevada; because that overlapping area is so minimal, the Western Shoshone will not be discussed in further detail here.

Wild seeds and roots contributed a large portion to the Yokuts diet. Tule roots were gathered, dried, and pounded into a flour which was prepared as a mush. Tule seeds and grass and flowering herb seeds were prepared in the same way. Leaves and stems of certain plants, such as clover and fiddle-neck, were also collected. Acorns, a staple of most California Native Americans, were not readily available in the ethnographic territory of the Yokuts. Some Yokuts tribes traded for acorns with neighboring groups, such as the Salinan and Chumash to the west, the Foothill Yokuts to the east, and the Kawaiisu and Kitanemuk to the southeast (Kroeber 1925). Waterfowl was frequently hunted with snares, nets, and bow and arrow. Land mammals and birds contributed a smaller part of the Yokuts diet. Small game was occasionally taken in snares or traps or shot with bows and arrows (Wallace 1978; Sutton et al. 2016).

Yokuts technology depended primarily on tule. Stems of the plant served as the raw material for baskets, cradles, boats, housing, and many other items. Manos and metate were used to process food and animal hides (Sutton et al. 2016). Tools such as knives, projectile points, and scraping tools were made from imported lithic materials because stone was not readily available in the Central Valley. Some tools, such as bead drills, could be made from local obsidian (Sutton et al. 2016). Marine shells secured through trade with coastal groups were used as shell money and personal adornment items, such as Olivella beads (Sutton et al. 2016; Wallace 1978).

Tübatulabal

The Tübatulabal inhabited the southern Sierra Nevada foothill region near the drainage area of the Kern and South Fork Kern rivers (Voegelin 1938). The area is mostly mountainous, interspersed with small lakes and meadows. The Tübatulabal were organized into three politically discrete bands, including the Palagewan, Pahkanapïl, and Bankalachi, with each band having a high degree of internal unity and their own chief (Smith 1978). Though the three groups primarily lived apart, they banded together for war, and visits and intermarriages between them were common.

Each band comprised a number of itinerant family groups who moved around seasonally most of the year, only settling down in semipermanent “hamlets” situated lower down in the foothills and in the Kern River Valley during the winter (Voegelin 1938; Smith 1978). These hamlets would be composed of around two to six households and each household consisted of a single biological bilateral family, often with one or two other relatives (Voegelin 1938; Smith 1978). Structure types varied by season and activity. In the winter, one family would be housed in a circular, closed, brush and mud shelter with a domed roof. Most hamlets also had a sweathouse, large oval structures made of oak branches, which were usually located near a natural pool or stream. In the summer months, temporary unwalled brush shade shelters, supported by vertical and horizontal beams, were utilized (Smith 1978).

Shamans were an important part of Tübatulabal life. Both men and women could be shamans, though males had both curative and witching power whereas women only had witching power (Voegelin 1938; Smith 1978). Shamans were born with their abilities and were assisted by supernatural guardian helpers. All misfortune and deaths (except those associated with war) were blamed on witchcraft and shamans with witching powers were feared. Curing shamans had the ability to heal and diagnose illness and held a high status among their people, their prestige growing according to the number of cures successfully performed. However, the consistent failure to head would often lead to accusations of witchcraft (Smith 1978).

Subsistence was based on a mixed economy focused on gathering, fishing, and hunting (Voegelin 1938; Smith 1978). Plant food resources were more diverse and abundant than in many other parts of California; staple crops included acorns and piñon nuts. Acorns were harvested from the ground, sun-dried, then stored in elevated granaries. Piñon nuts were knocked from the trees, gathered, and placed on brush fires to open up the shells. Once the nuts were removed from the shells, they were sun-dried and stored in in circular, stone-lined pits. A variety of other wild foods, such as small seeds, roots, bulbs, berries, and tubers, were also gathered using seed beaters, digging sticks, and catch baskets. Fish were second only to acorns and piñon in economic importance (Voegelin 1938; Smith 1978) and most fishing was done individually, except in July when communal fishing was more common. Large game was hunted using a sinew-backed bow and a variety of techniques. Smaller game was not actively hunted, with the exception of rabbits, and was instead caught using traps, snares, or spring-loaded nets. Rabbits, however, were hunted communally (Smith 1978).

Tübatulabal material culture included coiled and twined baskets of split willow, tree yucca roots, and deer grass. Basket traps and saddles (after horses were introduced in the area) were woven from tule. Pottery, made by hand of local red clay, was also common. Pots were sun-dried and fired in an open fire until they turned a grayish black color (Voegelin 1938; Smith 1978). Other types of technology utilized by the Tübatulabal include bow and arrow (sinew-backed and self-back bows, war arrows, and hunting arrows) nets, traps, snares, and various stone tools (projectile points, hafted and unhafted knives, and scrapers) and bone tools (such as awls). Barrel cactus spines were used for sewing and basketmaking. Digging sticks were used for gathering and both wooden and stone mortars and pestles were used for the pounding and grinding of seeds and other foods (Voegelin 1938; Smith 1978).

Monache

The Monache, often referred to as the Western Mono, occupied the western slope of the Sierra Nevada and comprised at least six different tribal groups, including the Northfork Mono, Wobonuch, Entimbich, Michalay, Wakasachi, and Patwisha (Spier 1978). The Monache shared a distinct language in the Western Branch of the Numic family, similar to the Eastern Mono and Owens Valley Paiute.

Settlements were generally small and did not follow an organized pattern, varying among the different tribal groups (Spier 1978). The Monache typically utilized three different types of dwelling structures, including a conical house with the floor excavated to at least one foot in depth, an oval house at ground level with a ridge pole supported by forked posts, and a conical bark covered house with a center post. Other common structure types included the semi-subterranean, earth-covered sweathouse, the bedrock mortar shade, and acorn granaries (Gifford 1932; Spier 1978).

Exogamous, patrilineal lineages were the major kinship units for the Monache, with chiefs leading each larger settlement. The exception to this was the Northfork Mono, who operated within a moiety system (Gifford 1932; Spier 1978). Membership within the Northfork Mono moiety system was determined patrilineally, each division having a chief who inherited the position. The role of the moiety chief was largely ceremonial. The moieties had a rivalrous and reciprocal relationship which played a role during ceremonies and other social events (Gifford 1932; Spier 1978).

Shamans were an important part of Monache life, and their primary role was curing illness; however, they were frequently looked upon with suspicion, especially when deaths occurred (Spier 1978). The Monache believed in the supernatural powers of totemic and tutelary spirits, and particular spirits were associated with a lineage or moiety (Gayton 1948; Spier 1978).

The Monache subsistence strategy was based on a mixed economy of hunting, fishing, and the gathering of plant foods (Spier 1978). Deer were a primary staple, along with acorns and piñon. Piñon nuts were relished and were obtained during expeditions to the Eastern Sierra, often by trading acorns to the Eastern Mono (Gifford 1932). Bears were also hunted from time to time and smaller game, such as ground squirrels and rabbits, were smoked from their holes and trapped. Fishermen used poison, harpoons, and weirs to catch fish during seasonal runs and some groups occasionally collected freshwater mussels. Manzanita berries, yucca roots, wild seeds, grubs, and insects also contributed to the Monache diet (Spier 1978).

Tools such as knives, projectile points, and scrapers were most commonly made from obsidian, which was imported (often as tool blanks) from the Eastern Mono (Spier 1978). Self-bows of California laurel and sinew-backed bows of juniper along with four different arrow types were utilized. Monache basketry was similar to those of the Foothill Yokuts and included twined cooking and burden baskets, baby cradles, seed beaters, sieves, winnowers, and coiled cooking, storage and washing baskets (Gifford 1932; Spier 1978). Pottery was made using a coiling technique (Spier 1978).

Owens Valley Paiute

The Owens Valley Paiute primarily inhabited the narrow Owens River valley that parallels the eastern side of the Sierra Nevada on the western edge of the Great Basin, though their territory also extended into the Sierra Nevada mountains in the area known today as the Inyo National Forest and Kings Canyon National Park. The Owens Valley is unique to other Great Basin environments; though it experiences little rainfall, there are abundant snow-fed streams that flow down from the Sierra, including the Owens River which in precontact times averaged 50 ft. in width, and the valley once had extensive marshes and grass lands. Additionally, the White and Inyo mountain ranges in the eastern portion of Owens Valley Paiute territory have an abundance of junipers, piñons, and other pines (Liljeblad and Fowler 1986).

Though the Owens Valley Paiute moved around seasonally, they were able to return to semi-permanent settlements in the valley that they intermittently occupied throughout the year due to the uniquely favorable ecological conditions of their territory (Liljeblad and Fowler 1986). The basic economic unit among the Owens Valley Paiute was the nuclear family. Each hamlet, referred to as villages by Steward (1933), was composed of a handful of nuclear family units that were typically dominated by one “kindred” (Liljeblad and Fowler 1986). The size and population of the semi-permanent villages varied, and the distribution of settlements generally corresponded to the proximity to rivers and streams. Clusters of hamlets, or villages, formed a district (Steward 1933; Liljeblad and Fowler 1986). Throughout most of the year each family or cluster of related families operated independently and autonomously. However, when groups returned to their dwellings in the semi-permanent villages during the spring for the meadow irrigation and again the fall for social and ceremonial activities, the increase in population related to coming together necessitated organized leadership of a headman for each district. The role of the headman, which was an inherited position, was limited to directing irrigation, organizing communal hunts, conducting festivals and ceremonies, and approving or vetoing the killing of a shaman accused of witchcraft (Steward 1933; Liljeblad and Fowler 1986).

Shamanism among the Owens Valley Paiute consisted primarily of doctoring; however, unlike elsewhere in the Great Basin, shamans held a more influential role in public affairs. Shamanistic power was individual, was typically obtained through dreams, and could be practiced by both men and women (Liljeblad and Fowler 1986).

Subsistence was based on a mixed economy focused on gathering, hunting, and fishing. Piñon nuts were the most important staple and were harvested mainly in the Inyo and White mountains (Steward 1933). A good crop would last throughout the winter and into the summer. When the piñon crop was good, large groups would winter in piñon territory. Acorns were also heavily relied on and even preferred. Acorns were typically imported since oaks were not as common in the eastern part of the Sierra Nevada. Also important was Indian ricegrass, especially in the years when the piñon crop failed, and wild rye. A variety of other wild foods such as small seeds, roots, bulbs, berries, and tubers also contributed to the Owens Valley Paiute diet. At the time of European contact, the Owens Valley Paiute were using irrigation to increase the yield of wild seed plots (Steward 1933), particularly nutgrass. Though fishing occurred in the Owens River and various other Sierra Nevada streams, it was not an important part of the tribal economy (Liljeblad and Fowler 1986). Hunting occurred in all seasons and could be done on an individual basis or communally. Large game such as deer, mountain sheep, and antelope were favored. Small game was occasionally taken in snares or traps or shot with bows and arrows, though rabbits were generally obtained during large, communal rabbit drives (Steward 1933; Liljeblad and Fowler 1986).

According to Steward (1933), several structure types were utilized by the Owens Valley Paiute. A "mountain house" was used above the timberline during fall and winter after the piñon harvest and was constructed using two upright posts set about 15 ft. apart which supported a long ridgepole. Side beams were then set all the way around, sloping to the ground, and conifer boughs covered the roof. Women would sleep in one and men in the other. Another type of dwelling consisted of a "winter valley house" which was used down in the valley during winters if there was a poor piñon crop. This was a cone-shaped semi subterranean structure, built around a 2 ft. deep pit, with a smoke hole in the center and mats of tule overlapping around the outside. There was also a "cook house" which was also cone-shaped, but it was not semi-subterranean, and it was covered with grasses. The fourth type of dwelling was the "summer house" which was a dome shaped structure with a sunshade built from willow, branches, and grass woven together. Finally, there was the sweathouse, a large, circular semi-subterranean structure with a smoke hole in the center and covered on the outside with layers of grass (Steward 1933; Liljeblad and Fowler 1986).

Owens Valley Paiute material culture tradition reflects its Great Basin roots (Liljeblad and Fowler 1986). Large game was hunted using the sinew-backed bow, cane or willow arrow shafts, and obsidian pointed arrows. Obsidian drills and knives (hafted and unhafted) were common. Basketry was coiled or twined and included conical carrying baskets, necked small-mouthed water containers, seed beaters, winnowing trays, and finely coiled treasure baskets. Coiled pottery of all shapes and utility was locally manufactured, made of a red clay then sun-dried and fired in an open fire. The resulting pottery could range in color from a mottled gray or muted red to a brownish gray or black color; it is now known as Owens Valley Brownware (Liljeblad and Fowler 1986). Other important items were the fire smoldering in cigar shaped slow matches and the fire drill (Steward 1933; Liljeblad and Fowler 1986).

b. Tribal Cultural Resources

Tribal cultural resources that could be present within the TCAG region include but are not limited to Native American burial sites, village or occupation sites, traditional resource gathering locations and natural landforms such as mountain peaks, ridge tops, or rivers. Such resources are present throughout the TCAG region, including known and documented sites as well as undocumented sites that will be identified through cultural resources survey or ground disturbance. Tribal cultural resources are likely to be encountered near areas of prior Native American occupation and activity, which includes areas both within and outside of areas of current development. Surficial archaeological deposits that are tribal cultural resources are more likely to be heavily disturbed within urban areas and more intact in rural settings; however, this does not preclude the presence of buried archaeological resources that may be significant in urban settings. For example, a tribal cultural resource that has been listed as a California Historical Landmark, First Tule River Indian Reservation (No. 388), is located in Porterville.

4.16.2 Regulatory Setting

a. Federal Laws, Regulations, and Policies

Archaeological Resources Protection Act of 1979 (ARPA)

This statute was enacted to protect archaeological resources and sites that are on public lands and tribal lands, to foster increased cooperation and exchange of information between government representatives, the professional archaeological community, and private individuals. Section 4 of the statute and Sections 16.5-16.12 of the ARPA describe the requirements that must be met before federal authorities can issue a permit to excavate or remove any archaeological resource on federal or tribal lands. The curation requirements of artifacts, other materials excavated or removed, and the records related to the artifacts and materials are described in Section 5 of the ARPA. This section also authorizes the Secretary of the Interior to issue regulations describing in more detail the requirements regarding these collections.

American Indian Religious Freedom Act of 1978

The American Indian Religious Freedom Act of 1978 (AIRFA) (42 U.S. Code Section 1996) pledges to protect and preserve the traditional religious rights of American Indians, Aleuts, Eskimos, and Native Hawaiians. It establishes a national policy that traditional Native American practices and beliefs, sites (and right of access to those sites), and the use of sacred objects shall be protected and preserved. If a place of religious importance to American Indians could be affected by a federal undertaking, AIRFA promotes consultation with Indian religious practitioners, which could be coordinated with Section 106 consultation. Amendments to Section 106 of the NHPA in 1992 strengthened the interface between AIRFA and the NHPA by clarifying the following: (1) properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization could be determined to be eligible for inclusion in the NRHP; and (2) in carrying out its responsibilities under Section 106, a federal agency shall consult with any Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to properties described under (1).

Archeological Resources Protection Act of 1979

The Archeological Resources Protection Act of 1979 (ARPA) (43 CFR Section 7) establishes uniform definitions, standards, and procedures to be followed by all federal land managers in providing protection for archaeological resources located on public lands and Native American lands. Under ARPA, additional requirements could apply to agency action if federal or Indian lands are involved. ARPA (1) prohibits unauthorized excavation on federal and Indian lands, (2) establishes standards for permissible excavation, (3) prescribes civil and criminal penalties, (4) requires agencies to identify archeological sites, and (5) encourages cooperation between federal agencies and private individuals.

Native American Graves Protection and Repatriation Act of 1990

The intent of the Native American Graves Protection and Repatriation Act of 1990 (25 U.S. Code Section 3001) is to identify Native American affiliation or lineal descent and ensure the rightful disposition, or repatriation, of Native American human remains, funerary objects, sacred objects, and items of cultural patrimony that are in federal possession or control. The regulations implementing the requirements of Native American Graves Protection and Repatriation Act relating to the inadvertent discovery of human remains and objects of cultural patrimony of Native American origin on federal or tribal lands are described in 43 CFR Section 10.4.

b. State Laws, Regulations, and Policies

Assembly Bill 52

California Assembly Bill 52 of 2014 (AB 52) expanded CEQA by defining a new resource category, "tribal cultural resources." AB 52 establishes that "a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment" (Public Resources Code [PRC] Section 21084.2). AB 52 further states when feasible, the lead agency shall establish measures to avoid impacts that would alter the significant characteristics of a tribal cultural resource (PRC Section 21084.3). PRC Section 21074 (a)(1)(A) and (B) defines tribal cultural resources as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe," and meets either of the following criteria:

a. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in PRC Section 5020.1(k).
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 PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

AB 52 also establishes a formal consultation process for California tribes regarding those resources. The consultation process must be completed before a CEQA document can be certified or adopted. AB 52 requires that lead agencies "begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project." Native American tribes to be included in the process are those that have requested notice of projects proposed in the jurisdiction of the lead agency.

AB 52 (PRC Section 21084.3(b)) describes mitigation measures that may avoid or minimize the significant adverse impacts to TCRs. Examples include:

(1) Avoiding and preserving the resources in place, including, but not limited to, planning and constructing to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria

(2) Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

   (A) protecting the cultural character and integrity of the resource

   (B) protecting the traditional use of the resource

   (C)protecting the confidentiality of the resource

(3) Establishing permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places

(4) Protecting the resource

In accordance with AB 52, TCAG has conducted AB 52 consultation as the lead agency for implementation of the proposed 2022 RTP/SCS. This consultation included written communication with seven Native American tribes and organizations who had previously requested to be notified of TCAG projects, and to which formal notice inviting consultation on the proposed RTP/SCS was sent on June 25, 2021. These were: Big Sandy Rancheria of Western Mono Indians, Dunlap Band of Mono Indians, Wuksache Indian Tribe/Eshom Valley Band, Kern Valley Indian Community, Santa Rosa Rancheria Tachi Yokut Tribe, Tubatulabals of Kern Valley, and Tule River Indian Tribe. No responses were received as of the date of this EIR. TCAG has met its obligations under AB 52 and considers tribal consultation to be concluded. The consultation did not result in identification of any tribal cultural resource.

4.16.3 Impact Analysis

a. Methodology and Significance Thresholds

In accordance with the requirements of AB 52, TCAG conducted AB 52 consultation for the proposed 2022 RTP/SCS, which consisted of written communication with the: Big Sandy Rancheria of Western Mono Indians, Dunlap Band of Mono Indians, Wuksache Indian Tribe/Eshom Valley Band, Kern Valley Indian Community, Santa Rosa Rancheria Tachi Yokut Tribe, Tubatulabals of Kern Valley, and Tule River Indian Tribe. No response was received. Therefore, AB 52 consultation has concluded.

Appendix G of the State CEQA Guidelines identifies the following criteria for determining whether a project’s impacts would have a significant impact to tribal cultural resources:

1. 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:
   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.

b. Project Impacts and Mitigation Measures

The following section discusses impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. Section 4.15.3.c summarizes the impacts associated with capital improvement projects proposed in the 2022 RTP/SCS. Due to the programmatic nature of the 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time. In general, however, implementation of proposed transportation improvements and future projects under the land use scenario envisioned by the 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1:	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: 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.

Impact TCR-1 **TRANSPORTATION PROJECTS AND THE LAND USE SCENARIO ENVISIONED IN THE PROPOSED 2022 RTP/SCS WOULD CAUSE A SUBSTANTIAL ADVERSE CHANGE IN THE SIGNIFICANCE OF A TRIBAL CULTURAL RESOURCE. THIS IMPACT WOULD BE SIGNIFICANT AND UNAVOIDABLE.**

As stated above, AB 52 consultation did not result in identification of any tribal cultural resources. However, the aboriginal California Native American groups including the Southern Valley Yokuts, Foothill Yokuts, Tübatulabal, Monache, and the Owens Valley Paiute that occupied the TCAG region may have burial sites, village or occupation sites, traditional resource gathering locations, and natural landforms of importance to these local tribes that could exist in the TCAG region. Therefore, tribal cultural resources could be encountered during implementation of the transportation projects included in the 2022 RTP/SCS and the land use scenario envisioned by the 2022 RTP/SCS. Effects on tribal cultural resources are highly dependent on the individual project site conditions and the characteristics of a project. Impacts to tribal cultural resources may include damage or destruction of the resources. Adherence to the requirements of AB 52 encourages tribal consultation with local Native American tribes and requires the identification of project-specific substantial adverse effects on tribal cultural resources and appropriate project-specific mitigation measures. If the project sponsor agencies determine that a specific transportation or land use project could cause a substantial adverse change in the significance of a tribal cultural resource, the impact would be significant. The following mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement Mitigation Measure TCR-1 below and Mitigation Measures CR-2(b) where applicable for projects implementing the proposed 2022 RTP/SCS with the potential to impact tribal cultural resources. Cities in the TCAG region and the County can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site specific conditions.

TCR-1 Tribal Cultural Resources Impact Minimization

Implementing agencies shall, or can and should, comply with AB 52, which may require formal tribal consultation. If the implementing agency determines that a project may cause a substantial adverse change to a tribal cultural resource, they shall implement mitigation measures identified in the consultation process required under PRC Section 21080.3.2, or shall implement the following measures where feasible to avoid or minimize the project-specific significant adverse impacts:

- Avoidance and preservation of the resources in place, including, but not limited to: designing and building the project to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space to incorporate the resources with culturally appropriate protection and management criteria.
- Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
  - Protecting the cultural character and integrity of the resource
  - Protecting the traditional use of the resource
  - Protecting the confidentiality of the resource
- Establishment of permanent conservation easements or other culturally appropriate property management criteria for the purposes of preserving or utilizing the resources or places.
- Native American monitoring by the appropriate tribe during soil disturbance for all projects in areas identified as sensitive for potential tribal cultural resources and/or in the vicinity (within 100 feet) of known tribal cultural resources.

Implementing Agencies and Timing

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

Significance After Mitigation

Mitigation Measures CR-2(b) would minimize impacts to archaeological resources, which may also constitute tribal cultural resources, through preconstruction surveys and measure to address unanticipated discoveries. Mitigation Measure TCR-1 would require implementation of mitigation identified through tribal consultation or other feasible mitigation to avoid or reduce impacts to identified tribal cultural resources. These measures would protect the resource's character, traditional use, and confidentiality. With such protection, implementation of the above measures would reduce impacts to tribal cultural resources. However, it cannot be guaranteed that all future project-level impacts can be mitigated and as such, impacts would be significant and unavoidable.

b. Specific RTP/SCS Projects that May Result in Impacts

All 2022 RTP/SCS projects that require construction may result in impacts to tribal cultural resources and, therefore, are not specifically identified in a table, as in some other sections. All 2022 RTP/SCS transportation projects are referenced in Section 2, *Project Description*. Additional analyses and AB 52 consultation with local tribes would be needed as the individual projects are implemented to determine the project-specific impact. The mitigation measures discussed above and potentially others requested by tribal representatives on a project-by-project basis would apply to these specific projects.

4.16.4 Cumulative Impacts

The cumulative impact analysis area for tribal cultural resources consists of the TCAG region and the adjoining counties, Fresno, Kings, Kern, and Inyo. Information regarding these adjoining counties can be found in Section 3.1, *Environmental Setting,* Table 3-1. Tribal cultural resources are regionally specific and determined by the local tribes. However, development in the cumulative impact analysis area would increasingly extend into previously undeveloped areas near or bordering the TCAG region that could have an impact on tribal cultural resource in the TCAG region by impacting the serenity of the tribal site or views from the resource, or projects in the TCAG region having a similar impact to tribal cultural resources in any of the adjacent counties. The TCAG region would continue to develop under the SCS and could result in expansion of urban areas into undeveloped land and that development could encourage development in adjoining counties that have the potential to impact tribal cultural resources. Tribal cultural resources are often associated with areas near water, such as rivers, because Native American Tribes congregated near water such as the Kings River that travels through Fresno, Tulare, and Kings counties. The increase in growth in previously undisturbed areas would contribute to regional impacts on tribal cultural resources.

Development in the TCAG area would increase under the 2022 RTP/SCS by increasing mobility and growth. The increase in growth in previously undisturbed areas contributes to regional impacts on tribal cultural resources. If there may be tribal cultural resources at the location of a project site, tribal consultation in accordance with AB 52 would help ensure protection of tribal cultural resources. However, tribal territory often crosses the boundaries of multiple jurisdictions within and outside of the TCAG region, and there could be several minor impacts to tribal cultural resources that together would result in a significant cumulative impact. The cumulative impact would be significant, and the overall contribution of the proposed 2022 RTP/SCS to significant cumulative tribal cultural resources impacts, and the 2022 RTP/SCS contribution to them would be cumulatively considerable, since Impact TCR-1 is significant. Mitigation Measures CR-2(b) and TCR-1 would reduce impacts associated with 2022 RTP/SCS projects. However, it cannot be guaranteed that all future project level impacts can be mitigated to a less than significant level. As such, the proposed 2022 RTP/SCS contribution would remain cumulatively considerable after mitigation.

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4.17 Utilities and Service Systems

This section evaluates impacts to utilities and service systems (water, wastewater treatment, stormwater drainage, electric power, natural gas, and telecommunications) of the proposed 2022 RTP/SCS.

4.17.1 Setting

a. Water Supply

Water within the TCAG region is supplied from multiple sources, including groundwater, imported surface water, recycled water, and the various watersheds within the County and greater Tulare Lake Hydrologic Region. Major water inputs include water from: 1) surface water that travels from the mountains as snowmelt or runoff, which then gets stored in various foothill reservoirs to be distributed via the watershed systems and a network of canals, 2) water imported from the wetter climates of northern California through the State Water Project (via the California Aqueduct) and the Central Valley Project (CVP) (via the Friant-Kern Canal), 3) groundwater that is pumped from underground reservoirs or aquifers, and 4) a combination of smaller sources like recycled and reused water within individual water districts or agency service areas. The amount of water from each of these sources varies depending upon the amount of precipitation the overall state receives in a particular year.

In 2005, the Department of Water Resources estimated groundwater overdraft by Hydrologic Region. For the Tulare Lake Basin, the total overdraft was estimated at 820,000 acre-feet per year (AFY), the greatest overdraft projected in the State, compared to a historical overdraft averaging 308,000 AFY from the period of 1921 – 1993. This overdraft is due to many factors including reductions of surface supplies in recent years by SWP and CVP export restrictions, Endangered Species Act requirements, and other factors. The groundwater overdraft is most pronounced along the western boundary of the County, as manifested by a lowering of pressure levels in the confined aquifers and historical land subsidence of 12 to 16 feet (Tulare County 2010). Updated information shows between 1998 and 2018, about 78 percent of monitoring wells in the region experienced a declining trend of groundwater levels. Over 51 percent of monitoring wells indicated a declining trend of more than 2.5 feet per year, indicating a drop of at least 50 feet in groundwater levels during that period (DWR 2020).

The TCAG region has been experiencing record-setting drought along with the rest of California and has continuously proclaimed a local drought emergency since 2014. According to the U.S. Drought Monitor, as of March 2022 Tulare County is experiencing an Extreme Drought intensity (U.S. Drought Monitor 2022). Drought conditions in general reduce available water from all sources other than groundwater supplies, which are limited in terms of the annual amount of water that can be withdrawn without causing a long-term drop in water levels (“Safe Yield”) and in the total storage of a basin that can be removed without substantial environmental effects (“Available Yield”). Such water source limitations make water conservation a necessity in the county.

Further discussion of water supplies, groundwater, and hydrology in the TCAG region can be found in Section 4.9, *Hydrology and Water Quality*.

b. Wastewater

County Service Providers

Wastewater-related services and facilities are provided primarily by local agencies within unincorporated Tulare County, with small treatment plants scattered throughout the County. Wastewater service providers are shown in Table 4.17-1.

Table 4.17-1 Wastewater Flows and Capacity of Facilities in Tulare County

Name	Current Average Daily Flow (MGD)	Permitted Capacity
Cutler PUD	0.420	1,256 ESDs
Earlimart PUD	0.800	0.800 MGD
East Orosi CSD	0.053	0.060 MGD
Goshen CSD	0.315	0.500 MGD
Ivanhoe PUD	0.360	0.560 MGD
Lemon Cove SD	0.012	0.020 MGD
London CSD	0.200	0.300 MGD
Orosi PUD	0.770	2,612 ESDs
Pixley PUD	0.298	0.290 MGD
Poplar CSD	0.220	0.310 MGD
Richgrove CSD	0.250	0.220 MGD
Springville PUD	0.056	0.060 MGD
Strathmore PUD	0.150	0.400 MGD
Sultana CSD	0.064	N/A
Terra Bella SMD	0.280	0.300 MGD
Tipton CSD	0.190	0.400 MGD
Woodville PUD	0.120	0.330 MGD
CSA #1 – Delft Colony	0.048	0.057 MGD
CSA #1 – El Rancho	0.012	N/A
CSA #1 – Seville	0.048	0.050 MGD
CSA #1 – Tonyville	0.032	N/A
CSA #1 – Tooleville	0.024	0.035 MGD
CSA #1 – Traver	0.067	0.089 MGD
CSA #2 – Wells Tract	0.030	N/A
CSA #1 – Yettem	0.030	N/A

Notes: ESD = Equivalent Single-Family Dwelling, CSA = County Service Area, CSD = County Sanitation District, JPWA = Joint Powers Wastewater Authority, PUD = Public Utility District, SMD = Sewer Maintenance District. MGD = Million Gallons per Day

N/A = information not available

Source: Tulare County 2010

City of Visalia Wastewater Treatment Plant

The Visalia Wastewater Treatment Plant has an overall capacity of 22 million gallons per day (MGD) with a permitted capacity of 20 MGD (Visalia 2010). It was renovated in 2014 to increase capacity and modernize infrastructure. The facility includes a method to capture methane gas that is then used to power a generator, saving the City money on electrical costs. In addition, more than 2.5 miles of underground pipe were laid so that the treated water from the plant is delivered to the Valley Oaks Golf Course and Plaza park for irrigation, thereby saving City water.

City of Tulare Wastewater Treatment Plant

The Tulare Wastewater Treatment Plant provides wastewater treatment for the Tulare area and is operated by the Tulare Wastewater Treatment Plant Division. It consists of both a domestic plant and an industrial plant. The domestic plant has a capacity of 6 million gallons per day (MGD), while the industrial plant has a capacity of 12 MGD. Currently these two plants treat 4.15 MGD and 7.5 MGD respectively (Tulare 2021). The plant also has 320 acres of storage ponds, 2,200 acres of farmland for beneficial reuse of treated wastewater, and renewable energy generation including an anaerobic bulk volume fermenter, fuel cells, solar photovoltaic panels.

City of Dinuba Wastewater Reclamation Facility

The City of Dinuba's Wastewater Reclamation Facility is designed with a capacity of approximately 3.14 MGD and is permitted for a monthly dry weather discharge flow of 3 MGD. Treated effluent from the plant is pumped into a series of on-site disposable ponds covering approximately 158 acres. Additionally, treated effluent is also pumped to 30 acres devoted to entirely to agriculture. In 2012, the facility underwent improvements to rehabilitate an aeration pond, construction of a new sludge dewatering facility, replacement of centrifugal influent pumps at existing headworks, among others (City of Dinuba 2006; Lyles Construction Group 2012).

City of Porterville Wastewater Treatment Plant

The City of Porterville Wastewater Treatment Facility is designed to treat 8 MGD of wastewater. The facility sends disinfected effluent through a 4.5-mile pipeline to land southwest of Porterville. It is applied to city-owned farmland as irrigation for agricultural activities. Biosolids are used as a soil amendment on city-owned farmland. The total reclamation area where effluent and biosolids are applied encompasses approximately 946 acres (City of Porterville 2022).

City of Exeter Wastewater Treatment Plant

The City of Exeter's Wastewater Treatment Plant receives and treats 980,000 gallons of sewage per day from residential and commercial waste. Treated water is used for local agricultural irrigation. The City of Exeter also has a Sewer System Management Plan which provides specifics on operation and maintenance, design and performance, as well as emergency response plans (City of Exeter 2022).

City of Farmersville Sewer Treatment Plant

The City of Farmersville's sewer treatment plant consists of headworks and aerated ponds. The design capacity of the existing plant is 1.4 MGD. The City of Farmersville is expected to expand the sewer treatment plant to 2.4 MGD in a future phase (Irwin 2021, City of Farmersville 2012, City of Farmersville Planning Commission 2020).

City of Lindsay Surface Water Treatment Plant

The City of Lindsay's Surface Water Treatment Plant is capable of handling flows between 1,600 and 1,800 gallons per minute (gpm). Surface water enters the plant through a turnout at the Friant-Kern Canal where chlorine is added. The plant's filters used to treat surface water are backwashed approximately every four days based on turbidity levels, and backwash water is discharged via a piped storm drain line to stormwater basins (City of Lindsay 2013).

City of Woodlake Wastewater Treatment Facility

The City of Woodlake's Wastewater Treatment Facility serves approximately 1,800 households. The facility consists of oxidation ditches, anoxic basins, percolation ponds, and an emergency pond, among other design features. The facility has a design capacity of 1.38 MGD (Central Valley Regional Water Quality Control Board 2009a; 2009b).

c. Stormwater

Flooding occurs occasionally on streets and roads in urbanized areas where stormwaters are diverted into manmade or artificial drainage systems. In urbanized areas, where substantial surface areas are covered with impervious surfaces, stormwater is not able to permeate and percolate into the soil and must be diverted into a storm drainage system. In some areas, these drainage systems are occasionally overloaded with stormwater drainage, or the drains become clogged with leaves and other debris, thereby impeding stormwater drainage onto transportation facilities. The ability of the storm drainage system to accommodate water flows is also largely based on ground permeability and infrastructure capacity.

The National Pollutant Discharge Elimination System (NPDES) permitting program provides implementation measures for reducing potentially harmful pollutants found in stormwater runoff from entering water bodies or affecting public health. In metropolitan areas, agencies responsible for maintaining and upgrading drainage facilities to accommodate volume are local cities and the County. The County of Tulare owns storm drainage systems known as Municipal Separate Storm Sewer Systems (MS4s) which collect stormwater runoff. Storm water systems and facilities are necessary to drain water and prevent flooding in urban areas, for controlling erosion, and for protecting water quality. Further discussion of stormwater drainage facilities and hydrology in the TCAG region can be found in Section 4.9, *Hydrology and Water Quality*.

d. Electric Power

The Southern California Edison Company (SCE) provides electric service to most of Tulare County. SCE obtains its electricity from natural gas, fossil fuels, nuclear power, hydroelectric power, and eligible renewable resources. The northern and southeastern corners of the TCAG region are served by the Pacific Gas & Electric Company (PG&E). This includes electricity to Dinuba and other unincorporated communities and areas in the northern portion of Tulare County. Further discussion of electric power in the TCAG region can be found in Section 4.6, *Energy*.

e. Natural Gas

In the TCAG region, most of the County is serviced by SCE, which provides natural gas in and between the cities throughout the region. PG&E supplies Dinuba and other unincorporated communities in the northern area of Tulare County. Natural gas supplies are derived from underground sources and brought to the surface at gas wells. Once extracted, gas is purified and the odorant that allows gas leaks to be detected is added to the normally odorless gas. Natural gas suppliers then send the gas into transmission pipelines, which are usually buried underground. Compressors propel the gas through the pipeline system, which delivers it to homes and businesses. In 2020, Tulare County consumed 159.46 million therms of natural gas (CEC 2020).

Further discussion of natural gas use in the TCAG region can be found in Section 4.6, *Energy*.

f. Telecommunications

Telecommunications are mainly a privately owned enterprise and are offered by a variety of companies with different service capacities across the TCAG region. The number of providers offering the service, the type of service available, and the transmission speed of the service all affect the quality of telecommunications. This approach differs from that of most other utilities, which are generally publicly owned or offered by limited or individual service providers in each area.

Many telecommunications providers offer phone, internet, and/or television service in Tulare County. Telecommunications providers will usually complete infrastructure and other service improvements for an area as the need arises to meet customer demand. Additionally, some areas in the TCAG region do not have access to cellular or broadband services, typically in rural areas or locations marked by topographical features that make accessible services difficult.

g. Solid Waste

Most residents in the TCAG region have curbside trash collection. Local waste haulers are contracted, under a franchise system, to provide this service to residents living within the incorporated cities. Unincorporated communities negotiate their own hauling contracts to provide trash collection, whereas collection service is provided in remote areas of the County through bin sites and transfer stations.

Per the most recent data regarding solid waste generation available for incorporated cities in Tulare County, in 2019 Dinuba produced 10,222 tons, Exeter produced 7,245 tons, Farmersville produced 5,884 tons, Lindsay produced 9,266 tons, Porterville produced 48,059 tons, Tulare produced 48,209 tons, Visalia produced 131,121 tons, and Woodlake produced 5,492 tons. The unincorporated areas of Tulare County produced 181,125 tons in 2019. In 2020, the TCAG region produced a total of 501,808 tons of solid waste, an increase of 77,565 tons compared to solid waste generated in 2017 (CalRecycle 2017; 2019; 2021a). Compared to the state’s total waste of 38,372,719 tons, the County was responsible for approximately 1.3 percent of the state’s total solid waste tonnage (CalRecycle 2021a).

Tulare County Solid Waste Management Department operates two landfills and six transfer stations. Each site allows for different types of waste disposal depending on its location. In addition, each disposal site maintains various waste disposal fees for residential and commercial refuse.

Landfills

The County landfills accept approximately 300,000 tons of waste per year, which is equivalent to about 5 pounds per person per day or approximately one ton per county resident per year (Tulare County 2021). The County currently operates two landfills: the Visalia Disposal Site, within the western portion of the City limits of Visalia; and the Teapot Dome Disposal Site, southwest of Porterville (CalRecycle 2021b, 2021c). However, each incorporated city individually contracts with different waste haulers, and thus some solid waste produced in Tulare County is diverted to landfills in neighboring counties. Per the latest data available, solid waste is also diverted to the American

Avenue Landfill in Fresno County, the McKittrick Waste Treatment Site in Kern County, the Avenal Landfill and Kettleman Hills Landfill in Kings County, the Fairmead Landfill in Madera County, the Antelope Valley Public Landfill and Asuza Landfill in Los Angeles County, and the Simi Valley Landfill in Ventura County. The unincorporated areas of Tulare County also utilize landfills outside of the County, the majority of which are located in Kern County (CalRecycle 2019). In total, 317,930 tons of solid waste were accepted at the Visalia Landfill, 116,941 tons of solid waste were accepted at the Teapot Dome Disposal Site, and 12,157 (2.7%) tons of solid waste were diverted to counties outside of the TCAG region. Current permits for the sites are summarized in Table 4.17-2. Solid waste landfill destinations are listed in Table 4.17-3.

Table 4.17-2 Active Solid Waste Landfills in the TCAG Region

Name	Projected Closure Date	Max Daily Disposal (tons)	Max Capacity (cubic yards)	Remaining Capacity (cubic yards)
Visalia Landfill	1/1/2024	2,000	18,630,666	14,815,501
Teapot Dome Landfill	12/31/2022	800	8,320,307	712,861
Source: CalRecycle 2021b; 2021c				

Table 4.17-3 2019 Solid Waste Landfill Destinations Within the TCAG Region

City	Visalia Landfill (tons/year)	Teapot Dome Disposal Site (tons/year)	Landfill/Disposal Site Outside of TCAG Region (tons/year)
Dinuba	9,940	0	62
Exeter	6,666	125	457
Farmersville	5,502	7	385
Lindsay	2,321	6,634	311
Porterville	1,133	45,456	1,469
Tulare	45,919	299	1,991
Tulare-Unincorporated	109,997	64,400	6,729
Visalia	130,628	14	479
Woodlake	5,214	6	271
Source: CalRecycle, 2021d			

Transfer Stations

Similar to the landfills, transfer stations accept trash for disposal. There are six county operated transfer stations, which accept waste of various types including general refuse and wood and green waste depending on size with flat and volume rates applying. These facilities collect material that is then "transferred" to be recycled or to the nearest landfill site. While not as all-inclusive as a landfill, transfer stations provide a broad collection opportunity for local residents (Tulare County 2021).

Table 4.17-4 provides information on active transfer stations in the County.

Table 4.17-4 Active Transfer Stations in the TCAG Region

Transfer Station	Max Permitted Metric Tons	Permitted Capacity (tons/day)
Badger	10 tons/day	15
Balance Rock	52 cubic yards/day	n/a
Camp Nelson	13 tons/day	15
Kennedy Meadows	60 cubic yards/day	n/a
Pine Flat	10 tons/day	15
Springville	12 tons/day	100

Source: Tulare County 2022

Waste Diversion and Recycling

The California Integrated Waste Management Act of 1989 (Chapter 1095, Statutes of 1989) requires every city and county, as part of the Countywide Integrated Waste management plan, to prepare a Source Reduction and Recycling Element that identifies how each jurisdiction would meet the mandatory state waste diversion goals of 50 percent of all solid waste through source reduction, recycling, and composting activities. CalRecycle produces a yearly Diversion/Disposal Progress Report for each county and the applicable jurisdictions. As of 2020, the jurisdictions of Dinuba, Exeter, Farmersville, Lindsay, Porterville, Tulare, Tulare-Unincorporated, Visalia, and Woodlake had submitted their annual reports and are awaiting approval (CalRecycle 2021). Information from the most recent year available, 2019, can be found in Table 4.17-5 below.

Table 4.17-5 2019 Jurisdiction Disposal in the TCAG Region

City	In-State Disposal (tons/year)	Transformed In-State (tons/year)	Alternative Daily Cover (tons/year)
Dinuba	10,222	0	1,439
Exeter	7,245	0	495
Farmersville	5,894	0	416
Lindsay	9,266	0	486
Porterville	48,059	1	2,566
Tulare	48,209	261	3,399
Tulare-Unincorporated	181,125	17	9,553
Visalia	131,121	11	9,895
Woodlake	5,492	0	383

Alternative Daily Cover is a CalRecycle-approved material other than soil used as a temporary overlay on an exposed landfill. It is defined as diversion through recycling and is not considered disposal. See Public Resources Code Section 41781.3(a)

Source: CalRecycle 2019

4.17.2 Regulatory Setting

a. Federal Laws, Regulations, and Policies

Safe Drinking Water Act

The Federal Safe Drinking Water Act (SDWA) establishes standards for contaminants in drinking water supplies. Contaminants regulated by the SDWA include metals, nitrates, asbestos, total dissolved solids, and microbes.

National Pollution Discharge Elimination System Permits

The NPDES permit program was established in the Clean Water Act (CWA) to regulate municipal and industrial discharges to surface waters of the United States. Federal NPDES permit regulations have been established for broad categories of discharges, including point-source municipal waste discharges and nonpoint-source stormwater runoff. NPDES permits generally identify effluent and receiving water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge; prohibitions on discharges not specifically allowed under the permit; and provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities.

Wastewater discharge is regulated under the NPDES permit program for direct discharges into receiving waters and by the National Pretreatment Program for indirect discharges to a sewage treatment plant. In California, the Federal requirements are administered by the SWRCB, and individual NPDES permits are issued by the RWQCBs.

Resource Recovery and Conservation Act (RCRA) of 1976

RCRA Subtitle D focuses on state and local governments as the primary planning, regulating, and implementing entities for the management of nonhazardous solid waste, such as household garbage and nonhazardous industrial solid waste. To promote the use of safer units for solid waste disposal, Subtitle D provides regulations for the generation; transportation; and treatment, storage, or disposal of hazardous wastes. USEPA developed federal criteria for the proper design and operation of municipal solid waste landfills (MSWLFs) and other solid waste disposal facilities. USEPA approved the State of California's program, a joint effort of the CIWMB, SWRCB, RWQCBs, and LEAs, on October 7, 1993.

Title 40 of the Code of Federal Regulations (CFR)

Title 40 of the Code of Federal Regulations (CFR), Part 258 (Resource Conservation and Recovery Act RCRA, Subtitle D) contains regulations for municipal solid waste landfills and requires states to implement their own permitting programs incorporating the Federal landfill criteria. The federal regulations address the location, operation, design, groundwater monitoring, and closure of landfills.

b. State Laws, Regulations, and Policies

California Building Standards Code (Title 24, CCR)

Title 24 applies to all buildings throughout the State of California, and includes requirements for structural, mechanical, electrical, and plumbing systems, and requires measures for energy conservation, green design, construction and maintenance, fire and life safety and accessibility. Cities and counties are required by state law to enforce Title 24. More restrictive ordinances can also be adopted by cities and counties due to specific geographical conditions. Included among the twelve parts of Title 24 are Part 9, which includes the California Fire Code, and is based on the 2009 International Fire Code, and Part 11, which includes the California Green Building Standards Code that includes measures for incorporating energy efficiency into buildings.

Safe Drinking Water Act (1976)

California enacted its own Safe Drinking Water Act in 1976. The California Department of Public Health (CDPH) [formerly the California Department of Health Services (CDHS)] has been granted primary enforcement responsibility for the SDWA. Title 22 of the California Administrative Code establishes CDPH authority and stipulates drinking water quality and monitoring standards. These standards are equal to or more stringent than the Federal standards.

Title 22 of the California Water Code

The California Water Code requires the CDPH to establish water reclamation criteria. In 1975, the former CDHS prepared Title 22 to fulfill this requirement. Title 22 regulates production and use of reclaimed water in California by establishing three categories of reclaimed water: primary effluent, which typically includes grit removal and initial sedimentation or settling tanks; adequately disinfected, oxidized effluent (secondary effluent) which typically involves aeration and additional settling basins; and adequately disinfected, oxidized, coagulated, clarified, filtered effluent (tertiary effluent) which typically involves filtration and chlorination. In addition to defining reclaimed water uses, Title 22 defines requirements for sampling and analysis of effluent and requires specific design requirements for facilities.

Water Supply Planning

SB 610 (Chapter 643, Statutes of 2001) and Senate Bill 221 (Chapter 642, Statutes of 2001) amended state law to improve the link between information on water supply availability and certain land use decisions made by cities and counties. The intent of SB 610 is to ensure that sufficient water supplies are available for growing communities. SB 610 requires local public water providers with more than 3,000 service connections to prepare a Water Supply Assessment (WSA) for certain projects that are subject to CEQA and meet specified minimum size criteria.

The WSA must document sources of water supply, quantify water demands, and compare future water supply and demand to show that sufficient water will be available to serve the project. Water supply must be assessed for normal, single dry, and multiple dry water years during a 20-year forecast. If supplies are found to be insufficient to serve the project, the WSA must include plans for acquiring sufficient supplies.

SB 221 (Chapter 642, Statutes of 2001)

SB 221 (Chapter 642, Statutes of 2001) applies to subdivisions of more than 500 dwelling units. Like SB 610, it is intended to ensure an adequate water supply for new development. SB 221 requires that approval of a tentative map include a requirement that a sufficient water supply is available.

Urban Water Management Planning Act

In 1983, the California Legislature enacted the Urban Water Management Planning Act (Water Code, Section 10610 et seq.), which requires urban water suppliers to develop water management plans to actively pursue the efficient use of available supplies. Every five years, water suppliers are required to develop UWMPs to identify short-term and long-term water demand management measures to meet growing water demands.

The primary municipalities within the TCAG region that have adopted Urban Water Management Plans (UWMPs) pursuant to the Urban Water Management Planning Act are the cities of Tulare, Exeter, Porterville, and Dinuba. The City of Visalia has a private water service agency (California Water Service Company) which also has an adopted a 2020 UWMP. As the Cities of Exeter and Porterville do not have an updated 2020 UWMP available for the public, their respective discussions are based on the most recently available UWMPs from 2015.

City of Tulare Urban Water Management Plan

The City of Tulare's UWMP was created to maintain efficient use of urban water supplies, continue to promote conservation, ensure sufficient water supplies are available for future beneficial use, and provide a mechanism for response during drought. The UWMP services a population of approximately 67,834. The service area includes the City of Tulare itself, the community of Matheny Tract and Soults Mutual Water Company. The UWMP's Water Shortage Contingency Plan includes measures which prohibit operating irrigation system during certain hours, prohibit washing automobiles, among other restrictions (City of Tulare 2021).

City of Exeter Urban Water Management Plan

The City of Exeter's UWMP services the incorporated area for the City of Exeter with a primary focus on groundwater, as groundwater is the sole source of municipal water supply. The UWMP does not include discussions on conjunctive use, groundwater recharge, saline water intrusion barriers, agricultural, wetlands or wildlife habitat because they are not applicable to the City of Exeter. The UWMP's Water Shortage Contingency Plan includes policies such as limiting landscape irrigation hours, restricting washing vehicles, and requiring commercial nurseries to only use drip irrigation systems (City of Exeter 2018).

City of Porterville Urban Water Management Plan

The City of Porterville's UWMP services the City of Porterville as well as some areas outside of the City of Porterville that are within the Planning Areas as defined in the Porterville 2030 General Plan update. Agricultural land use covers 58 percent of the total planning area the UWMP services. The City of Porterville has an existing Water Conservation Plan which outlines policies and procedures to help reduce water demands during drought. These policies include implementing public information programs, enforcing watering schedules, and, if necessary, placing restrictions on water use (City of Porterville 2015).

City of Dinuba Urban Water Management Plan

The City of Dinuba's UWMP services an approximately 6.5 square mile area in the City of Dinuba and was created based off of policies in long-term planning documents such as General Plans and Specific Plans. The City of Dinuba's UWMP includes a Water Shortage Contingency Plan which lists procedures to be carried out in the event of shortage. These include, expanding public information, limiting landscape irrigation, prohibiting vehicle washing, and offering water use surveys (City of Dinuba 2020).

California Water Service Urban Water Management Plan, Visalia District

The California Water Service provides service to the City of Visalia and thus their UWMP is enforced within the City of Visalia. The UWMP services a population of approximately 147,032. The Water Shortage Contingency Plan include policies such as prohibiting watering within 48 hours of measurable rainfall, expanding public information, limiting landscaping days, and prohibiting use of potable water for construction and dust control (California Water Service 2021).

State Water Conservation Requirements

Executive Order N-10-21, signed in July 2021, established a new water use efficiency framework for California and asked Californians to voluntarily reduce their water use by 15 percent compared to 2020 usage rates. The order requires the SWRCB to track and report monthly on the State's progress toward achieving a 15 percent reduction in statewide urban water use. Additionally, the Executive Order calls upon the Department of Water Resources to encourage conservation and monitor hydrologic conditions as ongoing indicators of water supply risk that may inform future drought response actions. The Executive Order includes conservation measures such as efficient landscape irrigation, household appliance efficiency, fixing leaks, installing low flow faucets and showerheads, and avoid hand washing vehicles.

Water Efficiency Legislation

Legislation passed in 2018 (AB 1668 and SB 606) directed the State Water Board to adopt long-term standards for the efficient use of water by June 30, 2022.

California Department of Resources Recycling and Recovery (CalRecycle)

CalRecycle (formerly the California Integrated Waste Management Board) oversees, manages, and monitors waste generated in California. It provides limited grants and loans to help California cities, counties, businesses, and organizations meet the State waste reduction, reuse, and recycling goals. It also provides funds to clean up solid waste disposal sites and co-disposal sites, including facilities that accept hazardous waste substances and non-hazardous waste. CalRecycle develops, manages, and enforces waste disposal and recycling regulations, including AB 939 and SB 1016, both of which are described below.

Integrated Waste Management Act – Assembly Bill 939

AB 939 (Public Resources Code 41780) requires cities and counties to prepare integrated waste management plans (IWMPs) and to divert 50 percent of solid waste from landfills beginning in calendar year 2000 and each year thereafter. AB 939 also requires cities and counties to prepare Source Reduction and Recycling Elements (SRRE) as part of the IWMP. These elements are designed to develop recycling services to achieve diversion goals, stimulate local recycling in manufacturing and stimulate the purchase of recycled products.

California State Recycling Law – Assembly Bill 341

AB 341 is California's Mandatory Recycling Law for commercial businesses, multifamily complexes, and public entities. AB 341 went into effect on July 1, 2012, and requires all businesses that generate four or more cubic yards of garbage per week and multifamily dwellings with five or more units to recycle. AB 341 also sets a statewide goal of 75 percent waste diversion.

California Mandatory Organics Recycling Law – Assembly Bill 1826

AB 1826 is California's Mandatory Organics Recycling Law for commercial businesses and multifamily complexes. AB 1826 requires businesses to recycle organic waste on and after April 1, 2016. By January 1, 2016, local jurisdictions were required to implement an organic waste recycling program that diverts organic waste generated by businesses and multifamily residential dwellings consisting of five or more units. AB 1826 phases the mandatory recycling of commercial organic waste over time based on volume of waste generated by businesses. In April 2016, businesses generating over eight cubic yards of organic waste per week were required to arrange for organic waste recycling services; in January 2017, businesses generating over four cubic yards of organic waste per week will do the same. Additionally, jurisdictions are required to submit annual reports. In 2020, CalRecycle conducted a formal review to determine if statewide organic waste disposal has been reduced by 50 percent of 2014 levels. It was determined organic waste had not been reduced by 50 percent of 2014 levels. As a result, the AB 1826 program was extended until December 21, 2026.

Senate Bill 1383

In September 2016, the Governor signed into law SB 1383 which establishes methane emissions reduction targets in a statewide effort to reduce emissions of short-lived climate pollutants (SLCP) in various sectors of California's economy. SB 1383 establishes targets to achieve a 50 percent reduction in the level of the statewide disposal of organic waste from the 2014 level by 2020 and a 75 percent reduction by 2025. The bill builds upon California's leading commitments to reduce greenhouse gas emissions and air pollution statewide. The Governor identified reductions of short-lived climate pollutant emissions, including methane emissions, as one of five key climate change strategy pillars necessary to meet California's target to reduce GHG emissions 40 percent below 1990 levels by 2030 as established in SB 32 (Pavley, Chapter 249, Statutes of 2016).

Senate Bill 1016

SB 1016 requires that the 50 percent solid waste diversion requirement established by AB 939 be expressed in pounds per person per day. SB 1016 changed the CalRecycle review process for each municipality's integrated waste management plan. After an initial determination of diversion requirements in 2006 and establishing diversion rates for subsequent calendar years, the Board reviews a jurisdiction's diversion rate compliance in accordance with a specified schedule. Beginning January 1, 2018, the Board began reviewing a jurisdiction's source reduction and recycling element and hazardous waste element once every two years.

Planning for water management, wastewater and stormwater management, and solid waste disposal is conducted by local agencies to support their long-term resource planning and ensure adequate service to meet existing and future demands. In addition to federal and State regulations governing these planning efforts, cities, counties, and water districts may provide regulatory advisement on water resources, water treatment, and solid waste disposal. Many jurisdictions incorporate goals and policies relating to these topic areas in their municipal codes, general plans, development standards, or other regulations (e.g., utility master plans, solid waste management plans).

c. Local Laws, Regulations, and Policies

City and County General Plans

State law requires every city and county to adopt a general plan that expresses the community's development goals and embodies public policy relative to the distribution of future land uses, both public and private (OPR 2017). Included in the general plan are potential hazards, policies, and mitigation measures related to utilities and related service systems. The elements contained in the general plan are intended to promote the highest quality of life in each jurisdiction.

The 2030 Tulare County General Plan includes goals and policies related to protecting the County's water supply and securing future supplies in Chapter 11, Water Resources, and flood and storm management in the Health and Safety Chapter. Major goals include WR-1 and -2, protection of surface and groundwater resources. These overarching goals are implemented by a wide variety of policies and work plans such as HS-5.4 (flood control measures and stormwater retention), WR-1.1 (groundwater withdrawal management), WR-1.8 (basin management participation), and WR-2.1 (protection of water quality).

The City of Visalia has numerous goals and policies related to water quality and hydrology in the General Plan, especially in the Water Resources section of the Open Space and Conservation Element, which covers water quality. Goals include OSC-O-6 (Protect water resources and quality), OSC-O-7 (preservation of waterways as habitat, groundwater recharge, and flood control), and PSCU-O-14 (management practices for groundwater recharge and stormwater management) which are implemented by Policies such as OSC-P-8 (waterway protection), OSC-P-10 (waterway setbacks), PSCU-P-60 (incorporation of stormwater detention basins) and PSCU-P-61 (control of stormwater runoff and pollutants). The Visalia Municipal Code contains stormwater, flood management, and conservation regulations in Titles 13, 15, and 16.

The City of Porterville 2030 General Plan Open Space and Conservation Element includes several goals and policies related to protection of the Tule River, which flows through the planning area and to groundwater recharge to the Tule Subbasin (City of Porterville 2007). The Guiding Policy is OSC-G-8, ensuring adequate water quality and supply for the entire community, and Implementation Policies include OSC-I-37 (watershed protection standards), OSC-I-39 (minimizing erosion and runoff), OSC-I-40 through 45 (pollution management), and OSC-I-53 through 56 (recharge and infiltration protection). The Porterville City Code has numerous regulations and ordinances related to water quality and conservation, including Chapter 7.IV on green building codes, and Chapter 19A which contains the Storm Drainage Systems regulations.

Other cities in the TCAG Region, such as Tulare and Exeter, have similar provisions, goals, policies, and regulations in their General Plans and municipal ordinances.

Groundwater Sustainability Agencies

All three major groundwater subbasins within the TCAG region have been assigned 'High' overdraft priorities and are considered critically overdrafted under the Sustainable Groundwater Management Act (SGMA, see *Regulatory Setting* above). There are several Groundwater Sustainability Agencies (GSAs) within the TCAG region, and most have submitted independent Groundwater Sustainability Plans (GSPs) as required under SGMA. Some of the larger GSAs within the region include:

Lower Tule River Irrigation District

Lower Tule River Irrigation District is one of the largest irrigation districts in California; it covers over 104,000 acres and contains approximately 150 miles of rivers and canals. Supplied by the Tule River, Friant-Kern Canal, and Cross Valley canal, the District serves Deer Creek, Tule River Authority, Poplar Ditch Company, Pioneer Water Company and other large dairy industries within the District's boundaries (Lower Tule Irrigation District/Pixley Irrigation District 2022).

Eastern Tule Groundwater Sustainability Agency

Eastern Tule Groundwater Sustainability Agency (ETGSA) is a local agency that was formed as a requirement of the State of California SGMA. The ETGSA implements the requirements of SGMA. The ETGSA, which includes the Greater Porterville Area, encompasses approximately 161,000 acres. ETGSA is located within the Tule Subbasin. SGMA applies to all parcels and persons located within the subbasin (ETGSA 2018).

Greater Kaweah Groundwater Sustainability Agency

The Greater Kaweah Groundwater Sustainability Agency (GKGSA) oversees groundwater management in the Kaweah Subbasin. The GKGSA's jurisdictional area extends 343 square miles, approximately half of the area within the Kaweah Subbasin. The Cities of Exeter, Farmersville, and Woodlake, and a portion of the City of Hanford are located within the GKGSA (GKGSA 2020).

Kings River East Groundwater Sustainability Agency

The Kings River East Groundwater Sustainability Agency (KREGSA) is one of seven groundwater sustainability agencies within the Kings Subbasin and covers 191,300 acres of the Kings Subbasin. KREGSA serves the Cities of Reedley, Orange Cove, and Dinuba, and several community services districts and irrigation districts. These entities are subject to management under the KREGSA Groundwater Sustainability Plan (KREGSA 2019).

East Kaweah Groundwater Sustainability Agency

The East Kaweah Groundwater Sustainability Agency (EKGSA) oversees groundwater management in the eastern portion of the Kaweah subbasin. Water is primarily supplied by the Kaweah River as a primary source of recharge to the area. The EKGSA serves Tulare County, the City of Lindsay, communities of Strathmore, Tooleville, Tonyville, and Plainview, as well as various irrigation districts (EKGSA 2020).

Mid Kaweah Groundwater Subbasin Joint Powers Authority

In 2015, the City of Visalia, City of Tulare, and Tulare Irrigation District entered into a Joint Powers Authority Agreement to form the Mid Kaweah Groundwater Subbasin Joint Powers Authority (MKGSJPA). This agreement allowed members of the MKGSJPA to manage groundwater within their jurisdictional boundaries and qualify to serve as the Mid-Kaweah Groundwater Sustainability Agency (MKGSA). Together, the jurisdictional area is approximately 163 square miles. The entities in the MKGSJPA are all subject to the GSP created by the GSA (MKGSA 2019).

Delano-Earlimart Irrigation District

The Delano-Earlimart Irrigation District includes a service area of approximately 56,500 acres in southern Tulare County and northern Kern County along the eastside of San Joaquin Valley. Over 90 percent of the jurisdiction is comprised permanent cropland. Along with the Richgrove Community Service District and Earlimart Public Utility District, the Delano-Earlimart Irrigation District has formed the Delano-Earlimart Irrigation District Groundwater Sustainability Agency which manages groundwater within southern Tulare County and a small northeast portion of Kern County (Delano-Earlimart Irrigation District).

Tri-County Water Authority

The Tri-County Water Authority has jurisdiction over lands in both the Tule and Tulare Lake Subbasins. The area is primarily irrigated and dryland agriculture, with two rural communities, Allensworth State Park and 'West of Earlimart', as well as farmsteads scattered throughout the area. The Tri-County Water Authority collaborates with the Tule Subbasin Technical Advisory Committee to manage groundwater in the Tule Subbasin (Tri-County Water Authority 2019).

Pixley Irrigation District

The Pixley Irrigation District serves landowners and large dairy industries within the District's boundaries, which cover approximately 69,500 acres and 67 miles of canals and rivers. Water supply for the District is drawn from 31,200 acre-feet from the Cross Valley Canal (Lower Tule Irrigation District/Pixley Irrigation District 2022).

Alpaugh Irrigation District

The Alpaugh Irrigation District is the Groundwater Sustainability Agency for portions of the eastern Tule Subbasin. It manages groundwater in the community of Alpaugh and serves as part of the Tule Subbasin Technical Advisory Committee (Tule Subbasin Groundwater Sustainability Agencies 2022).

4.17.3 Impact Analysis

a. Methodology and Significance Thresholds

Appendix G of the State CEQA Guidelines identifies the following criteria for determining whether a project's impacts would have a significant impact to utilities:

1. Require or result in the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction of which could cause significant environmental effects;
2. Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years;
3. Result in a determination by the wastewater treatment provider which serves or may serve the project that is has inadequate capacity to serve the projects projected demand in addition to the provider's existing commitments;
4. 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; or
5. Not comply with federal, state and local management and reduction statutes and regulations related to solid waste.

This analysis includes a program-level, qualitative assessment of impacts related to utilities and service system. Impacts related to these resource areas are localized in nature, and therefore the analysis is qualitative and focuses on the existing regulations, standards, and policy measures to address these localized impacts. This evaluation of public utilities/facilities impacts assumes that construction and development under the proposed 2022 RTP/SCS would adhere to applicable federal, State, and local regulations and would conform to appropriate standards in the industry, as relevant for individual projects. Where existing regulatory requirements or permitting requirements exist that are law and binding on responsible agencies and project sponsors, it is reasonable to assume that they would be implemented, thereby reducing impacts.

b. Project Impacts and Mitigation Measures

The following section discusses potential impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. Section 4.17.3.c summarizes the impacts associated with capital improvement projects proposed in the 2022 RTP/SCS. Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time. In general, however, implementation of proposed transportation improvements and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1:	Require or result in the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction of which could cause significant environmental effects
Threshold 3:	Result in a determination by the wastewater treatment provider which serves or may serve the project that is has inadequate capacity to serve the project’s projected demand in addition to the provider’s existing commitments

Impact UTIL-1 PROPOSED TRANSPORTATION PROJECTS AND FUTURE LAND USE SCENARIO OF THE PROPOSED 2022 RTP/SCS WOULD REQUIRE OR RESULT IN THE RELOCATION OR CONSTRUCTION OF NEW OR EXPANDED WATER, WASTEWATER TREATMENT, OR STORMWATER DRAINAGE, ELECTRIC POWER, NATURAL GAS, OR TELECOMMUNICATIONS FACILITIES, THE CONSTRUCTION OF WHICH WOULD CAUSE SIGNIFICANT ENVIRONMENTAL EFFECTS. THIS IMPACT WOULD BE SIGNIFICANT AND UNAVOIDABLE.

Water

Envisioned land use development under the proposed 2022 RTP/SCS would result in a need for new or expanded water treatment facilities to accommodate demand in specific areas that exceeds the capacity at existing facilities. Transportation projects would not lead to the construction of projects that include habitable residences or commercial buildings. However, transportation projects implemented under the proposed 2022 RTP/SCS would introduce additional water demands to the TCAG region, although transportation projects involve modification of existing facilities and would not result in a substantial increase in landscaped areas that require irrigation. As described below in Impact UTIL-4, water supply could be insufficient for meeting this increased demand. The use of advanced treatment technology, reclaimed water distribution, or groundwater recharge may need to be expanded to increase water supplies.

Proposed transportation projects and land use projects implementing the proposed 2022 RTP/SCS would require construction or expansion of water facilities. Depending on the exact timing and location of future development, it may become necessary to construct new water facilities or expand existing facilities to maintain adequate water supply. The construction of new or expanded water facilities could result in significant environmental impacts, depending on their location and design and the environmental resources present where the facilities are located.

Wastewater

Envisioned land use development under the proposed 2022 RTP/SCS would result in a need for new or expanded wastewater treatment facilities to accommodate demand in specific areas that exceeds the capacity at existing facilities. As discussed in 4.12, *Population and Housing*, between 2020 and 2046, the TCAG region is forecasted to grow by 85,734 people, which would increase demand for wastewater treatment. In some instances, wastewater treatment capacity may need to be expanded along with the use of advanced treatment technology, reclaimed water distribution, or groundwater recharge to increase water supplies.

Proposed transportation projects and land use projects implementing the proposed 2022 RTP/SCS would require construction or expansion of wastewater treatment facilities and may result in the determination by a wastewater treatment provider that it is has inadequate capacity to serve future demand. Depending on the exact timing and location of future development, it may become necessary to construct new wastewater treatment facilities or expand existing facilities to maintain adequate wastewater treatment capacity. The construction of new or expanded wastewater treatment facilities could result in significant environmental impacts, depending on their location and design and the environmental resources present where the facilities are located.

Stormwater

The proposed 2022 RTP/SCS would result in an increase of approximately 40,774 housing units through the horizon year. Development of the remaining acres outside of existing urban areas could be composed of a variety of land uses and impervious surfaces (e.g., paved areas, building rooftops, parking lots) that would result in incremental increases in the volume and rate of stormwater runoff, and possibly require the expansion or construction of new stormwater drainage facilities. Urban infill can also increase impervious surfaces by converting permeable vacant or underused parcels into land with more paving or structures. Some re-development can reduce the amount of impervious surface, however, by converting pavement or buildings into permeable paving or landscape. Redevelopment can also increase the amount and rate of runoff by discharging greater amounts of water on a site than before development, typically because of excessive landscape irrigation. Infrastructure upgrades would be required to accommodate the stormwater and water quality treatment needs of the individual development.

As described in Section 4.9, *Hydrology and Water Quality*, the CWA NPDES MS4 Phase I and Phase II requirements compel agencies and developments to implement SWMPs, which in turn require the implementation of source and treatment control measures. NPDES MS4 permittees are also required to develop and enforce ordinances and regulations to reduce the discharge of sediments and other pollutants in runoff and must verify compliance. New development that would introduce 10,000 or more square feet of new impervious surfaces would be required under Provision C.3 of the NPDES to incorporate LID strategies such as stormwater reuse, onsite infiltration, and evapotranspiration. Some typical BMPs to meet regulatory standards for project operation include erosion control and revegetation programs, LID, alternative discharge options and integrated pest management techniques in landscaped areas. During operations and maintenance of envisioned projects, operational BMPs would result in compliance with applicable stormwater runoff discharge permits.

The infill nature of the proposed 2022 RTP/SCS development pattern, combined with compliance with existing stormwater regulations that mitigate runoff flows, would result in less than significant impacts on the stormwater capacity of existing systems because much of the growth would occur on already impervious land built to lower standards and the slight increase of urbanized land would have to comply with current standards. However, development outside of urbanized areas would likely require the construction of new stormwater drainage systems that may create significant environmental impacts.

Likewise, some transportation projects would also increase impervious surface area compared to existing conditions, such as transportation projects that involve adding new or additional travel lanes to paved roads. Depending on the location and design specific to transportation projects included in the proposed 2022 RTP/SCS, stormwater runoff may be captured in existing storm drain systems and conveyed to local or regional wastewater treatment facilities. Additionally, roadways, such as state highways, are often adjacent to pervious surfaces, such as gravel shoulders, agricultural fields, or other unpaved surfaces. Runoff from the roadway surface is able to flow overland into these pervious areas and infiltrate the ground, reducing impacts to the local stormwater system. For other transportation projects, additional drainage infrastructure that results in additional ground disturbance would be required.

Energy and Telecommunication Infrastructure

Additionally, while implementation of the proposed 2022 RTP/SCS transportation projects would not result in the demand for new energy and telecommunication infrastructure, implementation of the proposed 2022 RTP/SCS land use development pattern could result in an increased demand. As noted in Section 4.13, *Population and* Housing, transportation projects within the proposed 2022 RTP/SCS are generally intended to improve existing transportation networks and improve safety, thus not inducing increased land development that could lead to additional demand for energy and telecommunication infrastructure. Concerning land use, the specific nature of the infrastructure is difficult to predict because both the energy and telecommunication fields are evolving rapidly with new technologies. As communities continue to implement strategies to electrify their communities and transition to a less carbon intensive electric system, upgrades to existing distribution systems would be expected. Where existing electric, natural gas, and telecommunications infrastructure cannot accommodate demand generated from increased land development and densities associated with implementation of the proposed 2022 RTP/SCS, and where the capacity of existing infrastructure is exceeded, new or expanded infrastructure that may create adverse environmental effects, including electric power, natural gas, and telecommunications may be required.

Summary

Overall, implementation of the proposed 2022 RTP/SCS may require new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities or the relocation of existing facilities. The construction or relocation of these facilities may have significant environmental impacts related to construction and to conversion of undeveloped land. Therefore, these impacts would be significant. The following mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures where applicable for transportation projects implementing the proposed 2022 RTP/SCS that would result in impacts to wastewater and other utility facilities. Cities and the County can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site specific conditions.

UTIL-1(a) Water and Wastewater Facilities

During the CEQA review process for individual facilities, TCAG and transportation project sponsor agencies, and cities in the TCAG region, Tulare County, and other utility providers with responsibility for the construction of new water or wastewater treatment and collection facilities or the expansion of existing facilities shall, or can and should, apply necessary mitigation measures to reduce significant environmental impacts associated with the construction or expansion of such facilities. The environmental impacts associated with such construction or expansion shall be avoided or reduced through the imposition of conditions required to be followed by those directly involved in the construction or expansion activities. Such conditions shall include those necessary to avoid or reduce impacts associated with air quality, noise, traffic, biological resources, cultural resources, greenhouse gas emissions, hydrology and water quality and others that apply to specific construction or expansion of water or wastewater treatment and collection facilities projects.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies are cities, Tulare County, and utility agencies for land use projects. This mitigation measure shall, or can and should, be applied during project permitting and environmental review.

UTIL-1(b) Stormwater Facilities

During the CEQA review process for individual facilities, TCAG and transportation project sponsor agencies, and cities in the TCAG region, Tulare County, and other special districts with responsibility for the construction of new stormwater drainage facilities or the expansion of existing facilities to adequately meet projected capacity needs shall, or can and should, apply necessary mitigation measures to avoid or reduce significant environmental impacts associated with the construction or expansion of such facilities. The environmental impacts associated with such construction or expansion shall be avoided or reduced through the imposition of conditions required to be followed by those directly involved in the construction or expansion activities. Such conditions shall include those necessary to avoid or reduce impacts associated with air quality, noise, traffic, biological resources, cultural resources, greenhouse gas emissions, hydrology and water quality, and others that apply to specific construction or expansion of storm water drainage facilities projects.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies are cities, Tulare County, and utility agencies for land use projects. This mitigation measure shall, or can and should, be applied during project permitting and environmental review.

UTIL-1(c) Stormwater Control Methods

During the CEQA review process for individual projects, TCAG and transportation project sponsor agencies, and cities in the TCAG region and Tulare County shall, or can and should, implement the following measures where feasible:

- For transportation projects, incorporate stormwater control, retention, and infiltration features, such as detention basins, bioswales, vegetated median strips, and permeable paving, early into the design process to ensure such features are analyzed during environmental review. Implement mitigation measures identified for such features on a project specific basis, where feasible and necessary based on project and site-specific considerations.
- For land use projects, incorporate stormwater control, retention, and infiltration features, such as use of permeable paving materials, dry wells, bioswales, or green roofs, early into the design process to ensure such features are analyzed during environmental review. Implement mitigation measures identified for such features on a project specific basis, where feasible and necessary based on project and site-specific conditions.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. This mitigation measure shall, or can and should, be applied during project permitting and environmental review.

UTIL-1(d) Electric Power, Natural Gas, or Telecommunications Facilities

During the CEQA review process, cities, Tulare County, and TCAG region energy and telecommunications providers and other agencies with responsibility for the construction or approval of new electric power, natural gas, or telecommunications facilities or the expansion of existing facilities to adequately meet projected capacity needs shall, or can and should, apply necessary mitigation measures to avoid or reduce significant environmental impacts associated with the construction or expansion of such facilities. The environmental impacts associated with such construction or expansion shall be avoided or reduced through the imposition of conditions required to be followed by those directly involved in the construction or expansion activities. Such conditions shall include those necessary to avoid or reduce impacts associated with air quality, noise, traffic, biological resources, cultural resources, greenhouse gas emissions, hydrology and water quality, and others that apply to specific construction or expansion of natural gas and electric facilities projects.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies are cities, Tulare County, and utility agencies for land use projects. This mitigation measure can and should be applied during project permitting and environmental review.

Significance After Mitigation

Implementation of Mitigation Measure UTIL-1(a) through UTIL-1(d) would reduce impacts associated with the construction of additional water and wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities because it would require implementing agencies to apply necessary mitigation measures to avoid or reduce significant environmental impacts associated with the construction or expansion of such facilities. However, these mitigation measures may not be feasible or effective for every project. Therefore, this impact would be significant and unavoidable. No additional mitigation measures to reduce this impact to less than significant levels are feasible.

Threshold 4:	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

Impact UTIL-2 TRANSPORTATION PROJECTS AND LAND USE PROJECTS IMPLEMENTING THE PROPOSED 2022 RTP/SCS WOULD GENERATE SOLID WASTE IN EXCESS OF THE CAPACITY OF LOCAL INFRASTRUCTURE OR OTHERWISE IMPAIR THE ATTAINMENT OF SOLID WASTE REDUCTION GOALS. THIS IMPACT WOULD BE SIGNIFICANT AND UNAVOIDABLE.

Construction activities would generate solid waste that would need to be disposed at local landfills, and individual contributions on a project-by-project basis would be analyzed under planning review prior to project implementation. Impacts associated with transportation infrastructure projects would be temporary and reduced by compliance with the California Green Building Code and Senate Bill 1016, which require that construction operations recycle a minimum of 50 percent of waste generated. Similarly, land use development projects would also be required to comply with a 50 percent diversion rate, as required by California's Integrated Waste Management Act of 1989 (State Assembly Bill [AB] 939) and a future 75 percent diversion pursuant to AB 341. Compliance with these requirements would ensure that solid waste generated from land use development would be minimized the extent practical, and that diversion rates would increase into the future, as development included in the proposed 2022 RTP/SCS is built out.

For the non-diverted waste generated by projects included in the proposed 2022 RTP/SCS, solid waste would require disposal in area landfills. As shown, there are two active landfills and six active transfer stations in the TCAG region. As described in Section 4.12, *Population and Housing*, between 2020 and 2046, the TCAG region is forecasted to grow by 85,734 people; 40,774 housing units; and 31,709 jobs. This increase in population would result in increased generation of solid waste and would potentially exceed local landfill capacity. The Visalia landfill has an expected 20-year future capacity which does not project out to the horizon year of 2046. Thus, it is possible solid waste will be generated in excess of local landfill capacity.

Land use development projects undertaken with implementation of the proposed 2022 RTP/SCS would be required to comply with federal, State, and local statues and regulations related to solid waste, including County and City General Plans. Local jurisdictions also have goals and policies for recycling and diversion of solid waste to ensure compliance such as AB 939 which requires that all California counties provide at least 15 years of ongoing landfill capacity.

While there are regulations in place intended to reduce solid waste generation, implementation of the proposed 2022 RTP/SCS would result land use development that would not occur evenly around the region. Areas with the most growth would generate waste that could exceed the current permitted capacity at local landfills. Implementation of the proposed 2022 RTP/SCS land use development pattern and transportation projects would reduce the capacity of existing landfills, leading to earlier closure dates than currently anticipated and a need for increased landfill capacity. Therefore, this impact would be significant. The following mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures where applicable for transportation projects implementing the proposed 2022 RTP/SCS that would result in impacts to solid waste generation. Cities and the County can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site specific conditions.

UTIL-2 Solid Waste Generation and Disposal

During the CEQA review process for individual facilities, TCAG and transportation project sponsor agencies, cities in the TCAG region, and Tulare County shall, or can and should, implement the following measures where feasible:

- Provide an easily accessible area that is dedicated to the collection and storage of non-hazardous recycling materials.
- Maintain or reuse existing building structures and materials during building renovations and redevelopment.
- Use salvaged, refurbished, or reused materials to help divert such items from landfills.
- Divert construction waste from landfills, where feasible, through means such as:
  - Submitting and implementing a construction waste management plan that identifies materials to be diverted from disposal;
  - Establishing diversion targets, possibly with different targets for different types and scales of development;
  - Helping project sponsors and implementing agencies share information on available materials with one another, to aid in the transfer and use of salvaged materials.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies are cities, Tulare County, and utility agencies for land use projects. This mitigation measure shall, or can and should, be applied during project permitting and environmental review.

Significance After Mitigation

Implementation of Mitigation Measure UTIL-2 would reduce impacts associated with solid waste generation because it would require that land use and transportation projects apply landfill diversion strategies including reusing building materials, maintaining structures where applicable, and developing construction waste management plans. However, these mitigation measures may not be feasible or effective for every project. Therefore, this impact would remain significant and unavoidable.

Threshold 5:	Not comply with federal, state and local statutes and regulations related to solid waste

Impact UTIL-3 TRANSPORTATION PROJECTS AND THE FUTURE LAND USE SCENARIO OF THE PROPOSED 2022 RTP/SCS WOULD BE REQUIRED TO COMPLY WITH ALL RELEVANT STATUES AND REGULATIONS RELATED TO SOLID WASTE. THIS IMPACT WOULD BE LESS THAN SIGNIFICANT.

As discussed under Impact UTIL-2, transportation projects and land use development projects implementing the proposed 2022 RTP/SCS would be required to comply with the California Green Building Code and SB 1016, which require that construction operations recycle a minimum of 50 percent of waste generated. Similarly, land use projects would also be required to comply with federal, State, and local statues and regulations related to solid waste, including a 50 percent diversion rate pursuant to AB 939 and a future 75 percent diversion pursuant to AB 341, as well as local jurisdiction goals and policies for recycling and diversion of solid waste. Therefore, the proposed 2022 RTP/SCS would comply with relevant federal, state, and local statutes and regulations related to solid waste, and this impact would be less than significant.

Mitigation Measures

No mitigation measures are required.

Threshold 2:	Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years

Impact UTIL-4 IMPLEMENTATION OF PROPOSED TRANSPORTATION PROJECTS AND FUTURE LAND USE SCENARIO IN THE PROPOSED 2022 RTP/SCS WOULD INCREASE WATER DEMAND IN THE TCAG REGION, RESULTING IN INSUFFICIENT WATER SUPPLIES AVAILABLE TO SERVE THE PROJECT AND REASONABLY FORESEEABLE FUTURE DEVELOPMENT DURING NORMAL, DRY, AND MULTIPLE DRY YEARS. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.

Water within the County is supplied from multiple sources, including groundwater, imported surface water, recycled water, and the various watersheds within the County and greater Tulare Lake HR. Projects implemented under the proposed 2022 RTP/SCS would introduce additional water demands to the TCAG region. Most transportation projects involve modification of existing facilities and would not result in a substantial increase in landscaped areas that require irrigation. Furthermore, new and extended roadways could include tree and shrub plantings. Major proposed 2022 RTP/SCS projects, particularly new and extended roadways, could affect groundwater supplies by incrementally reducing groundwater recharge potential. Increased impermeable surfaces associated with proposed projects could negatively impact natural infiltration within existing rights-of-way, however, there would be no effect on groundwater recharge if potential sites are already paved. Also, during grading and general construction activities for projects under the proposed 2022 RTP/SCS, water supply would be needed to provide fugitive dust management. As discussed in Section 4.9, *Hydrology and Water Quality*, given the current state of groundwater overdraft of many groundwater basins in the study area, and the likelihood that more than one project would be constructed simultaneously in areas with overdrafted basins, the short-term water supply impact during construction of proposed 2022 RTP/SCS transportation projects would be significant.

It is likely that many projects involving landscaping and infill development near transit would be located in urban areas served by overdrafted groundwater basins. Development associated with the land use scenario envisioned in the proposed 2022 RTP/SCS may also impact water supplies requiring additional water for mixed use development and infill, as well as outlying, development. Future development envisioned under the land use scenario would increase the demand on the region's water supply. Further, increased demand on water supply driven by the increase in population coupled with increasingly common drought conditions would result in insufficient supply. As described in Section 4.12, *Population and Housing*, between 2020 and 2046, the TCAG region is forecasted to grow by 85,734 people; 40,774 housing units; and 31,709 jobs. Given existing reliance on and over-drafting of groundwater and anticipated continued drought it is possible that there would be insufficient water without new or expanded supply. Therefore, the impact from land use projects would be significant.

As discussed in Section 4.17.2, *Regulatory Setting*, UWMPs for the TCAG area estimate and pursue the efficient use of available water supplies identifying short-term and long-term water demand management measures. UWMPs are generally updated every five years to account for water demand resulting from the growth envisioned in general plan updates and updated population growth forecasts. Therefore, the current UWMPs applicable to the TCAG region generally account for the land development envisioned in the proposed 2022 RTP/SCS because it is largely consistent with applicable general plans. In addition, SB 610/221 amended State law to improve the link between information on water supply availability and certain land use decisions made by cities and counties. Further, GSPs prepared under SGMA would be implemented to protect groundwater in the TCAG area. These regulatory and planning programs encourage planning for anticipated water usage and thus conservation in the TCAG area and would include consideration for the water demand associated with the proposed 2022 RTP/SCS.

The forecasted TCAG population growth, land use and transportation projects, although implemented in compliance with existing regulations, would generate considerable water demand. Groundwater subbasins are already being overdrawn to support the existing population and California entered a new drought in 2020 after a sustaining a five-year drought from 2012 to 2016. As of March 2022, the TCAG region is in an extreme drought condition (U.S. Drought Monitor 2022). In addition, although existing regulations would reduce groundwater impacts, some jurisdictions may not have local regulations, or the regulations may not apply to all projects. Therefore, the region may have insufficient water supplies available to serve RTP/SCS demands and reasonably foreseeable future development during normal, dry, and multiple dry years, and this impact would be significant. The following mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures where applicable for transportation projects implementing the proposed 2022 RTP/SCS that would result in impacts to water supply. Cities and the County can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site specific conditions.

UTIL-4 General Conservation Measures

During the CEQA review process for individual projects, TCAG and transportation project sponsor agencies, and cities in the TCAG region and Tulare shall, or can and should, implement water conservation measures to reduce water demand. They shall, or can and should, coordinate with relevant water services to ensure demand can be accommodated and identify a water consumption budget. Any water conservation measures that reduce demand for potable water, such as reducing water use for landscape irrigation for transportation projects or use of water-conserving fixtures in envisioned land use projects, shall be employed. Reclaimed water shall be used when possible. Specific conservation measures that shall be implemented may include, but would not be limited to:

- Limiting planting to native and non-native plants appropriate for the project microclimate so no water beyond natural rainfall is required for healthy plant survival after the plant establishment period
- Limiting supplemental water provided by irrigation to non-potable, unless not practicable
- Submitting written documentation of water availability prior to issuance of grading permits

IMPLEMENTING AGENCIES AND TIMING

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, Mitigation Measures UTIL-3 above, in addition to HYD-2(a) and HYD-2(b) in Section 4.9, *Hydrology and Water Quality*. These specific mitigation measures were developed for the proposed 2022 RTP/SCS program where applicable for transportation projects that have water supply impacts, where feasible and necessary based on project and site-specific considerations. Cities in the TCAG region and Tulare County can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site specific conditions.

Significance After Mitigation

Implementation of measures UTIL-4 above, in addition to HYD-2(a) and HYD-2(b) in Section 4.9, *Hydrology and Water Quality* would reduce impacts from project water use and impacts to groundwater recharge in the TCAG region. However, due to the programmatic nature of proposed 2022 RTP/SCS a precise, project-level analysis of specific water demand and supply impacts associated with individual transportation and land use projects is not possible. The land use scenario envisioned by proposed 2022 RTP/SCS along with transportation projects are water intensive and may result in the need for additional water supply, even with the implementation of mitigation measures listed above. Given the overdraft conditions of area groundwater basins and other regional water supply concerns, impacts would remain significant and unavoidable. No additional feasible mitigation measures to reduce this impact to less than significant levels are available.

4.17.4 Specific RTP/SCS Projects That May Result in Impacts

Table 4.17-6 identifies examples of transportation projects with the potential to cause or contribute to direct or indirect impacts to utility and service systems, such as those discussed above. These projects are representative and were selected based on their potential scope and likelihood of adversely impacting public utility systems. Additional specific analysis would be required as individual projects are implemented to determine the project specific magnitude of impact. Mitigation discussed above would apply to these specific projects.

c. Specific RTP/SCS Projects That May Result in Impacts

Table 4.17-6 Proposed 2022 RTP/SCS Projects That May Result in Utility and Service System Impacts

Project Jurisdiction and Location	Action	Potential Impact
Caltrans		
State Route 99 - 30.6/35.2 Tulare/Tagus - Prosperity Avenue to 1.2m S of Avenue 280	Widen existing roadway from 4 to 6 lanes	UTL-1(c), UTL-2, UTL-4
State Route 99 - 25.4/30.6 Tulare - Avenue 200 to Prosperity Avenue	Widen existing roadway from 4 to 6 lanes	UT©(c), UTL-2, UTL-4
State Route 99 – 13.5/25.4 – 0.7 miles north of Court Ave to Avenue 200	Widen existing roadway from 4 to 6 lanesUTL-1(c), UTL-2, UTL-4	
State Route 99 - 0.0/13.5 Near Earlimart, County Line Road to 0.7 miles north of Court Avenue	Widen existing roadway from 4 to 6 lanes	UTL-1(c), UTL-2, UTL-4
State Route 65 - 10.9/15.6 Terra Bella - Avenue 88 to Avenue 124	Widen existing roadway from 2 to 4 lanes	UTL-1(c), UTL-2, UTL-4
State Route 65 - 29.5/32.3 Near Lindsay-from Hermosa Road to Avenue 244	Realignment and widen existing roadway from 2 to 4 lanes	UTL-1(c), UTL-2, UTL-4
State Route 190 - 13.2/15.0 Porterville - Westwood to State Route 65	Widen existing roadway from 2 to 4 lanes	UTL-1(c), UTL-2, UTL-4
State Route 99 at Caldwell Avenue	Widen on/off ramps and bridge structure	UTL-1(c), UTL-2, UTL-4
State Route 99 at AgriCenter	Construct new Interchange	UTL-1(c), UTL-2, UTL-4
State Route 99 at Paige Avenue	Widen on/off ramps and bridge structure	UTL-1(c), UTL-2, UTL-4
State Route 198 at Road 148	Construct new interchange	UTL-1(c), UTL-2, UTL-4
State Route 190 at Main Street	Widen bridge structure, new ramps	UTL-1(c), UTL-2, UTL-4
Dinuba		
Nebraska Avenue at Alta Avenue	Roundabout at intersection	UTL-1(c), UTL-2, UTL-4
Kamm Avenue at Alta Avenue	Roundabout at intersection	UTL-1(c), UTL-2, UTL-4
Lindsay		
State Route 65 - at Tulare Avenue	Roundabout and local street improvements	UTL-1(c), UTL-2, UTL-4
Porterville		
State Route 190 - at Main Street and SR-65	WB Aux lane and ramp improvements	UTL-1(c), UTL-2, UTL-4
Westwood Street - South of Orange Avenue to south of Tule River	Widen existing road bridges from 2 to 4 lanes	UTL-1(c), UTL-2, UTL-4
Newcomb Street - North of Tule River to south of Poplar Ditch	New 4 lane overcrossing over SR 190	UTL-1(c), UTL-2, UTL-4
State Route 190 at Westwood	Roundabout and intersection improvements	UTL-1(c), UTL-2, UTL-4
State Route 190 at Plano Street	Roundabout and intersection improvements	UTL-1(c), UTL-2, UTL-4
Plano Street at College Avenue	Roundabout at intersection	UTL-1(c), UTL-2, UTL-4

Project Jurisdiction and Location	Action	Potential Impact
Visalia		
State Route 198 at Shirk Street	Turn lane, intersection, ramp improvements	UTL-1(c), UTL-2, UTL-4
State Route 198 downtown corridor interchanges	Turn lane, intersection, ramp improvements	UTL-1(c), UTL-2, UTL-4
State Route 198 at Lovers Lane	Turn lane, intersection, road rehabilitation improvements	UTL-1(c), UTL-2, UTL-4
Riggin Avenue - Akers to Demaree	Widen existing roadway from 2 to 4 lanes	UTL-1(c), UTL-2, UTL-4
Riggin Avenue - Mooney to Conyer	Widen existing roadway from 2 to 4 lanes	UTL-1(c), UTL-2, UTL-4
Riggin Avenue - Shirk to Akers	Widen existing roadway from 2 to 4 lanes	UTL-1(c), UTL-2, UTL-4
Riggin Avenue - Kelsey to Shirk	Widen existing roadway from 2 to 4 lanes	UTL-1(c), UTL-2, UTL-4
Tulare County		
Avenue 280 - Santa Fe (Visalia) to Lovers Ln (Visalia)	Widen existing roadway from 2 to 4 lanes	UTL-1(c), UTL-2, UTL-4
Avenue 280 - Lovers Ln (Visalia) to Virginia (Farmsersville)	Widen existing roadway from 2 to 4 lanes	UTL-1(c), UTL-2, UTL-4
Avenue 280 - Brundage (Farmersville) to Elberta (Exeter)	Widen existing roadway from 2 to 4 lanes	UTL-1(c), UTL-2, UTL-4
State Route 99 - South County interchanges	Turn lane, intersection, ramp improvements.	UTL-1(c), UTL-2, UTL-4
State Route 99 at Caldwell Avenue (Avenue 280)	Ramp signalization and intersection improv.	UTL-1(c), UTL-2, UTL-4
State Route 198 at State Route 65	Turn lane, intersection, ramp improvements	UTL-1(c), UTL-2, UTL-4
State Route 198 at Spruce Road	Turn lane, intersection, ramp improvements	UTL-1(c), UTL-2, UTL-4

4.17.5 Cumulative Impacts

Generally, utilities are provided on a local or regional level. Therefore, the cumulative impact analysis area for utilities consists of the TCAG region and the adjoining counties.

As shown in Table 3-1 in Section 3, *Environmental Setting,* the population for adjoining counties (Fresno, Inyo, Kern, and Kings) is projected to increase from approximately 2.1 million people in 2020 to approximately 2.6 million people by 2050. This level of growth would require or result in the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction of which would cause significant environmental effects. This development may also generate solid waste in excess of the capacity of local infrastructure and increase water demand in such that water supplies may be insufficient to serve envisioned development. Cumulative impacts to utilities would therefore be significant.

As described above, implementation of the proposed 2022 RTP/SCS may require new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities or the relocation of existing facilities, the construction of which would result in significant effects. The proposed 2022 RTP/SCS contribution to cumulative utilities impacts would be cumulatively considerable. Although mitigation measures described in this section would reduce impacts associated with proposed 2022 RTP/SCS projects, it cannot be fully guaranteed that all future project level impacts would be mitigated to a less than significant level, and the mitigation measures do not preclude any new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities or the relocation of existing facilities, the construction of which would result in significant effects. Therefore, the proposed 2022 RTP/SCS would remain cumulatively considerable after mitigation.

4.18 Wildfire

This section evaluates impacts on wildfire from implementation of the proposed 2022 RTP/SCS.

4.18.1 Setting

In California, responsibility for wildfire prevention and suppression is shared by federal, State, and local agencies. Federal agencies are responsible for federal lands in Federal Responsibility Areas. California has determined that some non-federal lands in unincorporated areas with watershed value are of statewide interest and have classified those lands as State Responsibility Areas (SRA), which are managed by the California Department of Forestry and Fire Protection (CAL FIRE). All incorporated areas and other unincorporated lands are classified as Local Responsibility Areas (LRA).

a. Wildfire Behavior and Controlling Factors

Human influence on wildfire includes direct influences, such as the ignition and suppression of fires, and indirect influence through climate change, the alteration of native vegetation, fire suppression, and development patterns. Human-induced wildfire ignitions can change fire regime characteristics in two ways: (1) changing the distribution and density of ignitions and (2) changing the seasonality of burning activity. Human-induced ignition sources include escapes from debris and brush-clearing fires, electrical equipment malfunctions, campfires, smoking, fire play (e.g., fireworks), vehicles, and arson. Consequently, areas near human development more frequently experience fires than very remote or urban areas. Figure 4.18-1 displays the Fire Hazard Severity Zones (FHSZ) in the TCAG region.

Once a fire is started, the spread and behavior of a fire become a function of fuel characteristics, terrain, and weather conditions. People have intervened deliberately and dramatically in the natural fire regime through fire suppression and, more recently, actions that affect fuel connectivity. Historically, fire suppression was used to prevent and limit wildfires. Over time, this land management practice (combined with forest regrowth after extensive logging in the late 19th century) has led to a buildup of forest fuels and an increase in the occurrence and threat of large, severe fires. Contemporary fire management practices include fuel management activities that are intended to reduce the intensity and severity of wildfires. Reducing fuels through mechanical treatments and prescribed fire have been found to be effective at reducing fire frequency, fire severity, and annual area burned when applied at the landscape scale over an extended period of time.

Wildfire activity is closely related to temperature and drought conditions, and in recent decades, increasing drought frequency and warming temperatures have resulted in increased fire activity and the largest, most destructive, and deadliest wildfires in California history. Climate change will continue to produce conditions that facilitate a longer fire season, which, when coupled with human-caused changes in the seasonality of ignition sources, will produce more, longer, and bigger fires during more times of the year. According to California's Fourth Climate Change Assessment, Statewide Summary Report (OPR 2018), if greenhouse gas emissions continue to rise, the frequency of extreme wildfires burning over 25,000 acres could increase by 50 percent by 2100, and the average area burned Statewide could increase by 77 percent by the end of the century.

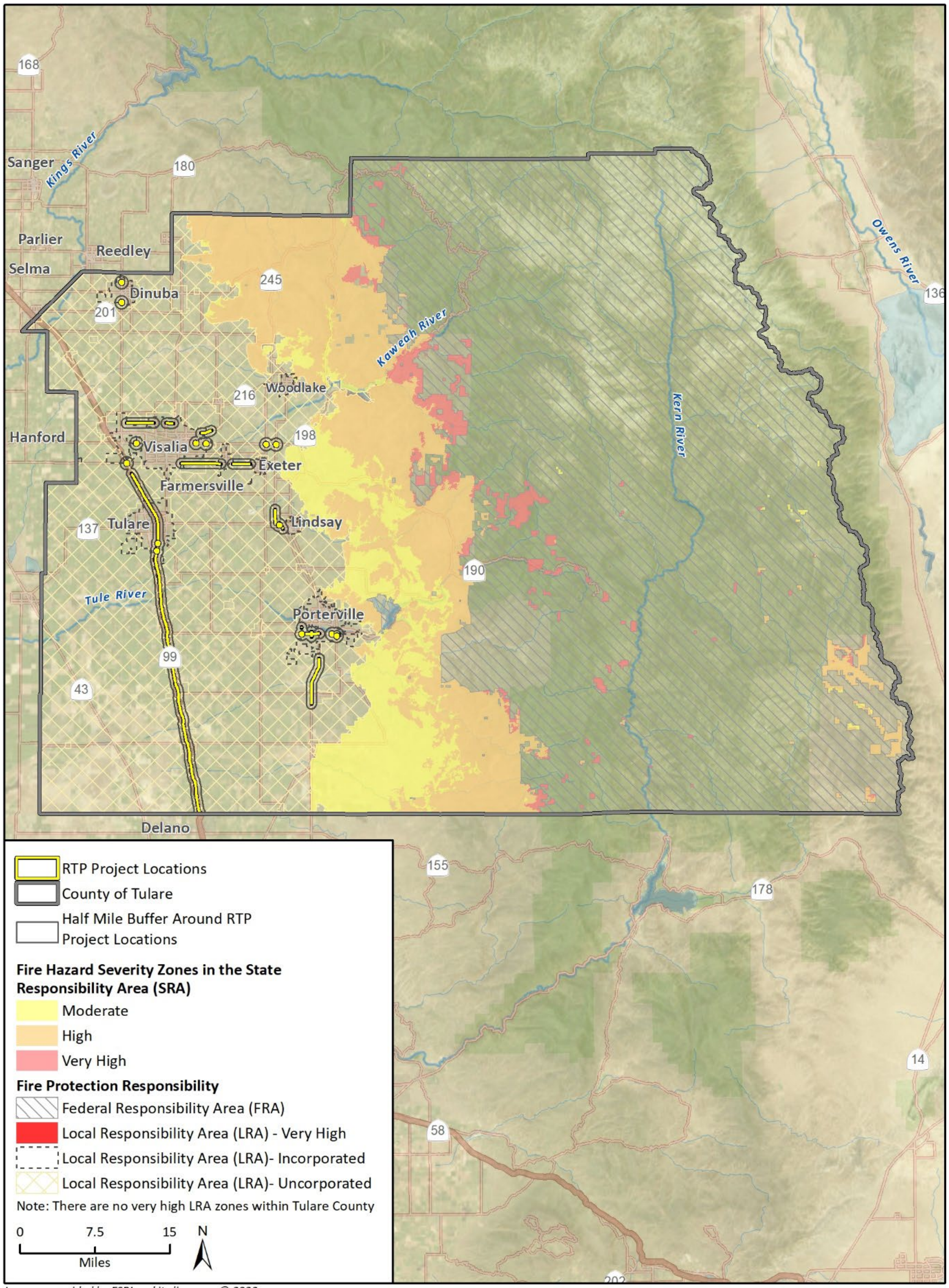
b. California Wildfire Hazards

While all of California is subject to some degree of wildfire hazard, there are specific features that make certain areas more hazardous. CAL FIRE is required by law to map areas of significant fire hazards based on fuels, terrain, weather and other relevant factors (Public Resources Code [PRC] 4201-4204 and California Government Code 51175-89). Factors that increase an area's susceptibility to fire hazards include slope, vegetation type and condition and atmospheric conditions. CAL FIRE has identified two types of wildfire risk areas: 1) Wildland Areas That May Contain Substantial Forest Fire Risks and Hazards and 2) Very High Fire Hazard Severity Zones (CAL FIRE 2022a). Each risk area carries with it code requirements to reduce the potential risk of wildfires. Under state regulations, areas within very high fire hazard risk zones must comply with specific building and vegetation management requirements intended to reduce property damage and loss of life within these areas.

Development that has spread into less densely populated, often hilly areas has increased the number of people living in heavily vegetated regions that are prone to wildfire. The area where wildlands meet urban development is referred to as the wildland-urban interface (WUI) and is subject to urban wildfire. In recent years some of the deadliest and most extensive fires in the history of the state have ignited in the WUI and spread to suburban and even urban areas (CAL FIRE 2021). In September 2021, a lightning strike ignited the Windy Fire on the Tule River Indian Reservation. The Windy Fire burned approximately 97,528 acres (National Wildfire Coordinating Group 2021). In June 2021, a fire at Success Valley Road and Reservation Road, East of Porterville, burned 800 acres and required 10 engines, two water tenders, six crews, and 172 personnel (CAL FIRE 2022b). These fires are examples of what can result from a fire in the WUI.

Throughout the TCAG region, there is a full range of conditions and fire hazards as indicated in the applicable FHSZ Maps for the region. State Responsibility Areas (SRAs) define an area where the State has financial responsibility for wildland fire protection and prevention. Local Responsibility Areas (LRAs) consist of incorporated cities, urban regions, agriculture lands, and portions of the desert where the local government is responsible for wildfire protection (CAL FIRE 2022a). According to the Tulare County Fire Hazard Severity Zones in SRA (CAL FIRE 2007), there are Moderate, High, and Very High FHSZs extending throughout the central TCAG region in a north-south direction as well as scattered FHSZs within the southeastern portion of the region, adjacent to Inyo County (CAL FIRE 2007). Portions of highways traverse FHSZs, including SR 190, SR 198, and SR 245. Of the TCAG region's approximate 3,099,188 acres of land coverage, 604,461 acres (20 percent of land coverage) are designated as SRAs. Approximately 1,567,084 acres (51 percent of land coverage) of the TCAG region, set in the eastern portion of the region, is within a Federal Responsibility Area (FRA). CAL FIRE does not have legal responsibility to provide fire protection within an FRA as that land is administered by the federal government (CAL FIRE 2022a). The urbanized areas in and around cities make up approximately 59,979 acres (2 percent of land coverage) of incorporated areas within LRAs. The unincorporated 829,937 acres (27 percent of land coverage) in the western TCAG region is classified as an LRA. There are no Very High FHSZs within incorporated or unincorporated LRAs. For a visualization of FHSZs in the TCAG region, refer to Figure 4.18-1.

Figure 4.18-1 Fire Hazard Severity Zone Map in the TCAG Region



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Additional Information Provided by Cal Fire, 2021.

4.18.2 Regulatory Setting

a. Federal Laws, Regulations, and Policies

International Fire Code

The International Fire Code (IFC), created by the International Code Council (IFCC), is the primary means for authorizing and enforcing procedures and mechanisms to ensure the safe handling and storage of any substance that may pose a threat to public health and safety. The IFC regulates the use, handling, and storage requirements for hazardous materials at fixed facilities. The IFC and the International Building Code use a hazard classification system to determine what protective measures are required for fire and life safety. These measures may include construction standards, separations from property lines, and specialized equipment. To ensure that these safety measures are met, the IFC employs a permit system based on hazard classification. The IFC is updated every three years and is the basis for the California Fire Code (CFC) (also updated triennially). Local jurisdictions, including the TCAG region cities, then adopt the CFC, in some cases with local amendments (IFCC 2021).

Federal Disaster Mitigation Act

The Disaster Mitigation Act of 2000 provided a new set of mitigation plan requirements that encourage state and local jurisdictions to coordinate disaster mitigation planning and implementation. States are encouraged to complete a “Standard” or an “Enhanced” Natural Mitigation Plan. “Enhanced” plans demonstrate increased coordination of mitigation activities at the state level and, if completed and approved, increase the amount of funding through the Hazard Mitigation Grant Program. The State of California Multi-Hazard Mitigation Plan (SHMP) complies with this act.

National Fire Plan

The U.S. Department of the Interior’s (DOI) National Fire Plan is intended to ensure an appropriate federal response to severe wildland fires, reduce fire impacts on rural communities, and ensure sufficient firefighting capacity in the future. The Rural Fire Assistance program is funded to enhance the fire protection capabilities of rural fire districts and safe and effective fire suppression in the wildland/urban interface. The program promotes close coordination among local, state, tribal, and federal firefighting resources by conducting training, equipment purchase, and prevention activities on a cost-shared basis (DOI 2000).

b. State Laws, Regulations, and Policies

2019 Strategic Plan for California

The 2019 Strategic Plan prepared by CAL FIRE and the California Natural Resources Agency lays out central goals for reducing and preventing the impacts of fire in the State. The goals are meant to establish, through local, State, federal, and private partnerships, a natural environment that is more resilient and human-made assets that are more resistant to the occurrence and effects of wildland fire (CAL FIRE 2019).

In addition to the 2019 Strategic Plan for California, individual CAL FIRE units develop fire plans, which are major strategic documents that establish a set of tools for each CAL FIRE unit for its local area. Updated annually, unit fire plans identify wildfire protection areas, initial attack success, assets and infrastructure at risk, pre-fire management strategies, and accountability within their unit's geographical boundaries. The unit fire plan identifies strategic areas for pre-fire planning and fuel treatment as defined by the people who live and work locally. The plans include contributions from local collaborators and stakeholders and are aligned with other plans for the area.

California Building Code (2019)

Chapter 7A of the California Building Code (California Code of Regulations, Title 24, Part 2) includes specific requirements related to exterior wildfire exposure. These requirements establish minimum standards to protect buildings located in Fire Hazard Severity Zone within SRAs and Wildland-Urban Interface Fire Areas. This code includes provisions for ignition resistant construction standards for new buildings.

California Fire Code

The 2019 California Fire Code (California Code of Regulations, Title 24, Part 9) establishes the minimum requirements consistent with nationally recognized good practices to safeguard the public health, safety, and general welfare for the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures, and premises, and to provide safety and assistance to firefighters and emergency responders during emergency operations. The provisions of this code apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal, and demolition of buildings or structures or any appurtenances connected or attached to such building structures throughout California.

California Emergency Services Act

The California Governor's Office of Emergency Services (Cal OES) is responsible for overseeing and coordinating emergency preparedness, response, recovery, and homeland security activities within the California. Section 8687.7 of the California Disaster Assistance Act required the development of a Standard Emergency Management System (SEMS) program, for managing multiagency and multijurisdictional responses to emergencies in California. The Cal OES Emergency Management Systems Unit is a multi-agency group charged with methodical review, evaluation, and approval of needed improvements to SEMS. State agencies are required to use SEMS and local government entities must use SEMS in order to be eligible for any reimbursement of response-related costs under the State's disaster assistance programs.

Cal OES serves as the lead State agency for emergency management and coordinates the State response to major emergencies in support of local government. SEMS provides the mechanism by which local governments request assistance from Cal OES, and Cal OES maintains oversight of the State's mutual aid system.

State of California Emergency Plan

The Cal OES Emergency Plan outlines a state-level strategy to support local government efforts during a large-scale emergency. In accordance with the California Emergency Services Act, the State Emergency Plan describes methods for carrying out emergency operations, mutual aid processes, emergency services of governmental agencies, resource mobilization, emergency public information, and continuity of government (Cal OES 2017).

California Multi-Hazard Mitigation Plan

The California Office of Emergency Services prepares the State Hazard Mitigation Plan (SHMP), which identifies hazard risks and includes a vulnerability analysis and a hazard mitigation strategy (Cal OES 2018). The SHMP is required under the Disaster Mitigation Act of 2000 for the State to receive federal funding. The Disaster Mitigation Act of 2000 requires a State mitigation plan as a condition of disaster assistance.

The SHMP represents the state's primary hazard mitigation guidance document - providing an updated analysis of the state's historical and current hazards, hazard mitigation goals and objectives, and hazard mitigation strategies and actions. The plan represents the state's overall commitment to supporting a comprehensive mitigation strategy to reduce or eliminate potential risks and impacts of disasters in order to promote faster recovery after disasters and, overall, a more resilient state. State Hazard Mitigation Plans are required to meet the Elements outlined in FEMA's State Mitigation Plan Review Guide (revised March 2015, effective March 2016).

Cal OES is responsible for the development and maintenance of the State's plan for hazard mitigation. The State's multi-hazard mitigation plan was last approved by the Federal Emergency Management Agency (FEMA) as an Enhanced State Mitigation Plan in 2018. The plan is designed to reduce the effects of disasters caused by natural, technological, accidental, and adversarial/human-caused hazards. The SHMP sets the mitigation priorities, strategies, and actions for the state. The plan also describes how risk assessment and mitigation strategy information is coordinated and linked from local mitigation plans into the SHMP and provides a resource for local planners of risk information that may affect their planning area. The State of California is required to review and revise its mitigation plan and resubmit for FEMA approval at least every five years to ensure continued funding eligibility for certain federal grant programs.

Senate Bill 1241 (Kehoe) of 2012

Senate Bill 1241 (Chapter 311, Statutes of 2012) requires cities and counties to address fire risk in SRAs and VHFHSZs in the safety element of their general plans. It also requires cities and counties to make certain findings regarding available fire protection and suppression services before approving a tentative subdivision map or parcel map.

Assembly Bill 3074 (Friedman) of 2020

Assembly Bill 3074 (Chapter 259, Statutes of 2020) imposes additional fuel reduction requirements on a person who owns, leases, controls, operates, maintains or builds an occupied dwelling or structure in, upon, or adjoining wild lands within a very high fire hazard severity zone.

SRA Fire Safe Regulations

The State Responsibility Area (SRA) Fire Safe Regulations CCR Title 14, Division 1.5, Section 1270 et seq. establishes CAL FIRE's basic wildland fire protection standards for new development and is applicable in all SRAs in California—areas where CAL FIRE is responsible for wildfire protection. Title 14 establishes minimum standards required for fire protection for emergency access, fuel modification (including a defensible space of 100 feet around structures), setback to property line, signage, and water supply. To comply with the standards, proposed development must include road and street networks that provide safe access for emergency wildland fire equipment and civilian evacuation concurrently. Newly constructed buildings and roads must post clearly visible signs, including names and contact numbers visible from the roadway. Emergency water for wildfire protection must be available and accessible in specified quantities. Finally, to reduce the intensity of a wildfire, strategic siting of fuel modification and greenbelts must meet specific requirements.

c. Local Laws, Regulations, and Policies

Local planning policies related to wildfire hazards are established in each jurisdiction's general plan, generally in the Safety Element or equivalent chapter. For emergency services, some of the relevant policies include coordinating with other agencies responsible for planning medical facilities to meet the health care needs of residents in the region, retaining hospitals, evaluating medical facility proposals, providing emergency response services, and participating in mutual-aid agreements. Example county General Plan goals and policies are provided below.

Tulare County General Plan

Among other topics, the Tulare County General Plan Health and Safety Element seeks to minimize the exposure of County residents, visitors, and public and private property to the effects of urban and wildfire areas. These include policies that address emergency services consultation and coordination (HS-6.3, HS-6.14, HS-6.15), ensure safe development (HS-6.1, HS-6.2, HS-6.4, HS-6.5), and address general fire safety (Tulare County 2012).

City General Plans and Regulations

City of Porterville General Plan

The City of Porterville General Plan Section 7, Public Health and Safety, determines the City of Porterville is not considered a fire-prone city, and structural fires pose a greater risk than wildland fires. However, the City of Porterville has policies in place which strengthen emergency response (PHS-I-13), establish building standards (PHS-I-14, PHS-I-16), and promote public awareness (PHS-I-15) (City of Porterville 2008).

City of Tulare General Plan

The City of Tulare General Plan 2055 Safety Element contains policies to protect people and property from fire risk. These include policies for development (SAF-P6.1, SAF-P6.2, SAF-P6.3, SAF-P6.4), public education (SAF-P6.10) and disaster preparedness (SAF-P6.5, SAF-P6.8, SAF-P6.9) (City of Tulare 2012).

City of Visalia General Plan

The City of Visalia General Plan Section 8, Safety and Noise, contains policies which primarily focus on mitigating structural fires, rather than wildland fires. However, some policies do address wildland fires and emphasize community response (S-P-21) and water supply (S-P-29) (City of Visalia 2014).

City of Woodlake General Plan

The City of Woodlake General Plan includes a goal to establish a cooperative working relationship between the Woodlake Fire Department and the Tulare County Fire Department (TCFD). The City of Woodlake also promotes policies which ensure adequate water supply and the establishment of a fire prevention program (City of Woodlake 2008).

The other smaller cities in the TCAG region have similar policies regarding cooperation with TCFD and other agencies in preventing, managing and fighting wildfires.

Emergency Operations Plan

Tulare County Emergency Operations Plan

The Tulare County Emergency Operations Plan (EOP) implements the California Standardized Emergency Management System (SEMS) in order to provide guidance in the event that large-scale emergency or disaster response activities are needed. Within the SEMS, standardized procedures for field-level emergency response, multi/inter-agency coordination, mutual aid, and coordination of damage information and resource requests are provided to serve as a unified response system for the entirety of California's emergency management community, which includes Tulare County's Office of Emergency Services (Tulare OES 2022; Cal OES 2022).

City of Visalia Emergency Operations Plan

The City of Visalia has an Emergency Operations Plan in place to address the planned response to emergency situations within the City. The Emergency Operations Plan focuses on mitigation any flooding hazards, establishment of operational concepts and procedures associated with initial response and extended response operations, and the recovery process, among other topics (City of Visalia 2011).

Local Hazard Mitigation Plan

Local jurisdictions develop, adopt, and update local hazard mitigation plans (LHMP) to establish guiding principles for reducing hazard risk, as well as specific mitigation actions to eliminate or reduce identified vulnerabilities. Tulare County, the Cities of Dinuba, Exeter, Farmersville, Lindsay, Porterville, Tulare, Visalia, and Woodlake; the Tule River Tribe; and Tulare County Office of Education staff have coordinated preparation of a Multi-Jurisdictional LHMP for Tulare County (Tulare OES 2018) to reduce or eliminate long-term risk to people and property from natural hazards and their effects in the TCAG region. This includes unincorporated Tulare County and its departments and offices, cities, special districts and Tribes located within Tulare County (Tulare OES 2018). The LHMP includes goals and policies to reduce fire severity and intensity in the region through wildfire prevention, fuels management, and coordination with local, State, and federal agencies. LHMPs are required to be updated every five years.

4.18.3 Impact Analysis

a. Methodology and Significance Thresholds

Appendix G of the State CEQA Guidelines identifies the following criteria for determining whether a project's impacts would have a significant impact on wildfire:

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:

1. Substantially impair an adopted emergency response plan or emergency evacuation plan.
2. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.
3. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment.

4. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes; or
5. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

Impacts related to impairment or interference of emergency response or evacuation plans (threshold 1) are discussed Section 4.15, *Transportation*, under Impact T-4.

The methodology used for the following evaluation is based on a review of documents and publicly available information about wildfire conditions in the TCAG region to determine the potential for implementation of projects in the proposed 2022 RTP/SCS to result in increased wildfire risks. This includes city and county planning documents. This program-level analysis is based on an overall understanding of the key fire safety concerns that could result from implementation of the proposed 2022 RTP/SCS. The evaluation of wildfire impacts reasonably assumes that the construction and development under the proposed 2022 RTP/SCS would adhere to the latest federal, state and local regulations, and conform to the latest required standards in the industry, as appropriate for individual projects.

b. Project Impacts and Mitigation Measures

The following section discusses potential impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. Section 4.18.3.c summarizes the impacts associated with capital improvement projects proposed in the proposed 2022 RTP/SCS. Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time. In general, however, implementation of proposed transportation improvements and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 2:	Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.
Threshold 3:	Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment.
Threshold 4:	Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes; or
Threshold 5:	Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

Impact WF-1 PROPOSED TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD BE LOCATED IN OR NEAR AN SRA OR VERY HIGH FIRE HAZARD SEVERITY ZONE, AND SIGNIFICANT RISKS OF LOSS, INJURY, OR DEATH FROM WILDFIRES OR DOWNSTREAM FLOODING OR LANDSLIDES WOULD OCCUR. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.

Wildland Fire

As shown in Figure 4.18-1 and discussed in Section 4.18.1, Setting CAL FIRE has mapped the central-west portion of the TCAG region as having a moderate or high fire hazard, with some very high fire hazard zones scattered east. The land use scenario envisioned by the proposed 2022 RTP/SCS concentrates the forecasted population and employment growth in urban areas and corridors of the counties, such as incorporated cities, unincorporated towns, and major roadways, where the risk of wildfire is less than in more rural, forested, or mountainous areas where fuels are abundant and emergency response access is restricted. No proposed 2022 RTP transportation projects are within an SRA or VHFHSZ. Proposed 2022 RTP transportation projects, including roadway improvements, transportation demand management, and transit improvements, would not involve developing residential uses that would include occupants. While some transportation projects may include office or maintenance structures, occupation would be temporary and would not be situated in very high FHSZs or SRAs. Land uses envisioned in the proposed 2022 RTP/SCS occur in urbanized areas, mainly in LRAs of incorporated cities and along SR-99. Transportation projects associated with the proposed 2022 RTP would improve mobility in the TCAG region and therefore could facilitate an expedited evacuation or escape during a wildfire. However, urban and outlying areas within the WUI are still at risk from wildfire.

Land use development envisioned in the proposed 2022 RTP/SCS that would be located within or less than two miles[1] from an SRA would cause significant wildfire impacts because existing codes and regulations cannot fully prevent wildfires from damaging structures or populations. These projects would increase the exposure of transportation infrastructure to risk of loss or damage from wildfire. Additionally, fire related impacts may extend far beyond the fire footprint as damage to homes, infrastructure, and ecosystems, and diminished air and water quality could all occur. People residing in residential development could be exposed to smoke and air pollution from wildfires regardless of their location within urbanized areas or the WUI. Thus, impacts associated with slope,

[1] For the purpose of this analysis, two miles is considered “near” an SRA or very high FHSZ.

prevailing winds, and other factors that would exacerbate wildfire risks and thereby expose project occupants to pollutant concentrations from a wildfire or uncontrolled spread of a wildfire would be significant.

Requirements to adhere to the local hazard mitigation plan, as well as the local general plan policies and programs aimed at reducing the risk of wildfires through land use compatibility, training, sustainable development, brush management, public outreach, and service standards for fire departments would reduce the risk of wildfire for these projects. Additionally, CBC regulations have been prepared and adopted for the purpose of establishing minimum wildfire protection standards in conjunction with building, construction, and development in a SRA. Title 14 sets forth the minimum development standards for emergency access, including fuel modification, setback, signage, and water supply, which are intended to result in development that avoids or minimizes the hazards associated with development including associated infrastructure to roads, fuel breaks, emergency water sources, power lines or other utilities in wildfire-prone areas.

Although there are limited instances where the proposed land use pattern and planned transportation investments of the proposed 2022 RTP/SCS may result in growth in or near wildfire prone areas, substantial wildfire-related effects could still occur. Fire risks are still present despite adherence to regulatory standards and the limited regional growth within an SRA or Wildland-Urban Interface (WUI) area. The proposed 2022 RTP/SCS plans for the construction and maintenance of associated infrastructure and envisions land development near SRAs. Global climate change will pose an increasing threat to wildland areas and nearby urban environments. The proposed 2022 RTP/SCS plans for the construction and maintenance of associated infrastructure and envisions land development within and near these areas. Due to the unpredictable nature of wildfires in California, it is anticipated that projects in the proposed 2022 RTP/SCS could exacerbate wildfire risk both in exposure to wildfires and in the aftermath conditions as a result of runoff, post-fire slope instability, or drainage changes as a result of wildfires denuding a slope. Even with implementation of required policies and measures, it is not possible to prevent the proposed 2022 RTP/SCS projects from exposing people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires. Therefore, impacts would be significant.

Construction and Fire Risk

There are proposed 2022 RTP/SCS projects that are adjacent to SRAs, including those in the Cities of Exeter, Lindsay, and Porterville (Table 4.18-1). However, even though there are no projects located within an SRA, construction activities for transportation and land use projects within the proposed 2022 RTP/SCS involving the use of vehicles and heavy machinery could result in the ignition of a wildfire. During construction, heavy equipment and passenger vehicles driving on vegetated areas prior to clearing and grading could increase the risk of fire. Heated mufflers, explosives used during site preparation or line spicing, and improper disposal of cigarettes could potentially ignite surrounding vegetation. The use of heavy equipment, such as bulldozers and graders, has the potential to accidentally ignite a fire from sparks created when equipment blades strike rocks or metal objects. If noticed by the equipment operator or other project specific personnel, small ignitions can easily be suppressed by the construction equipment and/or on-site fire watch personnel. A fire could also be started by project personnel improperly disposing of burning cigarettes in areas covered with wildland vegetation and within 50 feet of combustible material storage.

Moreover, if the introduction of invasive, non-native plants is not controlled during construction, a project site could progressively become dominated by non-native plants which tend to increase the frequency and severity of wildfires. Based on recent scientific evidence, it is likely that anthropogenic climate change will continue to chronically enhance the potential for western U.S. forest fire activity when fuels are not limiting. As discussed further in Section 4.8, *Greenhouse Gas Emissions and Climate Change*, increasingly difficult drought conditions and extreme weather events will continue to raise wildfire risk within the TCAG region.

New construction would be subject to the latest California Fire Code, which contains safety measures to minimize the threat from wildfires. Title 14 of the California Code of Regulations sets forth the minimum development standards for emergency access, fuel modification, setback, signage, and water supply, which help prevent loss of structures or life by reducing wildfire hazards. The codes and regulations would reduce the risk of loss, injury, or death from wildfire for new development envisioned by the proposed 2022 RTP/SCS, but not entirely. Therefore, impacts involving the installation or maintenance of associated infrastructure that may exacerbate fire risk would be significant.

Exacerbated Fire Risks

Slope failure and landslides can be exacerbated in regions in the aftermath of a wildfire. Hillsides can become denuded of vegetation and become unstable, increasing the potential for landslide risks and associated hazards downslope from such landslides. Potential impacts related to slope stability and landslides are discussed in Section 4.7, *Geology and Soils*. As discussed therein, the potential for substantial landslides was found to be low for the general locations of the proposed 2022 RTP/SCS project sites. Proposed 2022 RTP/SCS projects are within the valley region of Tulare County which is characterized primarily by flat topography. In addition, proposed 2022 RTP/SCS projects would be required to conform to Chapter 70 of the Uniform Building Code 1973 edition and a qualified engineering geologist would be retained to review reports and implement Chapter 70 measures, as stated in Policy 3.M.5 of the Tulare County General Plan. Additionally, all proposed 2022 RTP/SCS projects would have to abide by Article 7: *Excavation and Grading* within the Tulare County Code. However, the potential for slope failure and landslides can be exacerbated in these regions in the aftermath of a wildfire, even with adherence to the above sited regulations. Thus, impacts exposing people or structures to significant risks, including landsides, as a result of post-fire slope instability would be significant.

This same issue applies to runoff and flooding potential after a wildfire with denuded and unstable hillsides. Potential impacts related to flooding, runoff, and drainage are discussed in Section 4.9, *Hydrology and Water Quality*. Projects would be required to comply with existing design guidelines and local requirements for post-development peak stormwater flows and Best Management Practices to avoid and/or minimize flooding impacts and impacts to on-site and off-site drainage. However, even with adherence to these regulations, people or structures may still be exposed to downslope or downstream flooding or landslides as a result of runoff due to post-fire slope instability, and impacts would be significant. The following mitigation measures would reduce this impact.

Mitigation Measures

For transportation projects under their jurisdiction, TCAG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures where applicable for transportation projects implementing the proposed 2022 RTP/SCS that would result in impacts to significant risks of loss, injury, or death from wildfires. Cities and the County can and should implement these measures, where relevant to land use projects implementing the proposed

2022 RTP/SCS. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site specific conditions.

WF-1(a) Wildfire Risk Reduction

If an individual transportation or land use project included in proposed 2022 RTP/SCS is located within or less than two miles from an SRA or very high fire hazard severity zones, the implementing agency shall, or can and should, require appropriate mitigation to reduce the risk. Examples of mitigation to reduce risk of loss, injury or death from wildlife include, but are not limited to:

- Require the use of fire-resistant vegetation native to Tulare County and/or the local microclimate of the project site and discourage the use of fire-prone species especially nonnative, invasive species.
- Enforce defensible space regulations to keep overgrown and unmanaged vegetation, accumulations of trash and other flammable material away from structures.
- Provide public education about wildfire risk, fire prevention measures, and safety procedures and practices to allow for safe evacuation and/or options to shelter-in-place.
- Require adherence to the local hazard mitigation plan, as well as the local general plan policies and programs aimed at reducing the risk of wildfires through land use compatibility, training, sustainable development, brush management, public outreach, and service standards for fire departments.
- Ensure sufficient emergency water supply.
- Encourage the use of fire-resistant vegetation native to Tulare County and/or the local microclimate of the project site and discourage the use of fire-prone species especially non-native, invasive species.
- Require a fire safety plan be submitted to and approved by the local fire protection agency. The fire safety plan shall include all of the fire safety features incorporated into the project and the schedule for implementation of the features. The local fire protection agency may require changes to the plan or may reject the plan if it does not adequately address fire hazards associated with the project as a whole or the individual phase of the project.
- Prohibit certain project construction activities with potential to ignite wildfires during red-flag warnings issued by the National Weather Service for the project site location. Example activities that shall be prohibited during red-flag warnings include welding and grinding outside of enclosed buildings.
- Require fire extinguishers to be onsite during construction of projects. Fire extinguishers shall be maintained to function according to manufacturer specifications. Construction personnel shall receive training on the proper methods of using a fire extinguisher.
- Smoking and open fires shall be prohibited at individual transportation or land use projects sites included in proposed 2022 RTP/SCS during construction and operations. A copy of the notification to all contractors regarding prohibiting smoking and burning shall be provided to the County.

Implementing Agencies and Timing

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

WF-1(b) Fire Protection Plan

Implementing agencies for individual transportation or land use projects included in proposed 2022 RTP/SCS located within or less than two miles from an SRA or very high fire hazard severity zone shall, or can and should, prepare a Fire Protection Plan that meets TCFD requirements. The plan shall contain (but not be limited to) the following provisions:

- All construction equipment shall be equipped with appropriate spark arrestors and carry fire extinguishers.
- A fire watch with appropriate firefighting equipment shall be available at the Project site at all times when welding activities are taking place. Welding shall not occur when sustained winds exceed that set forth by the TCFD unless a TCFD-approved windshield is on site.
- A vegetation management plan shall be prepared to address vegetation clearance around all WTGs and a regularly scheduled brush clearance of vegetation on and adjacent to all access roads, power lines, and other facilities.
- Operational fire water tanks shall be installed prior to construction.
- Provisions for fire/emergency services access if roadway blockage occurs due to large loads during construction and operation
- Cleared, maintained parking areas shall be designated; no parking shall be allowed in non-designated areas.
- The need for and/or use of dedicated repeaters for emergency services.
- Appropriate Hot Work permits (such as cutting and welding permits) shall be obtained from the jurisdictional fire agency.
- Individual transportation or land use projects included in proposed 2022 RTP/SCS shall participate in the Red Flag Warning program with local fire agencies and the National Weather Service. The Applicant shall stop work during Red Flag conditions to reduce the risk of wildlife ignition.
- Compliance with California PRC sections 4291, 4442, and 4443.

Implementing Agencies and Timing

Implementing agencies for transportation projects are TCAG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

Significance After Mitigation

With implementation of mitigation measure WF-1(a) and WF-1(b), the risk of loss of structures and transportation infrastructure and the risk of injury or death due to wildfires would be reduced. These measures would make structures and transportation infrastructure more fire resistant and less vulnerable to loss in the event of a wildfire. These measures would also reduce the potential for construction of proposed 2022 RTP/SCS projects to inadvertently ignite a wildfire.

However, it is not possible to prevent a significant risk of wildfires or fully protect people and structures from the risks of wildfires in all cases. Therefore, this impact would remain significant and unavoidable. No additional mitigation measures to reduce this impact to less than significant levels are feasible.

c. Specific Proposed 2022 RTP/SCS Projects That May Result in Impacts

As discussed above, specific proposed 2022 RTP/SCS projects that would result in significant wildfire impacts are those located within or less than two miles from an SRA or very high fire hazard severity zones. These projects would increase the potential to ignite fires and therefore risk exacerbating the potential for loss or damage from wildfire. The public that would use that infrastructure and land uses developed within those areas and the maintenance personnel that would service that infrastructure or work within those areas would also be exposed to exacerbated risk of loss or damage due to wildfire. Proposed 2022 RTP/SCS projects that do not meet these criteria would have a lesser wildfire impact.

Table 4.18-1 shows all proposed 2022 RTP/SCS projects that would occur within or less than two miles from an SRA. All transportation or land use projects located within or less than two miles from an SRA or very high fire hazard severity zones would result in potentially exacerbated risks associated with Impact WF-1. Additional specific analysis described in the above mitigation measures would need to be conducted as individual projects are implemented in order to determine the magnitude of project-specific impacts.

Table 4.18-1 Specific Proposed 2022 RTP/SCS Projects That May Result in Wildfire Impacts

Project Jurisdiction and Location	Improvement	Potential Impact
Caltrans		
SR 65, Terra Bella – Avenue 88 to Avenue 124	Widen existing roadway from 2 to 4 lanes	WF-1
SR 65, Near Lindsay- from Hermosa Road to Avenue 244	Realignment and widen existing roadway from 2 to 4 lanes	WF-1
SR 190 Porterville – Westwood to Route 65	Widen existing roadway from 2 to 4 lanes	WF-1
SR 190 at Main Street	Widen bridge structure, new ramps	WF-1
Tulare County		
Avenue 280, Brundage (Farmersville) to Elberta (Exeter)	Widen existing roadway from 2 to 4 lanes	WF-1
City of Porterville		
Westwood Street, South of Orange Avenue to South of Tule River	Widen existing road/bridge from 2 to 4 lanes	WF-1
Newcomb Street, North of Tule River to south of Poplar Ditch	New 4 lane crossing over SR190	WF-1
SR 190 at Main Street and SR-65	WB Aux lane and ramp improvements	WF-1
SR 190 at Westwood	Roundabout and intersection improvements	WF-1
SR 190 at Plano	Roundabout and intersection improvements	WF-1
Plano at College	Roundabout at intersection	WF-1
City of Lindsay		
SR 65 at Tulare Avenue	Roundabout and local street improvements	WF-1

4.18.4 Cumulative Impacts

A wildfire ignited in the TCAG region could spread into adjoining counties. Likewise, wildfires ignited in counties adjoining the TCAG region could spread into the TCAG region. Therefore, the cumulative impact analysis area for wildfire consists of the TCAG region and the adjoining counties.

The proposed 2022 RTP/SCS is not expected to substantially increase wildfires, but the occurrence of wildfires always exists within the TCAG region and transportation and land use projects under the proposed 2022 RTP/SCS could place people and structures within or less than two miles from an SRA or very high fire hazard severity zones. Construction and operation of projects would risk exacerbating these existing fire hazards by creating additional potential sources of fire ignition.

During construction and operation of the proposed 2022 RTP/SCS projects, if one of these cumulative projects were to simultaneously result in a wildland fire ignition during construction, they could combine and increase the severity of wildland fires beyond existing conditions. The combination of these projects being constructed concurrently could substantially increase the frequency of fire in the area above natural conditions. Cumulative impacts would be significant.

The land use scenario envisioned in the proposed 2022 RTP/SCS would result in some projects located within or less than two miles from an SRA or very high fire hazard severity zones, causing significant wildfire impacts, as existing codes and regulations cannot fully prevent wildfires from being generated and damaging structures or populations. These projects would increase the potential to ignite fires and therefore risk exacerbating the potential for loss or damage from wildfire. This added risk could start wildfires that could spread outside the TCAG region impacting adjacent counties and communities. As a result, the land use scenario envisioned in the proposed 2022 RTP/SCS could result in a cumulatively considerable increase in wildfire risk. Mitigation measures described earlier in this section would minimize the contribution to this cumulative impact. However, the overall cumulative increase in fire frequency would continue to be substantial and the proposed 2022 RTP/SCS's contribution would be cumulatively considerable.

5 Other CEQA Required Discussions

This section discusses growth-inducing impacts, irreversible effects, and significant and unavoidable impacts that would be caused from implementation of the proposed 2022 RTP/SCS.

5.1 Growth Inducement

Section 15126.2(e) of the *State CEQA Guidelines* requires a discussion of a proposed project's potential to induce growth. Specifically, an EIR must discuss the ways in which the proposed project could foster economic or population growth. Included in this category are projects that would remove obstacles to population growth. In addition, the EIR must discuss how the project may encourage and/or facilitate other activities that could significantly affect the environment. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

5.1.1 Employment, Household, and Population Growth

According to the TCAG 2022 Regional Growth Forecast, population in the TCAG region is projected to grow by 30 percent, from approximately 481,649 residents (2021) to 567,383 total residents in 2046. Between 2021 and 2046, the TCAG region would grow by 85,734 people; 40,774 housing units; and 31,709 jobs. As discussed in Section 4.13, *Population and Housing*, the transportation and land use projects implementing the proposed 2022 RTP/SCS are designed and intended to accommodate projected growth to 2046. The projects under the proposed 2022 RTP/SCS would be phased to respond to growth as it occurs under adopted local general plans. As a result, the proposed 2022 RTP/SCS would not directly induce growth beyond that projected by 2046 and anticipated in local general plans; rather, it is intended to accommodate growth in a way that will help meet objectives described in Chapter D, *Sustainable Community Strategy* (SCS), of the proposed 2022 RTP/SCS.

Employment, population, and household growth would occur within the TCAG region regardless of whether the proposed 2022 RTP/SCS is implemented. The land use scenario envisioned by the proposed 2022 RTP/SCS would emphasize the development of infill and transit-oriented development (TOD) projects within existing urbanized areas; and therefore, may redistribute growth patterns. The location of infill and TOD projects would generally be on properties that have been identified as vacant or underutilized within applicable local jurisdictions. Infill and TOD projects would not necessarily result in significant new population growth within these jurisdictions; rather the proposed 2022 RTP/SCS would accommodate anticipated growth and concentrate it within existing urban cores instead of on the periphery of urban areas or within rural or semi-rural areas. Therefore, direct growth-inducing population growth impacts would be less than significant.

Implementation of the proposed 2022 RTP/SCS would create short-term economic growth in the region via construction-related job opportunities. Implementation of the proposed 2022 RTP/SCS would also generate additional employment opportunities for roadway, vehicle, and landscape maintenance and transportation facility clean-up. The employment increase may subsequently increase the demand for support services and utilities, which could generate secondary employment opportunities. This additional economic growth would likely raise the existing revenue base within the region. Although such growth may incrementally increase economic activity in the County, significant physical effects are not likely to result from economic growth generated by the proposed 2022 RTP/SCS.

Furthermore, while development envisioned as part of the proposed 2022 RTP/SCS could result in additional commerce, industry, recreation, public services, and infrastructure throughout the region, this economic activity would be consistent with the regional growth forecast and local general plans. Forecasted growth would be accommodated under the proposed 2022 RTP/SCS; therefore, the Plan would not be growth inducing, but rather it reflects the regulatory mandate to house the forecasted population and be based on the latest planning assumptions.

The proposed 2022 RTP/SCS was developed to integrate forecasted population increases, employment opportunities, and housing needs within the TCAG area. Therefore, the proposed 2022 RTP/SCS is designed to accommodate growth that would occur with or without its adoption; it is not designed, nor is it anticipated to, induce population growth beyond the levels forecasted.

5.1.2 Removal of Obstacles to Growth

The majority of the transportation improvement projects included in the proposed 2022 RTP/SCS are in existing urbanized areas and transit corridors in the cities of Tulare, Porterville, Visalia, Dinuba, and Lindsay; however, a few projects are also located in rural or semi-rural areas. Such transportation improvements can remove an obstacle to growth by either creating additional traffic capacity (in the case of a roadway widening) or providing new or easily facilitated access to undeveloped areas (in the case of a road extension). New infrastructure may also serve to accelerate or shift planned growth, to or encourage and intensify unplanned growth. These transportation network improvements would remove obstacles to growth in some areas of the region, which would support additional housing, population and economic growth, and could therefore be considered growth inducing.

The proposed 2022 RTP/SCS transportation improvements are designed to fully support infill development along existing transit corridors as outlined in Chapter D, *Sustainable Community Strategy*, and fully support the complementary transportation needs of the growing population. The SCS is designed to accommodate growth by encouraging infill and TOD development. The proposed 2022 RTP/SCS transportation improvement projects are intended and designed to support the land use projects established in the SCS. Therefore, the proposed 2022 RTP/SCS transportation improvement projects are consistent with projected and planned growth. Further, all proposed 2022 RTP/SCS transportation improvement projects are anticipated by the general plans of the applicable local jurisdictions, as all improvements have been coordinated with the applicable local jurisdiction.

5.2 Irreversible Effects

Section 15126.2(d) of the CEQA Guidelines requires a discussion of significant irreversible environmental changes that could result from implementation of a proposed project. These may include current or future uses of nonrenewable resources and secondary or growth-inducing impacts that commit future generations to similar uses. CEQA requires that irretrievable commitments of resources be evaluated to ensure that such current consumption is justified.

Many of the adverse impacts that could occur from implementation of the proposed 2022 RTP/SCS are short-term in nature resulting primarily from construction of the proposed transportation projects, urban infill, and TOD projects. Typical construction-related impacts can involve the following issues: noise, air quality, aesthetics, and construction-related erosion and associated water quality impacts. In addition, though such materials would not be used in a wasteful manner, all construction activity would involve the use of non-renewable energy sources, potable water and building materials (see Section 4.6, *Energy*). The use of these resources during construction would increase demand and impact supplies across the TCAG region.

Long-term irreversible environmental impacts are associated with increased asphalt or concrete paving and related direct and cumulative impacts to geology/soils, biological and cultural resources (historic resources); transportation; and hydrology/water quality, as discussed in their respective sections of this EIR. In addition, the proposed 2022 RTP/SCS would result in an overall increase in the urbanized character of the region. This would increase demand for potable water, electricity, and other resources in urban areas. The supply versus demand for these resources is evaluated by service/utility providers; thus, impacts would be determined during project specific review and as part of the overall planning process addressing regional growth. Mitigation measures have been recommended to minimize these impacts. However, in certain instances, as discussed in Section 5.3 below, impacts could remain significant with implementation of mitigation measures. Irreversible effects associated with land use and transportation projects in the proposed 2022 RTP/SCS would include those listed below. The following issues are addressed in environmental resource sections of Section 4, as noted:

- Conversion of agricultural lands, habitat areas, or other undeveloped lands into developed land or transportation uses (see Section 4.2, *Agricultural and Forestry Resources,* and Section 4.4, *Biological Resources*)
- Degradation of ambient air quality through the increase of harmful particulate matter as a result of an increase in PM_{10} and toxic air contaminant emissions (see Section 4.3, *Air Quality*)
- Consumption of significant amounts of nonrenewable energy for construction and operation of new development, infrastructure, or transportation improvements (see Section 4.6, *Energy,* and Section 4.8, *Greenhouse Gas Emissions and Climate Change*)
- Use of building materials, fossil fuels, and other resources for construction and operation of new development or transportation projects (see Section 4.8, *Greenhouse Gas Emissions and Climate Change*)
- GHG emissions that contribute to global climate change (see Section 4.8, *Greenhouse Gas Emissions and Climate Change*).

5.3 List of Significant and Unavoidable Impacts

As discussed in Sections 4.1 through 4.18 of the DEIR, implementation of 2022 RTP/SCS would result in the following significant and unavoidable impacts.

- Impact AES-1: adverse effect on a scenic vista, scenic resources within a state scenic highway
- Impact AES-2: degradation of existing visual character (non-urbanized areas)
- Impact AES-3: generation of new sources of light and glare
- Cumulative – Aesthetics (adverse effect on a scenic vista, scenic resources within a state scenic highway, visual character, and light/glare)
- Impact AG-1: conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use, and/or conflict with existing zoning for agriculture or a Williamson Act contract

- Cumulative – Agricultural Resources (conversion of and/or conflict with existing zoning for agricultural resources or a Williamson Act contract)
- Impact AQ-2: cumulatively considerable net increase in criteria pollutants (construction)
- Impact AQ-3: cumulatively considerable net increase in criteria pollutants (operation)
- Impact AQ-5: expose sensitive receptors to substantial TAC concentrations
- Cumulative – Air Quality (fugitive dust and ozone precursor emissions during construction and operation and exposure to substantial air pollutant concentrations/odors)
- Impact BIO-1: impacts on candidate, sensitive, or special-status species
- Impact BIO-2: impacts on sensitive habitats, natural communities, and wetlands
- Impact BIO-3: interference with wildlife movement
- Cumulative – Biological Resources (sensitive species, habitats, natural communities, wildlife movement)
- Impact CR-1: disturbance of known or unknown historical resources
- Impact CR-2: disturbance of known and unknown archeological resources
- Cumulative – Cultural Resources (historical and archaeological resources)
- Impact GEO-5: disturbance of known and unknown paleontological resources
- Cumulative – Geology and Soils (paleontological resources)
- Impact GHG-1: net increase in GHG emissions by 2046 compared to existing baseline conditions (construction)
- Impact GHG-2: net increase in GHG emissions by 2046 compared to existing baseline conditions (operation)
- Impact GHG-4: conflict with the State's ability to achieve SB 32, EOs S-3-05 and B-55-18, and applicable local GHG reduction plan targets and goals
- Cumulative – Greenhouse Gas Emissions (construction related GHG emissions and conflict with applicable plans/policies)
- Impact HYD-2: decrease groundwater supplies and interfere with groundwater recharge
- Impact HYD-5: conflict with or obstruction implementation of a water quality control plan or sustainable groundwater management plan
- Cumulative – Hydrology and Water Quality (groundwater)
- Impact N-1: substantial temporary or permanent increase in ambient noise levels (construction related sources)
- Impact N-2: substantial permanent increase in ambient noise levels (traffic related sources)
- Impact N-3: excessive groundborne vibration
- Impact N-4: placement of sensitive receptors in areas with unacceptable noise levels
- Impact N-5: exposure to excessive aviation related noise
- Cumulative – Noise (contribution to temporary and permanent noise levels; exposure to excessive construction and operational noise)
- Impact PS-1: adverse physical impacts from new or expanded facilities (fire, police, and parks)
- Impact PS-3: increased use of existing parks and recreational facilities, resulting in substantial physical deterioration, and inclusion of recreational facilities that would have an adverse physical effect on the environment

- Cumulative – Public Services and Recreation (adverse physical impacts from new or expanded facilities [fire, police, and parks]
- Impact T-2: increase in regional VMT and small decrease in VMT per capita
- Cumulative – Transportation and Circulation (increase in VMT)
- Impact TCR-1: substantial adverse change in the significance of a tribal cultural resource
- Cumulative – Tribal Cultural Resources (adverse change in the significance of a tribal cultural resources)
- Impact UTIL-1: relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities
- Impact UTIL-2: generation of solid waste in excess of the capacity of local infrastructure
- Impact UTIL-4: increased water demand resulting in sufficient water supplies
- Cumulative – Utilities and Service Systems (relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities; water supplies; solid waste generation)
- Impact WF-1: expose people or structures, either directly or indirectly, to wildfire risk and exacerbating the potential for loss or damage from wildfires
- Cumulative – Wildfire (direct and indirect exposure to wildfire hazards)

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6 Alternatives

As required by Section 15126(d) of the State CEQA Guidelines, this EIR examines a reasonable range of alternatives to the proposed 2022 RTP/SCS. Section 15126.6 of the CEQA Guidelines requires that an EIR "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project, but would avoid or substantially lessen any of the significant effects of the project and evaluate the comparative merits of the alternatives."

In addition, the CEQA Guidelines state the following:

- An EIR need not consider every conceivable alternative to a project. Rather, it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives that are infeasible. The range of potential alternatives to the proposed project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects. The EIR should briefly discuss the rationale for selecting the alternatives to be discussed. The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are (i) failure to meet most of the basic project objectives, (ii), infeasibility, or (iii) inability to avoid significant environmental impacts. (CEQA Guidelines Section 15126.6(a)(c).)
- "Feasible" means capable of being accomplished within a reasonable period of time, taking into account economic, environmental, legal, social and technological factors. (CEQA Guidelines Section 15364.)

The proposed Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS) is intended to comply with applicable regulatory requirements, including California Transportation Commission (CTC) Guidelines and Senate Bill (SB) 375. including SB 375's regional GHG reduction targets. TCAG's general objectives for the proposed 2022 RTP/SCS are to ensure that the transportation system planned for the TCAG region accomplishes the following:

- Serves regional goals, objectives, policies and plans.
- Responds to community and regional transportation needs.
- Promotes energy efficient, environmentally sound modes of travel, facilities and services.
- Promotes equity and efficiency in the distribution of transportation projects and services

More specific objectives of the proposed 2022 RTP/SCS are listed in Section 2.2 of the Project Description.

The analysis of alternatives focuses on the various land use and transportation scenarios that incorporate different assumptions regarding the combinations of future land uses and transportation system improvements. The proposed 2022 RTP/SCS is specifically intended for the TCAG region; therefore, an alternative location for the proposed 2022 RTP/SCS as a whole is not possible. However, within the TCAG region, the proposed 2022 RTP/SCS considered different patterns of land use and transportation investments to accommodate forecasted future growth and regional housing needs.

During the development of the proposed 2022 RTP/SCS, TCAG developed and evaluated scenarios that included various land use assumptions and transportation system improvements and investments to see how each scenario could achieve the GHG targets established by CARB for the TCAG region as well as other performance measures. Extensive outreach with partner agencies, local jurisdictions, key stakeholders, and the public was ongoing throughout the proposed.

6.1 Alternatives Development and Screening Process

The alternative land use and transportation scenarios modeled and analyzed by TCAG are described in Chapter C, Sustainable Communities Strategy (SCS) of the proposed 2022 RTP/SCS; the preferred scenario (proposed project) is described in detail within a separate section of the SCS as well as Chapter 2 of this EIR. The alternatives described below are based on scenarios developed during the SCS development process, adjusted as appropriate to develop alternatives that reduce project impacts identified as significant and unavoidable to a lesser impact level.

This alternatives analysis herein includes the following:

- **Alternative 1: No Project Alternative**. The No Project Alternative is comprised of a land use pattern that reflects a linear trend of densities and building types seen in 2014 at the latest forecast growth rate and a transportation network comprised of transportation projects that are currently in construction or are funded in the short-range Regional Transportation Improvement Program (RTIP). The No Project Alternative depicts future growth continuing without reference to any of the Regional Blueprint principles or strategies, such as an emphasis on compact development. This scenario can be considered “status quo.” It assumes current sub-regional growth trends continue consistent with growth forecast and continuing split of growth between cities, unincorporated communities, and rural areas.
- **Alternative 2: Business as Usual Alternative.** This alternative reflects the Trend Scenario. It is like the No Project Alternative except that it includes transportation investments from the project list for the 2014 RTP/SCS. The 2014 project list was used as it compliments best the growth pattern forecast in the No Project Alternative carrying forth the existing development pattern for comparison without projects identified in the 2018 RTP/SCS or the proposed 2022 RTP/SCS. This alternative can also be considered a “status quo” strategy and provides a baseline compared to the proposed 2022 RTP/SCS as it projects into the future the current land use pattern and road development in the TCAG region without the proposed 2022 RTP/SCS or future projects in the 2018 RTP/SCS.
- **Alternative 3: Blueprint (Old Plan) Alternative.** The Blueprint scenario was adopted as the preferred scenario of the 2018 RTP/SCS. It is based on the application of the development principles adopted as part of the 2009 Tulare County Regional Blueprint (2022 RTP/SCS, Appendix 1-L). Primary among these principles is an objective of a 25 percent higher overall density of new development compared to the Business as Usual Alternative. In general, this means a development footprint similar to the baseline but smaller in extent. The alternative also represents an increased and complementary investment in transit and active transportation, taking advantage of greater density along service corridors as forecast during development of the 2018 RTP/SCS. This alternative therefore includes transportation investments reflected in the 2018 RTP/SCS project list.
- **Alternative 4: Blueprint Plus**. The Blueprint Plus Alternative represents a change in future development patterns more pronounced than that envisioned by the Blueprint (Old Plan) Alternative but at the same density as the proposed 2022 RTP/SCS. Blueprint Plus has an

objective of overall density of new development 5 percent higher than the Blueprint, consistent with the proposed 2022 RTP/SCS. This density is reflected in an incremental shift to more compact development types primarily within the cities' spheres of influence where there is infrastructure to support such development, or such infrastructure can be efficiently extended compared to increased development along transit corridors.

This alternative adds to the Blueprint Plus scenario modeled in the SCS by focusing on implementation of the SCS goals:

- Promote the improvement of air quality and greenhouse gas reductions through congestion management coordination of land use, housing, and transportation systems; provision of alternative modes of transportation; and provision of incentives that reduce vehicle miles traveled
- Promote public health in the region by providing opportunities for residents to bicycle and walk to destinations such as home, work, school, medical facilities, and commercial and service businesses
- Provide a safe, secure, coordinated, and efficient public transit system that can reasonably meet the needs of residents
- Improve, enhance, and expand the region's bicycle and pedestrian systems and connectivity to those systems, while keeping them safe and convenient.

When compared to the proposed 2022 RTP/SCS, land use density would be similar, but concentrated in different areas. This alternative excludes the cross valley corridor (CVC) project; as such, new development is concentrated more in existing urban areas, rather than along the CVC route.

In terms of transportation investments, the emphasis on these goals would also be implemented by prioritizing proposed 2022 RTP/SCS transportation funding on transit and active transportation modes, as well as by emphasizing fix-it first for streets and highways, and de-emphasizing funding and hence construction of capacity increasing roadway projects. This priority of investment of transportation funding to cities, transit, and active transportation projects anticipated to result in less funding directed toward capacity increasing projects than under the of proposed 2022 RTP/SCS, and therefore less construction of capacity increasing projects on undisturbed lands.

Each alternative is analyzed below to determine whether environmental impacts would be similar to, less than, or greater than those of the preferred scenario in the proposed 2022 RTP/SCS. As required by CEQA, this section also includes a discussion of the "environmentally superior alternative" among those studied.

6.2 Alternatives Considered but Rejected

The CEQA Guidelines state that an EIR should identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination (CEQA Guidelines Section 15126.2(c)). Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are (i) failure to meet most of the basic project objectives, (ii), infeasibility, or (iii) inability to avoid significant environmental impacts (CEQA Guidelines Section 15126.6(c)). In addition, an EIR need not examine every permutation of the alternatives as long as a reasonable range of alternatives is examined. (See *Saltonstall v. City of Sacramento* (2015) 234 Cal. App. 4th 549, 577.) Also, although an EIR must discuss alternatives to a project in its entirety, it need not necessarily discuss alternatives to each particular component of a project. (See *California Oak Foundation v. Regents of University of California* (2010) 188 Cal. App. 4th 227, 276–277.)

For this EIR, there was one alternative that was considered by TCAG and rejected as infeasible. This alternative and reasons for elimination are described below.

6.2.1 Aggressive VMT Reduction Alternative

Due to the nature of the TCAG region, certain aggressive VMT reducing measures are infeasible, such as increased transit or increased TOD or higher density development. For example, the region has a high variability in residential density and has a large rural component, with substantially longer trip lengths and therefore higher VMT in and out of rural areas. These commuter trips are not easily replaced by transit as longer transit trip lengths typically require multiple stops and/or transfers, if even available, making commuting via transit less attractive. The rural areas of the TCAG region are also experiencing higher growth in housing and employment than urban areas. Such growth is particularly evident in the western areas of the TCAG region, with employment in the agriculture industry. These industries require a high level of in-person work and are therefore not conducive to telecommuting.

Commuter travel and interregional travel to other regions of the San Joaquin Valley for jobs create a jobs-housing imbalance and results in relatively higher VMT for the TCAG region. Increasing infill development and higher density in the TCAG region may have very little impact on those long work trips.

There are also significant agriculture activities from farm workers making seasonal transient (field-to-field) trips and agriculture goods movements. These trips are not conducive to transit and often generate longer trip lengths and thus higher VMT. The VMT generated by these activities does not respond to VMT reduction strategies such as increased transit or telecommuting.

The region’s aging population in rural communities is expected to grow at a faster rate in the next 20 years. This population attracts more service trips from rural jurisdictions, resulting in higher VMT and making it difficult to provide efficient urban transit.

Other measures such as higher parking fees as well as tolling highway travel are only feasible in highly urbanized areas where increased transit services are available as an alternative mode. Therefore, an aggressive VMT reduction alternative was determined to be infeasible and was not considered as an alternative for detailed consideration in this EIR.

6.2.2 CVC Blueprint Plus Transit Growth Alternative

The CVC Blueprint Plus Transit Growth alternative is the proposed 2022 RTP/SCS project plus the growth pattern included in Alternative 4 described above. This scenario was modeled by TCAG but the results of the modeling showed no significant difference between the proposed Project and this scenario. The scenario did not achieve better Regional VMT or SB743 VMT reductions than the proposed project, nor for air quality or GHG emissions reductions. Because it did not achieve better results compared to the proposed Project, and is similar to Alternative 4, it was not considered as an alternative for detailed consideration in this EIR.

6.3 Alternative 1: No Project Alternative

6.3.1 Description

The No Project Alternative is comprised of a land use pattern that reflects and linear trend of densities and building types seen in 2014 at the latest forecast growth rate and a transportation network comprised of transportation projects that are currently in construction or are funded in the short-range RTIP. The No Project Alternative depicts future growth continuing without reference to any of the growth patterns in the proposed Project, such as an emphasis on compact development along transit corridors. This scenario can be considered “status quo.” It assumes current sub-regional growth trends continue consistent with growth forecast and continuing split of growth between cities, unincorporated communities, and rural areas. Transportation projects would be focused on transportation needs consistent with this growth pattern to increase capacity on local and regional roads, not emphasizing more transit or active transportation projects.

6.3.2 Impact Analysis

a. Aesthetics

Implementation of this alternative would result in fewer visual impacts resulting from transportation projects, as compared to the proposed 2022 RTP/SCS, because many of the proposed interchange improvements, auxiliary and transition lanes, new roadways and overcrossings and road extensions, would not be constructed. Nevertheless, many transportation projects would still be constructed under this alternative with the potential to impact scenic vistas on designated scenic highways, along with the gradual transformation toward a more urban/suburban character would occur in many parts of the TCAG region. In fact, because this alternative would continue current sub-regional growth trends rather than emphasizing an infill approach to land use and housing, more development would occur outside of existing urban areas, which may result in greater impacts to scenic resources in the less developed portions of the TCAG region. Thus, impacts related to visual character would be significant and unavoidable for this alternative, as they would be with the proposed 2022 RTP/SCS. The overall level of impact resulting from combined transportation improvement and land use projects would be similar when compared to the proposed 2022 RTP/SCS with some impacts greater while other impacts less but would remain significant and unavoidable.

b. Agriculture and Forestry Resources

This alternative would result in fewer transportation projects being constructed, including roadway widening and other projects that could directly convert agricultural land to non-agricultural use. However, because this alternative would continue current sub-regional growth trends rather than emphasizing an infill approach to land use and housing, more development would be expected to occur outside of existing urbanized areas, including within areas currently used for agricultural production. Given the extent of Important Farmland in the TCAG region, impacts related to converting Important Farmland to non-agricultural use, conflicts between urban and agricultural land uses, and conflicts with existing agricultural zoning and/or Williamson Act contracts would be worse under this alternative than for the proposed 2022 RTP/SCS.

Forestland in the TCAG region is located primarily in the eastern half of the County. Under the No Project Alternative, similar to the proposed project, County and city polices would continue to focus development in areas that do not include forest land or timberland, as defined by statutes.

However, under the No Project Alternative, land use strategies contained within the proposed 2022 RTP/SCS, which encourage growth in developed areas rather than a more dispersed land use pattern, would not be applied, thereby potentially resulting in increased potential for conversion of forest land, timberland, or Timberland Production zones. Therefore, forestry resource impacts would be increased under this alternative.

The overall impact to agriculture and forestry resources resulting from the No Project Alternative would be greater than under the proposed 2022 RTP/SCS, and agricultural land impacts would remain significant and unavoidable.

c. Air Quality

Implementation of this alternative would reduce short-term air quality impacts from construction activity, as fewer transportation projects would be implemented and therefore less construction activity would occur. However, because regional VMT would increase under this alternative, operational ROG, NO_x, PM_{10}, and CO emissions would be slightly increased compared to the proposed 2022 RTP/SCS, as shown in Table 6-1 (see also Modeling Methodology in Appendix A to the proposed 2022 RTP/SCS).

Table 6-1 Regional Emissions Analysis of the No Project Alternative

Alternative	Regional VMT	ROG Emissions (tons/day)	NO_X Emissions (tons/day)	PM_{10} Emissions (tons/day)[1]	CO Emissions (tons/day)	SO_x Emissions (tons/day)
No Project	12,465,620	0.9171	2.7327	0.7288	5.9989	0.0432
2022 RTP/SCS	12,241,939	0.9010	2.6844	0.7159	5.8890	0.0424

VMT = vehicle miles traveled; ROG = reactive organic gases; NOx = nitrous oxide; PM_{10} = particulate matter with a diameter of 10 microns or less; CO = carbon monoxide; SOx = sulfur oxide

PM_{10} includes tire wear and brake wear emissions.

Source: On-road motor vehicle emissions were calculated by TCAG using EMFAC. Refer to 2022 RTP/SCS Chapter C and Appendix A for complete methodology.

The higher emissions would be due to higher VMT expected under this alternative (12.46 million compared to 12.24 million VMT per day, an increase of 1.8 percent). The SCS is intended to increase residential and commercial land use capacity within existing transit corridors which would shift a greater share of future growth to these corridors, ultimately increasing density and improving circulation and multimodal connections. If this alternative were selected, improvements in the transportation infrastructure and infill development projects anticipated under the proposed 2022 RTP/SCS would not occur. Higher VMT as a result of fewer alternative transportation projects under this alternative would result in higher ROG, NO_x, $PM_{10,}$ and CO emissions.

Future land use development under this alternative would not be compact or infill focused. As such, the No Project Alternative would not concentrate population adjacent to transit and other transportation facilities that could result in more people being exposed to elevated health risks from TACs. Accordingly, impacts related to TAC exposure to sensitive receptors would be less under this alternative than under the proposed 2022 RTP/SCS but would remain significant and unavoidable.

Overall air quality impacts would increase under this alternative when compared to the proposed 2022 RTP/SCS because VMT would be higher under this alternative, as shown in Table 6-1. Under this alternative, TACs would be reduced due to reduced compact development near transit and transportation facilities. However, long term operational impacts related exposure of sensitive receptors to substantial hazardous air pollutant concentrations would remain significant and unavoidable, as they would be for the proposed 2022 RTP/SCS.

d. Biological Resources

Implementation of this alternative may result in fewer impacts to biological resources resulting from transportation improvement projects, as fewer roadway extensions, widening projects, bridge repairs, and creek crossings would occur under this alternative. However, because this alternative would continue current sub-regional growth trends rather than emphasizing an infill approach to land use and housing, more development would be expected to occur outside of existing urbanized areas, including in areas providing habitat for special status plant and animal species. Overall impacts to special status plants, animals, wetlands and/or riparian habitat and wildlife movement outside developed urban areas would therefore be greater than under the proposed 2022 RTP/SCS. Impacts would remain significant and unavoidable, as they would be for the proposed 2022 RTP/SCS.

e. Cultural Resources

As described in Section 4.5, *Cultural Resources,* some of the proposed 2022 RTP/SCS projects may be located in proximity to historical resources or include repair or replacement of potentially historical structures (e.g., bridges). Because fewer transportation projects would be developed under the No Project Alternative, these impacts would be reduced. In addition, because less infill development would occur under this alternative, fewer impacts involving redevelopment or demolition of existing structures resulting from land use development would occur. Impacts to historic resources would therefore be reduced when compared to the proposed 2022 RTP/SCS. However, project specific impacts may still be significant, as they are for the proposed 2022 RTP/SCS.

Implementation of this alternative would involve less ground disturbance associated with transportation improvements than would occur under the proposed 2022 RTP/SCS. However, because more land use development could occur outside of existing urbanized areas, more ground disturbance would be expected to occur in previously undeveloped areas. As such, the potential for uncovering known or unknown archaeological resources would increase under this alternative for new development but decrease for transportation projects. The overall level of impact resulting from combined transportation improvement and land use projects would be similar when compared to the proposed 2022 RTP/SCS, with some impacts greater and some impacts less. Impacts to archaeological resources would remain significant and unavoidable, as they are for the proposed 2022 RTP/SCS.

f. Energy

Because this alternative would result in less construction of transportation infrastructure, energy use associated with construction activities would be reduced when compared to the proposed 2022 RTP/SCS. However, this alternative would not include many of the capital improvements envisioned under the proposed 2022 RTP/SCS that would improve transportation efficiency and reduce regional energy demand, such as active transportation projects. Energy use will increase over time as the result of regional socioeconomic (population and employment) growth, regardless of implementation of the proposed 2022 RTP/SCS. The No Project Alternative would result in similar total and per capita energy use as compared to the proposed 2022 RTP/SCS. As discussed in Section

4.6, *Energy,* the proposed 2022 RTP/SCS would not result in inefficient, unnecessary, or wasteful direct or indirect consumption of energy, and would be consistent with applicable energy conservation policies. Because the No Project Alternative would be similar in both total and per capita energy use, impacts would be similar when compared to the proposed 2022 RTP/SCS and impacts related to inefficient, unnecessary, or wasteful direct or indirect energy consumption would be less than significant, as they are for the proposed 2022 RTP/SCS.

g. Geology and Soils and Mineral Resources

Impacts of this alternative related to erosion and loss of topsoil would be less than significant pursuant to compliance with existing regulations, similar to the proposed 2022 RTP/SCS. Because this alternative does not include as many new interchanges, roads and fixed facilities, there would be less exposure of new structures to hazardous geologic conditions, including liquefaction, expansive soils, landslides, ground-shaking, and flooding. Conversely, if inadequate structures are not replaced, the potential for these existing structures and people using these structures to be harmed by geologic hazards could be greater than under the proposed 2022 RTP/SCS than under the No Project Alternative. Implementation of this alternative would involve less ground disturbance associated with transportation improvements than would occur under the proposed 2022 RTP/SCS. However, because more land use development could occur outside of existing urbanized areas due to growth continuing under the existing land use pattern, more development would be expected to occur in previously undeveloped areas. While development under the No Project Alternative would also be required to comply with the California Building Code and requirements set forth by the Alquist Priolo Zone Act, the No Project Alternative would result in a greater area of land being converted from undeveloped to developed uses that could be located in areas with greater susceptibility to seismic related risks. Impacts related to susceptibility to seismic related risks would increase, but still be considered less than significant, as it is under the proposed 2022 RTP/SCS.

Impacts to paleontological resources would be greater under this alternative compared to the proposed 2022 RTP/SCS, as mitigation for paleontological resources would not be implemented and ground disturbing activities could result in significant and unavoidable impacts, similar to the proposed 2022 RTP/SCS. Projects located within mineral resource zones would be required to comply with the California Surface Mining and Reclamation Act, as would all projects under the proposed 2022 RTP/SCS, and as such impacts would remain less than significant, as under the proposed 2022 RTP/SCS.

h. Greenhouse Gas Emissions and Climate Change

The No Project Alternative would result in fewer impacts associated with GHG emissions during construction activities as fewer transportation infrastructure projects would be constructed compared to the proposed 2022 RTP/SCS. However, operation of the No Project Alternative would result in conflicts with applicable GHG reduction plans, policies, and regulations, a significant and unavoidable impact. Construction and operation of the No Project Alternative would result in significant and unavoidable impacts due to an increase in GHG emissions. The No Project Alternative would not include the promotion of sustainable modes of travel, clean vehicle technologies and traffic operational improvements within the TCAG region that would help improve GHG emissions levels from mobile sources substantially. Overall, the per capita GHG emissions under the No Project Alternative would be slightly higher than GHG emissions with the proposed 2022 RTP/SCS, as shown in Table 6-2.

Table 6-2 No Project Per Capita Passenger Vehicle CO2 Emissions Comparison in 2046

Alternative	Per Capita GHG Emissions (lbs/day)
No Project Alternative	14.51
Proposed 2022 RTP/SCS	14.21
Difference	**0.3**

MT = metric tons; CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalent
Source: Total GHG emissions were calculated by TCAG. Refer to 2022 RTP/SCS Chapter C and Appendix A for complete methodology.

The overall impact of this alternative would be greater than what would occur under the proposed 2022 RTP/SCS and would remain significant and unavoidable.

i. Hazards and Hazardous Materials

This alternative would result in fewer transportation infrastructure projects being constructed, thereby reducing hazardous material use, storage, and transportation resulting from construction of those projects. However, the volume of hazardous materials being transported to support land use development in the region would remain the same, as land use development would continue to occur under this alternative. Because future development under the No Project Alternative would be subject to applicable hazardous materials regulations and programs, impacts relating to routine transport, use, or disposal of hazardous materials; risk of upset and accident conditions; emissions within one-quarter mile of a school; and airport hazards would be less than significant, similar to the proposed 2022 RTP/SCS. Similar to the proposed 2022 RTP/SCS, transportation improvement projects and land use projects could be located on sites on the list of hazardous material sites compiled by Government Code Section 65962.5, a significant and unavoidable impact. Overall hazards and hazardous materials impacts would be similar under this alternative as under the proposed 2022 RTP/SCS.

j. Hydrology and Water Quality

This alternative would result in fewer transportation infrastructure projects being constructed. Therefore, this alternative would reduce water quality impacts resulting from construction-related erosion and sedimentation and would generate less water demand for dust suppression activities for transportation projects. These impacts would remain less than significant pursuant to compliance with existing regulations, as they are for the proposed 2022 RTP/SCS.

Because this alternative would continue current sub-regional growth trends rather than emphasizing an infill approach to land use and housing, more development would be expected to occur outside of existing urbanized areas. As such, impervious surfaces would be expected to increase under this alternative. Because projects would be located in less developed areas, runoff would include fewer urban pollutants such as heavy metals from auto emissions, oil and grease than projects under the proposed 2022 RTP/SCS. However, because more development would occur in and therefore be adjacent to agricultural areas, runoff from those adjacent agricultural areas would contain more fertilizers and pesticides. While projects under this alternative may require more grading and vegetation removal, including in proximity to creeks, less urban development may result in less disturbance of soils on previously contaminated sites. As such, water quality in creeks may be more impacted, but water quality within urban areas may be less impacted. Because of these tradeoffs, the No Project Alternative would result in impacts to water quality that are overall comparable to the proposed 2022 RTP/SCS with some impacts greater while other impacts would be less; water quality impacts would remain less than significant, pursuant to compliance with existing regulations, as they are for the proposed 2022 RTP/SCS.

Regarding groundwater recharge, the No Project Alternative would include fewer new lane miles, which could result in more permeable surface area available compared to the proposed 2022 RTP/SCS. Therefore, impacts to groundwater recharge related to land use and transportation projects would be less than significant, similar to the proposed 2022 RTP/SCS. However, due to the current over-drafted state of groundwater basins in the TCAG region, additional overdraft of groundwater supply would be significant, similar to the proposed 2022 RTP/SCS.

k. Land Use and Planning

As with the proposed 2022 RTP/SCS, this alternative would not be anticipated to divide an established community. As noted in Section 4.11, *Land Use,* the proposed 2022 RTP/SCS includes a list of planned and programmed projects including local and regional capital improvements that have been anticipated or accounted for in local general plans and regional, statewide, and federal transportation improvement programs. In addition, the objective of the proposed 2022 RTP/SCS is to provide for a comprehensive transportation system of facilities and services that meets public need for the movement of people and goods, and that is consistent with the social, economic, and environmental goals and policies of the region. The No Project Alternative would not provide capital improvements anticipated within applicable general plans and transportation improvement programs, nor would it guide development to explicitly meet social, economic, and environmental goals and policies of the region as anticipated under the proposed 2022 RTP/SCS. Due to the more dispersed land use pattern, the amount of undeveloped land impacted would be greater under this alternative.

Although the No Project Alternative would continue existing land use patterns and trends, it would increase the severity of several environmental impacts, as discussed herein. As such, it could result in conflicts with land use plans, policies and regulations adopted for the purpose of avoiding or mitigating environmental effects. Because environmental effects would generally increase under this alternative, the overall impacts on land use would be greater under this alternative when compared to the proposed 2022 RTP/SCS but would remain less than significant.

l. Noise

From a programmatic perspective, fewer transportation infrastructure projects would result in less construction activity under the No Project Alternative. This would reduce temporary noise impacts throughout the TCAG region. In addition, because the number of infill or compact development projects would be less under the No Project Alternative, construction-related noise impacts on adjacent sensitive receptors would also decrease. However, construction noise would still occur, and impacts would continue to be significant, as they are for the proposed 2022 RTP/SCS.

Although the number of transportation projects would be reduced as compared to the proposed 2022 RTP/SCS, increased traffic volumes resulting from regional growth would continue to occur. Whether noise impacts would be greater or less than those anticipated under the proposed 2022 RTP/SCS remains dependent on-site specific considerations that cannot currently be known. Regionally, the difference in VMT between the No Project Alternative and the proposed 2022 RTP/SCS is not enough to noticeably change overall noise levels in the region. Mobile source noise levels resulting from traffic would therefore be similar under the No Project Alternative when compared to the proposed 2022 RTP/SCS and would remain significant and unavoidable.

Construction vibration of transportation projects or land use projects under the No Project Alternative could result in excessive groundborne vibration. Some cities and counties in the TCAG region include specific regulations in their municipal code to reduce construction vibration impacts., Impacts would be greater than under the 2022 RTP/SCS and would remain significant and unavoidable. Overall, noise-related impacts across the region would be similar to the proposed 2022 RTP/SCS and would continue to be significant and unavoidable.

m. Population and Housing

The No Project Alternative would result in the same population increase in the region by 2046 as the proposed 2022 RTP/SCS. As such, impacts related to population growth would be similar to the proposed 2022 RTP/SCS and would remain less than significant. Because fewer transportation projects would be implemented and land uses would be less dense (thus resulting in less demolition and redevelopment of existing housing), displacement-related impacts would be reduced under this alternative when compared to the proposed 2022 RTP/SCS. This impact would be less than significant. Overall population and housing impacts would be less than the proposed 2022 RTP/SCS.

n. Public Services and Recreation

Implementation of this alternative would result in the same population increase in the region by 2046 as the proposed 2022 RTP/SCS. As such, expected demand on public services, recreation, and utilities and service systems would be similar to the proposed 2022 RTP/SCS and may require new or expanded facilities. Overall, impacts related to public services and recreation would be similar as under the proposed 2022 RTP/SCS and would remain significant and unavoidable.

o. Transportation

This alternative would not include many of the transportation projects envisioned under the proposed 2022 RTP/SCS, including new highway and intersection projects, new bikeway and pedestrian projects (active transportation), and new transportation demand management projects. Many of these projects are intended to address VMT, and in many cases would serve as mitigation measures to reduce potential impacts associated with planned long-term development.

Because these VMT-reducing projects would not be implemented under this alternative, VMT in the TCAG region would increase under the No Project Alternative. As shown in Table 4.15-5 in Section 4.15, *Transportation*, in 2046, daily VMT would be 12,244,957 with implementation of the proposed 2022 RTP/SCS, compared to 12,465,620 under the No Project Alternative – an increase of 220,663. Thus, under the No Project Alternative, there would be a 1.8 percent increase in daily VMT in 2046 compared to conditions with the proposed 2022 RTP/SCS.

Under the No Project Alternative, projects to increase transit capacity on congested facilities and transit frequency would not be implemented. As a result, transit ridership would decrease under the No Project Alternative. The proposed 2022 RTP/SCS would accommodate approximately 20,848 daily transit riders, whereas the No Project Alternative would accommodate approximately 18,596 daily transit riders, a decrease of 2,252 daily riders. Without these types of projects, operation of public transit may be unreliable or fail to meet the frequency and performance standards established by transit providers in the TCAG region. Thus, compared to the proposed 2022 RTP/SCS, the No Project Alternative would have a greater adverse impact on transit service in the TCAG region, and impacts related to conflicts with transportation plans and policies would be significant.

Overall, the No Project Alternative would result in increased daily VMT, a significant and unavoidable impact, and increased adverse impacts to transit service as projects to increase capacity on congested facilities and bus lines would not be implemented. Thus, overall, impacts to transportation would be greater under the No Project Alternative.

p. Tribal Cultural Resources

Implementation of this alternative would involve less ground disturbance associated with transportation improvements than would occur under the proposed 2022 RTP/SCS. However, because more land use development could occur outside of existing urbanized areas, more ground disturbance would be expected to occur in previously undeveloped or open space areas. As such, the potential to disturb tribal cultural resources, including ancestral remains and sacred sites, would increase under this alternative. Future projects would be required to comply with AB 52, which may require formal tribal consultation. Compliance with this requirement would reduce impacts to the extent feasible; however, impacts would remain significant and unavoidable. However, because of the increased potential to disturb tribal cultural resources from development outside of urbanized areas the overall impact of the No Project Alternative would be greater than under the proposed 2022 RTP/SCS, and significant and unavoidable.

q. Utilities and Service Systems

Implementation of this alternative would result in the same population increase in the region by 2046 as the proposed 2022 RTP/SCS. As such, expected demand on utilities and service systems would be similar to the proposed 2022 RTP/SCS and may require new or expanded facilities. Overall, impacts related to the environmental effects of new or increased utilities and service systems would be similar as under the proposed 2022 RTP/SCS and would remain significant and unavoidable.

Increases to water demand are primarily associated with increased population levels. The No Project Alternative would result in the same population increase in 2046 as the proposed 2022 RTP/SCS. However, this alternative would result in less compact land use development, which would result in a less efficient water supply system (e.g., greater areas of irrigated landscaping). As such, future water demand associated with this alternative would be greater than water demand for the proposed 2022 RTP/SCS. This impact, which is significant and unavoidable for the proposed 2022 RTP/SCS, would be greater under the No Project Alternative and would remain significant and unavoidable.

r. Wildfire

The No Project Alternative would allow more housing near wildlands, due the less compact growth pattern, and would increase the vulnerability of people and structures to wildland fire. Under the No Project Alternative land use development could occur outside of existing urbanized areas and extend into more wildland areas. Wildfire impacts, which are significant and unavoidable for the proposed 2022 RTP/SCS, would be greater under the No Project Alternative and would remain significant and unavoidable.

6.4 Alternative 2: Business as Usual Alternative

6.4.1 Description

This alternative reflects the Trend Scenario. It is like the No Project Alternative except that it includes transportation investments from the project list for the 2014 RTP/SCS. This alternative includes a slightly modified transportation network with reduced number of transportation improvements as the proposed 2022 RTP/SCS. This project list is considered most complementary to the growth pattern forecast in the No Project Alternative. This alternative can also be considered a "status quo" strategy and provides a baseline for the Blueprint-based alternatives. Compared to the proposed Project, land use development pattern would be the same as in Alternative 1 with an even split between urban and rural development. Compared to the proposed Project, the transportation project list would focus on road projects to meet the needs of its development pattern, but with some additional transit investment as identified in the proposed 2022 RTP/SCS, but not to the level of investment in the proposed project, nor include a transit focused land use pattern to support transit development.

6.4.2 Impact Analysis

a. Aesthetics

The Business as Usual Alternative includes a slightly modified transportation network with reduced number of transportation improvements as the proposed 2022 RTP/SCS. Since the Business as Usual Alternative includes a modified transportation network with fewer investments, it would have less of an impact in terms of adding contrasting visual elements to existing natural, rural, and open space areas and reduced potential to result in visual impacts to eligible State Scenic Highways and scenic vistas. Without the compact growth strategies of the proposed 2022 RTP/SCS, the consumption and disturbance of natural lands would increase under this alternative. The Business as Usual Alternative would result in the disturbance of approximately 9,193 acres of previously undisturbed land, compared to 9,849 acres for the proposed 2022 RTP/SCS – an increase of 2,344 acres (Appendix A). As such, this alternative would result in greater visual impacts because of the increased consumption of open space, vacant land, and interspersed transportation infrastructure.

The Business as Usual Alternative would not include urban form strategies to the same extent as the proposed 2022 RTP/SCS. Nighttime lighting impacts would be greater, as more vacant land would be consumed under this alternative as lighting impacts are typically most pronounced in rural areas. Aesthetic impacts under the Business as Usual Alternative would be increased under this alternative and would remain significant and unavoidable.

b. Agriculture and Forestry Resources

Similar to the No Project Alternative, the Business as Usual Alternative would not encourage a compact development pattern. This alternative would not include the urban form strategies that would focus growth within urban areas and, consequently, would result in the consumption of a greater amount of farmland compared to the proposed 2022 RTP/SCS. This alternative would result in the conversion of approximately 2,205 acres of farmland, 828 acres more than the proposed 2022 RTP/SCS. Therefore, impacts related to converting Important Farmland to non-agricultural use, conflicts between urban and agricultural land uses, and conflicts with existing agricultural zoning and/or Williamson Act contracts would be greater under this alternative and remain significant and unavoidable.

The Business as Usual Alternative includes a modified transportation network with fewer investments than the proposed 2022 RTP/SCS, and would not encourage a compact development pattern. Accordingly, land use strategies contained within the proposed 2022 RTP/SCS, which encourage growth in developed areas rather than a more dispersed land use pattern, would not be applied, thereby potentially resulting in increased potential for conversion of forest land, timberland, or Timberland Production zones. Therefore, forestry resource impacts would be increased under this alternative.

State and federal laws and locally-approved plans and policies currently in place would continue to protect these agricultural and forestry resources. However, impacts under the Business as Usual Alternative would be increased compared to the proposed 2022 RTP/SCS, as increased consumption of agricultural, forest, and timberland land would occur. Impacts to agricultural resources would remain significant and unavoidable.

c. Air Quality

Implementation of the Business as Usual would reduce short-term air quality impacts from construction activity, as fewer transportation projects would be implemented compared to the 2022 RTP/SCS and therefore less construction activity would occur. However, because regional VMT would increase under this alternative, operational ROG, NO_x, PM_{10}, CO, and SO_x emissions would be higher compared to the proposed 2022 RTP/SCS as shown in Table 6-3 (see also Modeling Methodology in Appendix A).

Table 6-3 Regional Emissions Analysis of the Business as Usual Alternative

Alternative	Regional VMT	ROG Emissions (tons/day)	NO_X Emissions (tons/day)	PM_{10} Emissions (tons/day)[1]	CO Emissions (tons/day)	SO_x Emissions (tons/day)
Business as Usual	12,877,346	0.9475	2.8230	0.7529	6.1927	0.0446
2022 RTP/SCS	12,241,939	0.9010	2.6844	0.7159	5.8890	0.0424

VMT = vehicle miles traveled; ROG = reactive organic gases; NOx = nitrous oxide; PM10 = particulate matter with a diameter of 10 microns or less; CO = carbon monoxide; SOx = sulfur oxide
PM10 includes tire wear and brake wear emissions.
Source: On-road motor vehicle emissions were calculated by TCAG. Refer to 2022 RTP/SCS Chapter C and Appendix A for complete methodology.

The higher emissions would be due to higher VMT expected under this alternative (12.87 million compared to 12.24 million VMT per day, an increase of 5.1 percent). The SCS intends to increase residential and commercial land use capacity within existing transit corridors which would shift a greater share of future growth to these corridors, ultimately increasing density and improving circulation and multimodal connections. If this alternative were selected, improvements in the transportation infrastructure and infill development projects anticipated under the proposed 2022 RTP/SCS would not occur. Higher VMT as a result of fewer alternative transportation projects under this alternative would result in higher ROG, NO_x, PM_{10}, CO, and SO_x emissions.

Future land use development under the Business as Usual Alternative would not be compact or infill focused. As such, this alternative would not concentrate population adjacent to transit and other transportation facilities that could result in more people being exposed to elevated health risks from

TACs. Accordingly, impacts related to TAC exposure to sensitive receptors would be less under this alternative than under the proposed 2022 RTP/SCS but would remain significant and unavoidable.

Overall air quality impacts would increase under the Business as Usual Alternative when compared to the proposed 2022 RTP/SCS because VMT would be higher. Under this alternative, TACs would be reduced due to less compact development near transit and transportation facilities. However, long term operational impacts related exposure of sensitive receptors to substantial hazardous air pollutant concentrations would remain significant and unavoidable, as they would be for the proposed 2022 RTP/SCS.

d. Biological Resources

Under the Business as Usual Alternative, more areas would be impacted through excavation, ground disturbance, and construction activities as compared to the proposed 2022 RTP/SCS, since this alternative would not focus growth in urban areas to the same extent as the proposed project. The Business as Usual Alternative would result in the disturbance of approximately 9,193 acres of previously undisturbed land, compared to 6,849 acres for the proposed 2022 RTP/SCS – an increase of 2,344 acres (Appendix A). Therefore, the Business as Usual Alternative would result in land use development taking place over a greater area of land. As a result, this alternative would result in greater habitat consumption which could include special status species habitat, riparian habitat, federally protected wetlands, migratory wildlife corridors, and native wildlife nursery sites. Therefore, biological resource impacts for the Business as Usual Alternative would be greater than the proposed 2022 RTP/SCS and impacts would remain significant and unavoidable.

e. Cultural Resources

As described in Section 4.5, *Cultural Resources,* some of the proposed 2022 RTP/SCS projects may be located in proximity to historical resources or include repair or replacement of potentially historical structures (e.g., bridges). Since this alternative would not focus growth in urban areas through infill development, fewer impacts involving redevelopment or demolition of existing structures resulting from land use development would occur. Impacts to historic resources would therefore be reduced when compared to the proposed 2022 RTP/SCS. However, project specific impacts may still be significant, as they are for the proposed 2022 RTP/SCS.

Implementation of this alternative would involve less ground disturbance associated with transportation improvements than would occur under the proposed 2022 RTP/SCS. However, because more land use development could occur outside of existing urbanized areas, ground disturbance would be expected to occur in previously undeveloped areas. As such, the potential for uncovering known or unknown archaeological resources would increase under this alternative for land use development but decrease for transportation projects. The overall level of impact resulting from combined transportation improvement and land use projects would be similar when compared to the proposed 2022 RTP/SCS, with some impacts greater and some impacts less. Impacts to archaeological resources would remain significant and unavoidable, as they are for the proposed 2022 RTP/SCS.

f. Energy

The Business as Usual Alternative would accommodate the same increase in total population, households, and jobs as the proposed 2022 RTP/SCS. However, the total energy consumption under the Business as Usual Alternative would be greater, as policies and programs towards reducing energy use and strategies to focus growth within urban areas would not be applied, which would help reduce the number of new energy facilities or expansion of existing facilities that need to be constructed. Under the proposed 2022 RTP/SCS, households would consume an average of 94.4 million BTU per year (Appendix A). Typically, compact infill and mixed-use developments are generally higher efficiency dwellings accounting for the reduction in total energy consumption. The Business as Usual Alternative's dispersed development would require additional electricity and natural gas facilities to serve a more dispersed land use pattern, and would result in households consuming an average of 106.6 million BTU per year (Appendix A). This approximately 13 percent increase in energy consumption could necessitate new or expanded facilities to serve additional areas. Lower density development would be dispersed throughout the TCAG region under the Business as Usual Alternative to satisfy the same population growth. Therefore, impacts related to energy would be greater with the Business as Usual Alternative. However, impacts related to inefficient, unnecessary, or wasteful direct or indirect energy consumption would be less than significant, as they are for the proposed 2022 RTP/SCS.

g. Geology and Soils and Mineral Resources

Impacts of the Business as Usual Alternative related to erosion and loss of topsoil would be less than significant pursuant to compliance with existing regulations, similar to the proposed 2022 RTP/SCS. Because this alternative does not include as many of the transportation improvement projects, there would be less exposure of new transportation infrastructure to hazardous geologic conditions, including liquefaction, expansive soils, landslides, ground-shaking, and flooding. Conversely, if inadequate structures are not replaced, the potential for these existing structures and people using these structures to be harmed by geologic hazards could be greater than under the proposed 2022 RTP/SCS. Implementation of this alternative would involve less ground disturbance associated with transportation improvements than would occur under the proposed 2022 RTP/SCS. However, because more land use development could occur outside of existing urbanized areas due to growth continuing under the existing land use pattern, more development would be expected to occur in previously undeveloped areas. While development under the Business as Usual Alternative would also be required to comply with the California Building Code and requirements set forth by the Alquist Priolo Zone Act, this alternative would result in a greater area of land being converted from undeveloped to developed uses that could be located in areas with greater susceptibility to seismic related risks. Overall, impacts related to susceptibility to seismic related risks would increase compared to the proposed 2022 RTP/SCS, but still be considered less than significant, as it is under the proposed 2022 RTP/SCS.

Impacts to paleontological resources would be greater under this alternative compared to the proposed 2022 RTP/SCS, as mitigation for paleontological resources would not be implemented and ground disturbing activities could result in significant and unavoidable impacts, similar to the proposed 2022 RTP/SCS. Projects located within mineral resource zones would be required to comply with the California Surface Mining and Reclamation Act, as would all projects under the proposed 2022 RTP/SCS, and as such, impacts would remain less than significant, as under the proposed 2022 RTP/SCS.

h. Greenhouse Gas Emissions and Climate Change

The Business as Usual Alternative would result in fewer impacts associated with GHG emissions during construction activities as fewer transportation infrastructure projects would be constructed compared to the proposed 2022 RTP/SCS. However, operation of the Business as Usual Alternative would result in conflicts with applicable GHG reduction plans, policies, and regulations, a significant and unavoidable impact. Construction and operation of the Business as Usual Alternative would result in significant and unavoidable impacts due to an increase in GHG emissions. The Business as Usual Alternative would not include the same proportion and promotion of sustainable modes of travel, clean vehicle technologies and traffic operational improvements within the TCAG region that would help improve GHG emissions levels from mobile sources substantially. Overall, the GHG emissions under the Business as Usual Alternative would be slightly greater than GHG emissions with the proposed 2022 RTP/SCS, as shown in Table 6-4.

Table 6-4 Business as Usual Alternative No Project Per Capita Passenger Vehicle CO2 Emissions Comparison in 2046

Alternative	Per Capita GHG Emissions (lbs/day)
Business as Usual Alternative	15.08
Proposed 2022 RTP/SCS	14.21
Difference	**0.87**

MT = metric tons; CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalent
[1] Refer to Section 4.8, *Greenhouse Gas Emissions and Climate Change*
Source: Total GHG emissions were calculated by TCAG. Refer to 2022 RTP/SCS Chapter C and Appendix A for complete methodology.

The overall impact of this alternative would be greater than what would occur under the proposed 2022 RTP/SCS and would remain significant and unavoidable.

i. Hazards and Hazardous Materials

The Business as Usual Alternative would result in fewer transportation infrastructure projects being constructed, thereby reducing hazardous material use, storage, and transportation resulting from construction of those projects. However, the volume of hazardous materials being transported to support land use development in the region would remain the same, as land use development would continue to occur under this alternative. Because future development under the Business as Usual Alternative would be subject to applicable hazardous materials regulations and programs, impacts relating to routine transport, use, or disposal of hazardous materials; risk of upset and accident conditions; emissions within one-quarter mile of a school; and airport hazards would be less than significant, similar to the proposed 2022 RTP/SCS. Similar to the proposed 2022 RTP/SCS, transportation improvement projects and land use projects could be located on sites on the list of hazardous material sites compiled by Government Code Section 65962.5. Similar to the proposed 2022 RTP/SCS, this alternative would involve implementation of Mitigation Measure HAZ-3, but impacts related to development on sites on the list of hazardous material sites compiled by Government Code Section 65962.5 would remain significant and unavoidable. Overall, hazards and hazardous materials impacts would be similar under this alternative as under the 2022 RTP/SCS.

j. Hydrology and Water Quality

The Business as Usual Alternative would result in a more dispersed land use pattern, thereby increasing the amount of impervious surfaces and increasing impacts to water quality and groundwater. The Business as Usual Alternative would result in the disturbance of approximately 9,193 acres of previously undisturbed land, 2,344 acres more than the proposed 2022 RTP/SCS (Appendix A). Due to a more dispersed growth pattern, the Business as Usual Alternative's impacts to flood risk would be greater than those associated with the proposed 2022 RTP/SCS. Flooding impacts would generally be site specific; although with greater consumption of vacant land, this alternative has a greater risk of locating development in flood prone areas. Regarding groundwater recharge, the Business as Usual Alternative would include fewer new lane miles, which could result in more permeable surface area available, compared to the proposed 2022 RTP/SCS. However, the Business as Usual Alternative would result in greater land consumption, and as a result, there would be fewer opportunities for groundwater recharge. Impacts would be greater than the proposed 2022 RTP/SCS and would remain significant and unavoidable.

k. Land Use and Planning

As with the 2022 RTP/SCS, this alternative would not be anticipated to divide an established community, as development would occur consistent with existing land use patterns and primarily within existing communities. As noted in Section 4.11, *Land Use and Planning,* the 2022 RTP/SCS includes a list of planned and programmed projects including local and regional capital improvements that have been anticipated or accounted for in local general plans and regional, statewide, and federal transportation improvement programs. In addition, the objective of the 2022 RTP/SCS is to provide for a comprehensive transportation system of facilities and services that meets public need for the movement of people and goods, and that is consistent with the social, economic, and environmental goals and policies of the region. The Business as Usual Alternative would not provide transportation projects to the same extent as the 2022 RTP/SCS within applicable general plans and transportation improvement programs, nor would it guide development to explicitly meet social, economic, and environmental goals and policies of the region. Due to the more dispersed land use pattern and reduced focus on growth within compact areas, the amount of undeveloped land impacted would be greater under this alternative.

Although the Business as Usual Alternative would continue existing land use patterns and trends, it would increase the severity of several environmental impacts, as discussed herein. As such, it could result in conflicts with land use plans, policies, and regulations adopted for the purpose of avoiding or mitigating environmental effects. Because environmental effects would generally increase under this alternative, the overall impacts on land use would be greater under this alternative when compared to the proposed 2022 RTP/SCS but would remain less than significant.

l. Noise

From a programmatic perspective, fewer transportation infrastructure projects would result in less construction activity under the Business as Usual Alternative. This would reduce temporary noise impacts throughout the TCAG region. In addition, because there would be less focus on growth within compact areas, construction-related noise impacts on adjacent sensitive receptors would also decrease. However, construction noise would still occur, and impacts would continue to be significant, as they are for the proposed 2022 RTP/SCS.

Although the number of transportation projects would be reduced as compared to the proposed 2022 RTP/SCS, increased traffic volumes resulting from regional growth would continue to occur. Whether noise impacts would be greater or less than those anticipated under the proposed 2022 RTP/SCS remains dependent on site specific considerations that cannot currently be known. Regionally, the difference in VMT between the Business as Usual Alternative and the proposed 2022 RTP/SCS is not enough to noticeably change overall noise levels in the region. Mobile source noise levels resulting from traffic would therefore be similar under the Business as Usual Alternative when compared to the proposed 2022 RTP/SCS and would remain significant and unavoidable.

Construction vibration of transportation projects or land use projects under the Business as Usual Alternative could result in excessive groundborne vibration. Some cities and counties in the TCAG region include specific regulations in their municipal code to reduce construction vibration impacts. Impacts would be greater than under the proposed 2022 RTP/SCS and would remain significant and unavoidable.

Overall, noise-related impacts across the region under this alternative would be similar to the proposed 2022 RTP/SCS, with some impacts greater and some impacts similar, and would continue to be significant and unavoidable.

m. Population and Housing

The Business as Usual Alternative would result in the same population increase in the region by 2046 as the proposed 2022 RTP/SCS. As such, impacts related to population growth would be similar to the proposed 2022 RTP/SCS and would remain less than significant. Because fewer transportation projects would be implemented and land uses would be less dense (thus resulting in less demolition and redevelopment of existing housing), displacement-related impacts would be reduced under this alternative when compared to the 2022 RTP/SCS. This impact would be less than significant. Overall population and housing impacts would be less than the proposed 2022 RTP/SCS.

n. Public Services and Recreation

Implementation of the Business as Usual Alternative would result in the same population increase in the region by 2046 as the proposed 2022 RTP/SCS. As such, expected demand on public services and recreation would be similar to the proposed 2022 RTP/SCS and may require new or expanded facilities. Overall, impacts public services and recreation would be similar as under the proposed 2022 RTP/SCS, and would remain significant and unavoidable.

o. Transportation

This alternative would not include many of the transportation projects envisioned under the proposed 2022 RTP/SCS, including new highway and intersection projects, new bikeway and pedestrian projects (active transportation), and new transportation demand management projects. Many of these projects are intended to address VMT, and in many cases would serve as mitigation measures to reduce potential impacts associated with planned long-term development.

Because these VMT-reducing projects would not be implemented under this alternative, VMT in the TCAG region would increase under the Business as Usual Alternative: in 2046, daily VMT would be 12,244,957 with implementation of the proposed 2022 RTP/SCS, compared to 12,877,346 under the Business as Usual Alternative – an increase of 632,388 VMT (Appendix A). Thus, under this alternative, there would be a 5.2 percent increase in daily VMT in 2046 compared to conditions with the proposed 2022 RTP/SCS (Appendix A).

Under the Business as Usual Alternative, projects to increase transit capacity on congested facilities and transit frequency would not be implemented. As a result, transit ridership would decrease under the Business as Usual Alternative. The proposed 2022 RTP/SCS would accommodate approximately 20,848 daily transit riders, whereas the Business as Usual Alternative would accommodate approximately 19,161 daily transit riders, a decrease of 1,687 daily riders. Without these types of projects, operation of public transit may be unreliable or fail to meet the frequency and performance standards established by transit providers in the TCAG region. Thus, compared to the proposed 2022 RTP/SCS, the Business as Usual Alternative would have a greater adverse impact on transit service in the TCAG region and conflict with local transit and active transportation plans.

Overall, the Business as Usual Alternative would result in increased daily VMT, a significant and unavoidable impact, and increased adverse impacts to transit service as projects to increase capacity on congested facilities and bus lines would not be implemented. Thus, overall, impacts to transportation would be increased under the Business as Usual Alternative.

p. Tribal Cultural Resources

Implementation of this alternative would involve less ground disturbance associated with transportation improvements than would occur under the proposed 2022 RTP/SCS. However, because more land use development could occur outside of existing urbanized areas, ground disturbance would be expected to occur in previously undeveloped areas. As such, the potential to disturb tribal cultural resources, including ancestral remains and sacred sites, would increase under this alternative. Future projects would be required to comply with AB 52, which may require formal tribal consultation. Compliance with this requirement would reduce impacts to the extent feasible, however, would remain significant and unavoidable, similar to the proposed 2022 RTP/SCS. Because of the increased potential to disturb tribal cultural resources from development outside of urbanized areas, the overall impact of this alternative would be greater than under the proposed 2022 RTP/SCS, and significant and unavoidable.

q. Utilities and Service Systems

Implementation of this alternative would result in the same population increase in the region by 2046 as the proposed 2022 RTP/SCS. As such, expected demand on utilities and service systems would be similar to the proposed 2022 RTP/SCS and may require new or expanded facilities. Overall, environmental impacts resulting from the need for expanded or new utilities and service systems would be similar as under the proposed 2022 RTP/SCS and would remain significant and unavoidable.

Increases to water demand are primarily associated with increased population levels. The Business as Usual Alternative would result in the same population increase in 2046 as the proposed 2022 RTP/SCS. However, this alternative would result in less dense land use development, which would result in a less efficient water supply system (e.g., greater areas of irrigated landscaping). As such, future water demand associated with this alternative would be greater than water demand for the proposed 2022 RTP/SCS. This impact, which is significant and unavoidable for the proposed 2022 RTP/SCS, would be greater under the Business as Usual Alternative. Impacts would remain significant and unavoidable.

r. Wildfire

The Business as Usual Alternative would allow more housing near wildlands, due the less compact growth pattern, and would increase the vulnerability of people and structures to wildland fire. Under the Business as Usual Alternative, land use development could occur outside of existing urbanized areas and extend into more wildland areas. Wildfire impacts, which are significant and unavoidable for the proposed 2022 RTP/SCS, would be greater under the Business as Usual Alternative and would remain significant and unavoidable.

6.5 Alternative 3: Blueprint (Old Plan) Alternative

6.5.1 Description

The Blueprint (Old Plan) Alternative reflects the adopted preferred scenario of the 2018 RTP/SCS. It is based on the application of the development principles adopted as part of the 2009 Tulare County Regional Blueprint (2022 RTP/SCS, Appendix 1-L). Primary among these principles is an objective of a 25 percent higher overall density of new development compared to the Business as Usual Alternative. In general, this means a development footprint similar to the baseline but smaller in extent. Compared to the proposed 2022 RTP/SCS, the Blueprint (Old Plan) Alternative land use scenario would be less dense, because the current proposed Plan further densifies development by 5 percent beyond the adopted 2018 RTP/SCS. This alternative also represents an increased and complementary investment in transit and active transportation compared to alternatives 1 and 2, taking advantage of greater density along service corridors as forecast during development of the 2018 RTP/SCS. However, these investments in transit and active transportation would be slightly less than in the current proposed 2022 RTP/SCS as it does not include transit and active transportation projects and funding added to the proposed 2022 RTP/SCS or the corresponding increased density that would support such investments.

6.5.2 Impact Analysis

a. Aesthetics

The Blueprint (Old Plan) Alternative reflects the adopted preferred scenario of the 2018 RTP/SCS, which entails a slightly modified transportation network with reduced number of transportation improvements compared to the proposed 2022 RTP/SCS. Since the Blueprint (Old Plan) Alternative includes a modified transportation network with fewer investments, it would have less of an impact in terms of adding contrasting visual elements to existing natural, rural, and open space areas and reduced potential to result in visual impacts to eligible State Scenic Highways and scenic vistas. Without the same compact growth strategies of the proposed 2022 RTP/SCS, the consumption and disturbance of natural lands would increase slightly under this alternative. The Blueprint (Old Plan) Alternative would result in the disturbance of approximately 7,308 acres of previously undisturbed land, compared to 9,849 acres for the proposed 2022 RTP/SCS – an increase of 459 acres (Appendix A). As such, this alternative would result in slightly greater visual impacts because of the increased consumption of open space, vacant land, and interspersed transportation infrastructure.

The Blueprint (Old Plan) Alternative would not include urban form strategies to the same extent as the proposed 2022 RTP/SCS. Nighttime lighting impacts would be somewhat greater, as more vacant land would be consumed under this alternative as lighting impacts are typically most pronounced in rural areas. Aesthetic impacts under the Blueprint (Old Plan) Alternative would be slightly increased under this alternative and would remain significant and unavoidable.

b. Agricultural and Forestry Resources

The Blueprint (Old Plan) Alternative would encourage a compact development pattern, but not to the same extent as the proposed 2022 RTP/SCS. This alternative would result in the conversion of approximately 1,475 acres of farmland, compared to 1,377 acres for the proposed 2022 RTP/SCS – an increase of 98 acres. Therefore, impacts related to converting Important Farmland to non-agricultural use, conflicts between urban and agricultural land uses, and conflicts with existing agricultural zoning and/or Williamson Act contracts would be slightly greater under this alternative and would remain significant and unavoidable. Similarly, this alternative would slightly increase potential for conversion of forest land, timberland, or Timberland Production zones. Therefore, forestry resource impacts would be slightly increased under this alternative.

State and federal laws and locally-approved plans and policies currently in place would continue to protect these agricultural and forestry resources. However, impacts under the Blueprint (Old Plan) Alternative would be increased compared to the proposed 2022 RTP/SCS, as increased consumption of agricultural, forest, and timberland land would occur. Impacts to agricultural resources would remain significant and unavoidable.

c. Air Quality

As shown in Table 6-5, ROG, NO_x, PM_{10}, SO_x, and CO emissions would be higher compared to the proposed 2022 RTP/SCS due to an increase in VMT (see also Modeling Methodology in Appendix A to the 2022 RTP/SCS).

Table 6-5 Regional Emissions Analysis for the Blueprint (Old Plan) Alternative

Alternative	VMT	ROG Emissions (tons/day)	NO_X Emissions (tons/day)	PM_{10} Emissions (tons/day)[1]	CO Emissions (tons/day)	SO_x Emissions (tons/day)
Blueprint (Old Plan)	12,725,515	0.9363	2.7897	0.7440	6.1229	0.0441
2022 RTP/SCS	12,241,939	0.9010	2.6844	0.7159	5.8890	0.0424

VMT = vehicle miles traveled; ROG = reactive organic gases; NO_x = nitrous oxide; PM_{10} = particulate matter with a diameter of 10 microns or less; CO = carbon monoxide; SO_x = sulfur oxide
[1] PM_{10} includes tire wear and brake wear emissions.
Source: On-road motor vehicle emissions were calculated by TCAG. Refer to 2022 RTP/SCS Chapter C and Appendix A for complete methodology.

The higher emissions would be due to slightly increased VMT expected under this alternative. Impacts would remain significant and unavoidable, as under the proposed 2022 RTP/SCS.

Future land use development under this alternative would be compact and infill focused. As such, this alternative would concentrate population adjacent to transit and other transportation facilities that could result in more people being exposed to elevated health risks from TACs. Accordingly, impacts related to TAC exposure to sensitive receptors under this alternative would be similar to the proposed 2022 RTP/SCS and would remain significant and unavoidable.

Overall, air quality impacts would therefore be greater under this alternative when compared to the proposed 2022 RTP/SCS.

d. Biological Resources

The Blueprint (Old Plan) Alternative would encourage a compact development pattern, but not to the same extent as the proposed 2022 RTP/SCS. This alternative would result in the disturbance of approximately 7,308 acres of previously undisturbed land, compared to 6,849 acres for the proposed 2022 RTP/SCS – an increase of 459 acres (Appendix G). Therefore, the Blueprint (Old Plan) Alternative would result in land use development taking place over a slightly greater area of land. As a result, this alternative would result in greater habitat consumption which could include special status species habitat, riparian habitat, federally protected wetlands, migratory wildlife corridors, and native wildlife nursery sites. Therefore, biological resource impacts would be slightly greater than the proposed 2022 RTP/SCS and impacts would remain significant and unavoidable.

e. Cultural Resources

As described in Section 4.5, *Cultural Resources,* some of the proposed 2022 RTP/SCS projects may be located in proximity to historical resources or include repair or replacement of potentially historical structures (e.g., bridges). Under this alternative, many of the projects that would include repair or replacement of potentially historic resources would still occur. Impacts to historical resources would therefore be similar compared to the proposed 2022 RTP/SCS.

Implementation of this alternative would involve similar ground disturbance associated with transportation improvements than would occur under the proposed 2022 RTP/SCS. Because slightly more land use development could occur outside of existing urbanized areas, ground disturbance would be expected to occur in previously undeveloped areas. As such, the potential for uncovering known or unknown archaeological resources would increase under this alternative for land use development. The overall level of impact resulting from combined transportation improvement and land use projects would be somewhat greater when compared to the proposed 2022 RTP/SCS. Impacts to archaeological resources would remain significant and unavoidable, as they are for the proposed 2022 RTP/SCS.

f. Energy

The Blueprint (Old Plan) Alternative would accommodate the same increase in total population, households, and jobs as the proposed 2022 RTP/SCS. However, the total energy consumption under the Blueprint (Old Plan) Alternative would be greater, as policies and programs towards reducing energy use and strategies to focus growth within urban areas would not be applied to the same extent. Under the proposed 2022 RTP/SCS, households would consume an average of 94.4 million BTU per year (Appendix A). Typically, compact infill and mixed-use developments are generally higher efficiency dwellings accounting for the reduction in total energy consumption. Blueprint (Old Plan) Alternative would result in households consuming an average of 96.9 million BTU per year (Appendix A). This approximately 2.6 percent increase in energy consumption could necessitate new or expanded facilities to serve additional areas. Therefore, impacts related to energy would be slightly greater with the Blueprint (Old Plan) Alternative than under the proposed 2022 RTP/SCS. However, impacts related to inefficient, unnecessary, or wasteful direct or indirect energy consumption would be less than significant, as they are for the proposed 2022 RTP/SCS.

g. Geology and Soils and Mineral Resources

As discussed in Section 4.7, *Geology and Soils*, the transportation improvements and land use projects envisioned by the proposed 2022 RTP/SCS would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides. Compliance with design standards described in the CBC and preparation of site-specific geotechnical investigations would ensure impacts would be less than significant. This alternative reflects the adopted preferred scenario of the 2018 RTP/SCS, which entails a reduced number of transportation improvements and slightly less compared development than the proposed 2022 RTP/SCS. Development under this alternative would similarly be required to comply with the CBC. Therefore, impacts related to rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides would remain less than significant under this alternative, and impacts would be similar to the proposed 2022 RTP/SCS.

Impacts to paleontological resources would be slightly greater under this alternative compared to the proposed 2022 RTP/SCS as development would be slightly less compact, but would still be significant and unavoidable, similar to the proposed 2022 RTP/SCS. Projects located within mineral resource zones would be required to comply with the California Surface Mining and Reclamation Act, as would all projects under the proposed 2022 RTP/SCS, and as such, impacts would remain less than significant, as under the proposed 2022 RTP/SCS.

h. Greenhouse Gas Emissions

The Blueprint (Old Plan) Alternative would result in fewer impacts associated with GHG emissions during construction activities as fewer transportation infrastructure projects would be constructed compared to the proposed 2022 RTP/SCS. However, operation of this alternative would result in conflicts with applicable GHG reduction plans, policies, and regulations, a significant and unavoidable impact. Construction and operation of the Blueprint (Old Plan) Alternative would result in significant and unavoidable impacts due to an increase in GHG emissions. Overall, the GHG emissions under this alternative would be slightly greater than GHG emissions with the proposed 2022 RTP/SCS.

Table 6-6 compares the per capita GHG emissions for the Blueprint (Old Plan) Alternative and the 2022 RTP/SCS. As shown therein, this alternative would slightly increase total per capita GHG emissions from 14.21 pounds per day per capita for the proposed 2022 RTP/SCS to 14.86-pounds per day per capita, an increase of approximately 4.6 percent. Impacts would be greater under this alternative and would remain significant and unavoidable, as they are for the proposed 2022 RTP/SCS.

Table 6-6 Blueprint (Old Plan), No Project Per Capita Passenger Vehicle CO2 Emissions Comparison in 2046

Alternative	Per Capita GHG Emissions (lbs/day)
Blueprint (Old Plan)	14.86
Proposed 2022 RTP/SCS	14.21
Difference	**0.65**

MT = metric tons; CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalent
[1] Refer to Section 4.8, *Greenhouse Gas Emissions/Climate Change*
Source: Total GHG emissions were calculated by TCAG. Refer to 2022 RTP/SCS Chapter C and Appendix A for complete methodology.

i. Hazards and Hazardous Materials

This alternative would result in somewhat fewer infrastructure projects being constructed, thereby reducing hazardous material use, storage and transportation resulting from construction of those projects. However, the volume of hazardous materials being transported to support land use development in the region would remain the same. Because this alternative would be subject to existing regulations and programs, impacts relating to routine transport, use, or disposal of hazardous materials; risk of upset and accident conditions; emissions within one-quarter mile of a school; airport hazards; and interference with emergency response and evacuation plans would be less than significant, similar to the proposed 2022 RTP/SCS. Similar to the proposed 2022 RTP/SCS, transportation improvement projects and land use projects could be located on sites on the list of hazardous material sites compiled by Government Code Section 65962.5. Similar to the proposed 2022 RTP/SCS, this alternative would involve implementation of Mitigation Measure HAZ-3, but impacts related to development on sites on the list of hazardous material sites compiled by Government Code Section 65962.5 would remain significant and unavoidable. Overall, hazards and hazardous materials impacts would be similar under this alternative as under the 2022 RTP/SCS.

j. Hydrology and Water Quality

The Blueprint (Old Plan) Alternative would encourage a compact development pattern, but not to the same extent as the proposed 2022 RTP/SCS. As such, this alternative would slightly increase the amount of impervious surfaces and increasing impacts to water quality and groundwater. The Blueprint (Old Plan) Alternative would result in the disturbance of approximately 7,308 acres of previously undisturbed land, 159 acres more than the proposed 2022 RTP/SCS (Appendix A). Due to a somewhat more dispersed growth pattern, the Blueprint (Old Plan) Alternative's impacts to flood risk would be greater than those associated with the proposed 2022 RTP/SCS. Flooding impacts would generally be site specific; although with greater consumption of vacant land, this alternative has a greater risk of locating development in flood prone areas. Regarding groundwater recharge, the Blueprint (Old Plan) Alternative would include fewer new lane miles, which could result in more permeable surface area available, compared to the proposed 2022 RTP/SCS. However, the Blueprint (Old Plan) Alternative would result in somewhat greater land consumption, and as a result, there would be fewer opportunities for groundwater recharge. Impacts would be slightly greater than the proposed 2022 RTP/SCS and would remain significant and unavoidable.

k. Land Use and Planning

Compared to the 2022 RTP/SCS, land use under this alternative is less dense and transportation projects are slightly less focused on transit/active transportation. Development under this alternative would still be concentrated in urbanized areas and would consist of primarily infill projects. As such, the land use pattern under this alternative would not result in the physical division of communities and impacts would be similar to the proposed 2022 RTP/SCS.

Development under this alternative could conflict with land use plans, policies, and programs and would continue to require mitigation. As such, implementation of this alternative would conflict with land use plans, policies, and regulations adopted for the purpose of avoiding or mitigating environmental effects. Because environmental effects would generally increase under this alternative, the overall impacts on land use would be greater under this alternative when compared to the proposed 2022 RTP/SCS but would remain less than significant.

l. Noise

Land use development under this alternative would result in infill development, but to a lesser degree than the proposed 2022 RTP/SCS. As such, increased noise levels from increased transit onto development in the area would continue to expose sensitive receivers exposed to greater sound levels, however to a lesser degree than the proposed 2022 RTP/SCS. Increased ambient noise levels for sensitive receivers in these areas would be significant and unavoidable under this alternative, as it is for the 2022 RTP/SCS. From a programmatic perspective, this alternative would result in less construction activity, which would reduce temporary noise impacts throughout the TCAG region.

Although this alternative would involve fewer transportation improvement projects and noise would generally be reduced as compared to the proposed 2022 RTP/SCS, cumulative regional traffic volumes would increase regardless of implementation of the proposed 2022 RTP/SCS or this alternative. Whether noise impacts would be greater or less than those anticipated under the proposed 2022 RTP/SCS remains dependent on site-specific considerations that cannot currently be known. Regionally, the difference in VMT between the proposed 2022 RTP/SCS and this alternative is not enough to noticeably change overall noise levels in the region. Mobile source noise levels resulting from traffic would be slightly greater under this alternative than the proposed 2022 RTP/SCS as this alternative would result in more VMT.

Because fewer transportation improvements would be implemented under this alternative, there would be decreased potential for transit noise under this alternative.

Construction vibration of transportation projects or land use projects under this alternative could result in excessive groundborne vibration. Some cities and counties in the TCAG region include specific regulations in their municipal code to reduce construction vibration impacts. As under the proposed 2022 RTP/SCS, mitigation measures are available to reduce physical impacts due to vibration to the extent feasible, however, impacts would be similar to the proposed 2022 RTP/SCS and would remain significant and unavoidable.

Overall, noise-related impacts across the region would be similar to the proposed 2022 RTP/SCS and would continue to be significant and unavoidable.

m. Population and Housing

This alternative would result in the same population increase in the region by 2046 as the proposed 2022 RTP/SCS. As such, impacts related to population growth would be to the same as for the proposed 2022 RTP/SCS and would continue to be less than significant. Temporary displacement as a result of more infill projects could occur; however, this displacement would be offset by an increase in housing units. Compliance with regulations under the Federal Uniform Relocation and Real Property Acquisition Policies Act would further reduce impacts to less than significant, as under the proposed 2022 RTP/SCS. Overall population and housing impacts would be similar to the proposed 2022 RTP/SCS.

n. Public Services and Recreation

This alternative would result in the same population increase in the region by 2046 as the proposed 2022 RTP/SCS. As such, expected demand on public services and recreation would be similar to the proposed 2022 RTP/SCS, and may require the construction of new or expanded facilities to meet demand. This impact would remain significant and unavoidable, as it is for the proposed 2022 RTP/SCS. This alternative would emphasize transit projects and higher density, infill housing, however to a less degree than the proposed project. Higher density housing in transit and urban areas would reduce impacts related to the provision of public services, since services already exist in these areas. Thus, impacts to public services and recreation would be reduced compared to the proposed 2022 RTP/SCS but would remain significant and unavoidable.

o. Transportation

In 2046, VMT in the TCAG region would increase under the Blueprint (Old Plan) Alternative: in 2046, daily VMT would be 12,244,957 with implementation of the proposed 2022 RTP/SCS, compared to 12,725,515 for the Blueprint (Old Plan) Alternative – an increase of 480,558 (Appendix A). Thus, under this alternative, there would be a 3.9 percent increase in daily VMT in 2046 compared to conditions with the proposed 2022 RTP/SCS (Appendix A).

The Blueprint (Old Plan) Alternative would accommodate approximately 22,493 daily transit riders, a decrease of 1,645 daily riders, as this alternative would include less investment in transit and active transportation. Thus, compared to the proposed 2022 RTP/SCS, the Blueprint (Old Plan) Alternative would have an increased impact on transit service in the TCAG region.

Overall, the Blueprint (Old Plan) Alternative would result in increased daily VMT in the TCAG region compared to the 2022 RTP/SCS, a significant and unavoidable impact. Thus, overall, impacts to transportation would be increased under the Blueprint (Old Plan) Alternative.

p. Tribal Cultural Resources

Land use development under this alternative would result in infill development, but to a lesser degree than the proposed 2022 RTP/SCS. Because more land use development could occur outside of existing urbanized areas, ground disturbance would be expected to occur in previously undeveloped areas. As such, the potential to disturb tribal cultural resources, including ancestral remains and sacred sites, would slightly increase under this alternative. Future projects would be required to comply with AB 52, which may require formal tribal consultation. Compliance with this requirement would reduce impacts to the extent feasible, however, would remain significant and unavoidable, similar to the proposed 2022 RTP/SCS. Because of the increased potential to disturb tribal cultural resources from development outside of urbanized areas, the overall impact of this alternative would be greater than under the proposed 2022 RTP/SCS, and significant and unavoidable

q. Utilities and Service Systems

Implementation of this alternative would result in the same population increase in the region by 2046 as the proposed 2022 RTP/SCS. As such, expected demand on utilities and service systems would be similar to the proposed 2022 RTP/SCS and may require the construction of new or expanded facilities to meet demand. This impact would continue to be significant and unavoidable, as it is for the proposed 2022 RTP/SCS.

Increases to water demand are primarily associated with increased population levels. This alternative assumes the same population growth compared to the proposed 2022 RTP/SCS. Water supply system demands would be similar as population growth would be the same. Demand would increase in urbanized areas where water infrastructure already exists. As such, future water demand associated with this alternative would be similar to water demand of the proposed 2022 RTP/SCS. This impact, which is significant and unavoidable for the proposed 2022 RTP/SCS, would be similar under this alternative.

r. Wildfire

The Blueprint (Old Plan) Alternative would encourage a compact development pattern, but not to the same extent as the proposed 2022 RTP/SCS. Under this alternative, land use development could occur outside of existing urbanized areas and extend into more wildland areas. Wildfire impacts, which are significant and unavoidable for the proposed 2022 RTP/SCS, would be slightly greater under the Blueprint (Old Plan) Alternative and would remain significant and unavoidable.

6.6 Alternative 4: Blueprint Plus Alternative

6.6.1 Description

The Blueprint Plus Alternative represents a change in future development patterns more pronounced than that envisioned by the Blueprint (Old Plan) Alternative but at the same density as the proposed 2022 RTP/SCS. Blueprint Plus has an objective of overall density of new development 5 percent higher than the Blueprint, consistent with the proposed 2022 RTP/SCS. This density is reflected in an incremental shift to more compact development types primarily within the cities' spheres of influence where there is infrastructure to support such development, or such infrastructure can be efficiently extended compared to increased development along transit corridors.

This alternative adds to the Blueprint Plus scenario modeled in the SCS by focusing on implementation of the SCS goals:

- Promote the improvement of air quality and greenhouse gas reductions through congestion management coordination of land use, housing, and transportation systems; provision of alternative modes of transportation; and provision of incentives that reduce vehicle miles traveled
- Promote public health in the region by providing opportunities for residents to bicycle and walk to destinations such as home, work, school, medical facilities, and commercial and service businesses
- Provide a safe, secure, coordinated, and efficient public transit system that can reasonably meet the needs of residents
- Improve, enhance, and expand the region's bicycle and pedestrian systems and connectivity to those systems, while keeping them safe and convenient.

When compared to the proposed 2022 RTP/SCS, land use density would be similar, but concentrated in different areas. This alternative excludes the cross valley corridor (CVC) project; as such, new development is concentrated more in existing urban areas, rather than along the CVC route.

In terms of transportation investments, the emphasis on these goals would also be implemented by prioritizing proposed 2022 RTP/SCS transportation funding on transit and active transportation modes, as well as by emphasizing fix-it first for streets and highways, and de-emphasizing funding and hence construction of capacity increasing roadway projects. This priority of investment of transportation funding to cities, transit, and active transportation projects anticipated to result in less funding directed toward capacity increasing projects than under the of proposed 2022 RTP/SCS, and therefore less construction of capacity increasing projects on undisturbed lands.

6.6.2 Impact Analysis

a. Aesthetics

Under the Blueprint Plus Alternative, land use density would be five percent greater to the proposed 2022 RTP/SCS, concentrated more in urban areas rather than also along transit corridors. Impacts related to eligible State Scenic Highways and vistas would generally be the same as the proposed 2022 RTP/SCS since this alternative would include improvements along similar transportation networks, although less capacity increasing projects. The Blueprint Plus Alternative would accelerate implementation of transit, bike and pedestrian facilities in urban areas.

The Blueprint Plus Alternative would not include as many capacity increasing transportation projects as the proposed 2022 RTP/SCS, thereby this alternative would result in less contrasts to visual elements to existing natural, rural, and open space areas where capacity increasing project could occur. Under the Blueprint Plus Alternative, land use strategies would increase density and transit in urban areas and the Cross Valley Corridor and potentially lessen transportation improvements that facilitate access to undeveloped lands, lessening the potential for visual impacts to new development areas. Similar to the 2022 RTP/SCS, the Blueprint Plus Alternative includes policies to dissuade such encroachment on open space and vacant lands and the Blueprint Plus Alternative would include land use planning strategies to reduce consumption of vacant, open space/recreation and agricultural lands. This alternative would result in the disturbance of 6,913 acres of previously undisturbed land, an increase of 64 acres or 0.9 percent compared to the proposed 2022 RTP/SCS (Appendix A). This difference is negligible (less than one percent change), and as such, visual character impacts for land use would be similar to the proposed 2022 RTP/SCS, but impacts from capacity increasing projects would be less. Overall, impacts would be similar under this alternative but would remain significant and unavoidable.

Under this alternative, more aggressive growth strategies would be applied to urban areas, which would potentially result in greater impacts related to light and glare and visual character of neighborhoods as more intense development occurs within these urban areas; however, these impacts would occur in existing urban developed areas compared to more development along transit corridors without as much current urban development. As more development is focused in urban areas, fewer aesthetic and nighttime lighting impacts would occur in undeveloped areas. In addition, with less capacity increasing projects, additional sources of light and glare would be reduced. Therefore, impacts to light and glare under the Blueprint Plus Alternative would be slightly less compared to the proposed project but would remain significant and unavoidable.

b. Agricultural and Forestry Resources

The proposed 2022 RTP/SCS would direct more growth to already urbanized areas, thereby reducing the amount of agricultural lands that would be converted to non-agricultural uses. Under the Blueprint Plus Alternative, growth would also be concentrated in urban areas. This alternative would involve the conversion of 1,404 acres of agricultural land, an increase of 1.9 percent compared to the proposed 2022 RTP/SCS. Therefore, more agricultural land would be converted to non-agricultural uses. The Blueprint Plus Alternative includes mobility choices and capacity within urban areas by focusing on increased investments in transit and active transportation modes as well as an emphasis on fix-it first for streets and highways and less emphasis on capacity increasing projects. Therefore, the pressure under this alternative to convert agricultural lands located near capacity increasing transportation projects and the periphery of built-out areas to urban land uses could be less as transportation improvements would focus less on new roads.

Under the Blueprint Plus Alternative, development would be targeted in urban areas, particularly in already developed urban areas but would still result in 27 more acres converted compared to the proposed project, a 1.9 percent increase. Thus, the Blueprint Plus Alternative with a less dispersed land use pattern across the region, would still convert agricultural land and potential conflicts with Williamson Act contracts similar or slightly more than the proposed project. The Blueprint Plus Alternative includes less capacity increasing transportation projects than the proposed 2022 RTP/SCS and this alternative would also focus development in existing urban areas to avoid

Williamson Act lands. Impacts related to conversion/conflict Williamson Act lands under the Blueprint Plus Alternative would be slightly greater than the proposed 2022 RTP/SCS.

Impacts to forestlands and TPZs would be similar compared to the proposed 2022 RTP/SCS due to the similar growth pattern of both. Impacts would be similar under the Blueprint Plus Alternative.

c. Air Quality

Under this alternative, the land use development pattern would have a compact and higher density in urban areas and near transit. As such, more sensitive receptors would be exposed to health risks from TACs during construction or operation. Long term operational impacts related to PM_{10} and exposing sensitive receptors would be similar to the proposed 2022 RTP/SCS, as shown in Table 6-7. As a result, exposure to substantial hazardous air pollutant concentrations would remain significant and unavoidable, as under the proposed 2022 RTP/SCS.

As shown in Table 6-7, NO_x, $PM_{10,}$ CO, and SO_x emissions would be slightly higher compared to the proposed 2022 RTP/SCS due to an increase in VMT (see also Modeling Methodology in Appendix A to the 2022 RTP/SCS). ROG emissions would remain approximately the same.

Table 6-7 Regional Emissions Analysis for the Blueprint Plus Alternative

Alternative	VMT	ROG Emissions (tons/day)	NO_X Emissions (tons/day)	PM_{10} Emissions (tons/day)[1]	CO Emissions (tons/day)	SO_x Emissions (tons/day)
Blueprint Plus	12,299,408	0.9050	2.6963	0.7191	5.9154	0.0426
2022 RTP/SCS	12,241,939	0.9010	2.6844	0.7159	5.8890	0.0424

VMT = vehicle miles traveled; ROG = reactive organic gases; NO_x = nitrous oxide; PM_{10} = particulate matter with a diameter of 10 microns or less; CO = carbon monoxide; SO_x = sulfur oxide

[1] PM_{10} includes tire wear and brake wear emissions.

Source: On-road motor vehicle emissions were calculated by TCAG. Refer to 2022 RTP/SCS Chapter 5 and Appendix A for complete methodology.

Overall, air quality impacts would be slightly higher under this alternative when compared to the proposed 2022 RTP/SCS. The higher emissions would be due to slightly higher VMT expected under the Blueprint Plus Alternative. Impacts would remain significant and unavoidable, as under the proposed 2022 RTP/SCS.

d. Biological Resources

The Blueprint Plus Alternative would result in the disturbance of approximately 6,913 acres of previously undisturbed land, compared to 6,849 acres for the proposed 2022 RTP/SCS – an increase of 64 acres or 0.9 percent (Appendix G). This difference is negligible (less than one percent change). Because the Blueprint Plus Alternative would have less capacity increasing projects on undisturbed land compared to the proposed 2022 RTP/SCS, impacts to special-status species would be slightly reduced compared to the proposed 2022 RTP/SCS as less land would be disturbed to construct capacity increasing projects.

Direct impacts to wildlife movement include increased noise and human presence during construction, as well as increased trash, which may attract predators to the project site and discourage wildlife use of surrounding natural habitat. Increased roadway traffic, due to the division of habitat and corridors, may affect surrounding wildlife and lead to increased wildlife mortality. Since the Blueprint Plus Alternative includes less capacity increasing projects than the proposed

2022 RTP/SCS, increased impacts of this alternative would result in slightly reduced impacts to wildlife movement by habitat modification.

e. Cultural Resources

With increased development in existing urban areas there would be more opportunity for impacts to existing built historical resources. Impacts to historical resources under the Blueprint Plus Alternative would be greater than those under the proposed 2022 RTP/SCS and would remain significant and unavoidable.

Under the Blueprint Plus Alternative, similar undeveloped areas would be impacted by excavation and ground disturbing activities from land use projects as compared to the proposed 2022 RTP/SCS. Both the Blueprint Plus Alternative and proposed Project focuses increased development in infill areas with further expansion of non-motorized transportation. The Blueprint Plus Alternative de-emphasizes building capacity increasing highway projects compared to the proposed 2022 RTP/SCS, reducing the potential for construction on undeveloped areas having a greater chance of uncovering cultural resources.

Increased development in previously developed areas would result in less opportunities to disturb uncovered cultural resources. Further, as development would be focused in urban areas, impacts related to accidental discovery of archeological resources and tribal cultural resources would generally be reduced. The Blueprint Plus Alternative would result in slightly reduced impacts overall, however, impacts would remain significant and unavoidable.

f. Energy

The Blueprint Plus Alternative includes enhanced transportation and development projects similar to the proposed 2022 RTP/SCS but with development density focused in urban areas. This alternative would result in a similar impact related to the need for expanded or newly constructed energy facilities to serve the population growth in the region due to greater emphasis in urban areas for both. The Blueprint Plus Alternative would accommodate the same increase in total population, households, and jobs as the proposed 2022 RTP/SCS. Therefore, the total energy consumption under this alternative would be similar to the proposed 2022 RTP/SCS.

Both the Blueprint Plus Alternative and the proposed 2022 RTP/SCS include strategies to focus growth in urban areas, which would help reduce the number of new energy facilities or expansion of existing facilities that need to be constructed. Infill and mixed-use developments are generally higher efficiency dwellings accounting for the reduction in total energy consumption. Higher density development throughout the TCAG region under the Blueprint Plus Alternative would serve to accommodate the same population growth with less dispersed development. As with the proposed 2022 RTP/SCS, under the Blueprint Plus Alternative, similar land use strategies would occur. It is possible that increased density in urban areas could put additional pressure on energy providers to increase capacity to these areas resulting in additional impacts. Impacts to energy under the Blueprint Plus Alternative would be similar compared to the proposed 2022 RTP/SCS.

g. Geology and Soils and Mineral Resources

This alternative would involve focused density within existing cities and would include fewer capacity-increasing projects than the proposed 2022 RTP/SCS. Development under this alternative would similarly be required to comply with the CBC. Therefore, impacts related to rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides would remain less than significant under this alternative, and impacts would be similar to the proposed 2022 RTP/SCS.

Impacts related to erosion and loss of topsoil would be less than significant pursuant to compliance with existing regulations, similar to the proposed 2022 RTP/SCS. Because this alternative would involve fewer capacity-increasing projects than the proposed 2022 RTP/SCS, there would be less exposure of new road structures to hazardous geologic conditions, including liquefaction, expansive soils, landslides, ground-shaking and flooding. Development under this alternative would also be required to comply with the CBC and requirements set forth by the Alquist Priolo Zone Act. Therefore, impacts would be less compared to the proposed 2022 RTP/SCS and impacts would remain less than significant.

Because this alternative would involve less capacity increasing projects, impacts to paleontological resources would be less under this alternative compared to the proposed 2022 RTP/SCS but would remain significant and unavoidable. Further, development under this alternative would avoid known mineral resources to the extent feasible, and projects located within MRZ-2 areas are required to identify and mitigate impacts during the environmental review for project-specific impacts pertaining to mineral resources to allow for the recovery of identified minerals. Impacts to mineral resources would remain less than significant, as under the proposed 2022 RTP/SCS. Therefore, impacts to geology and soils and mineral resources would be reduced compared to the proposed 2022 RTP/SCS and would remain less than significant. Impacts to paleontological resources would be significant and unavoidable but would be reduced under this alternative.

h. Greenhouse Gas Emissions and Climate Change

The Blueprint Plus Alternative would result in fewer impacts associated with GHG emissions during construction activities for capacity increasing projects as the amount of construction would be smaller with fewer capacity increasing projects. Table 6-8 compares the per capita GHG emissions for the Blueprint Plus Alternative and the proposed 2022 RTP/SCS. As shown therein, Alternative 4 would incrementally increase total GHG emissions from 14.21 pounds per day per capita for the proposed 2022 RTP/SCS to 14.28 pounds per day per capita. This increase would be negligible (less than one percent difference), and impacts would be similar to the proposed 2022 RTP/SCS under this alternative and would remain significant and unavoidable.

Table 6-8 Blueprint Plus, Net Change in Total GHG Emissions

Alternative	Per Capita GHG Emissions (lbs/day)
Blueprint Plus	14.28
Proposed 2022 RTP/SCS	14.21
Difference	**0.07**

MT = metric tons; CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalent
[1] Refer to Section 4.8, *Greenhouse Gas Emissions and Climate Change*
Source: Total GHG emissions were calculated by TCAG. Refer to 2022 RTP/SCS Chapter 5 and Appendix A for complete methodology.

i. Hazards and Hazardous Materials

This alternative would result in fewer capacity increasing projects being constructed, thereby reducing hazardous material use, storage and transportation resulting from construction of those projects. However, the volume of hazardous materials being transported to support land use development in the region would remain the same. Because this alternative would be subject to existing regulations and programs, impacts relating to routine transport, use, or disposal of hazardous materials; risk of upset and accident conditions; emissions within one-quarter mile of a school; airport hazards; and interference with emergency response and evacuation plans would be less than significant, similar to the proposed 2022 RTP/SCS. This alternative would involve high density, infill-focused development; however, similar to the proposed 2022 RTP/SCS, transportation improvement projects and land use projects could be located on sites on the list of hazardous material sites compiled by Government Code Section 65962.5, and impacts would remain significant and unavoidable. Overall, hazards and hazardous materials impacts would be similar under this alternative as under the 2022 RTP/SCS.

j. Hydrology and Water Quality

Under the Blueprint Plus Alternative, fewer undeveloped areas would be impacted by excavation and construction activities related to capacity increasing transportation projects as compared to the proposed 2022 RTP/SCS. The direct effects of the Blueprint Plus Alternative from transportation projects on water resources would be less compared to the proposed 2022 RTP/SCS due to less capacity increasing projects being built. Direct effects from less capacity increasing projects on undisturbed land would be reduced. Impacts to groundwater infiltration caused by the increased impervious surfaces of roadway projects, and to increased flooding hazards, would be slightly less compared to the proposed 2022 RTP/SCS.

With regard to groundwater recharge at a large scale, the Blueprint Plus Alternative would consume similar acres of land providing the same opportunities for groundwater recharge. Overall, the Blueprint Plus Alternative would result in fewer impacts to water resources, due to the reduced impervious surface area from more less capacity increasing projects being built on undisturbed land. Overall, impacts would remain significant and unavoidable.

k. Land Use and Planning

Current land use practices may require reconsideration to address the Blueprint Plus Alternative as the Blueprint Plus focuses more growth into the existing urban area at a higher density around transit corridors and existing activity centers, possibly beyond what communities have currently planned for. To achieve the densities of the Blueprint Plus, there would be a greater chance to conflict with, local general plans, market forces and community desired growth patterns.

As a result of greater concentrations of density in specified areas and increasing redevelopment pressures, the Blueprint Plus Alternative could result in increased division of existing communities. The Blueprint Plus Alternative would also increase the potential for land use incompatibilities in urban areas. Impacts of the Blueprint Plus Alternative relative to land use would be similar to or less than the proposed 2022 RTP/SCS in non-urban areas, but greater in urban areas.

l. Noise

Implementation of the proposed 2022 RTP/SCS would result in the same total regional population and households as the Blueprint Plus Alternative. However, under the Blueprint Plus Alternative, a greater number of transit investments would be made. Under the Blueprint Plus Alternative, the population distribution would be more concentrated in urban areas and more influenced by additional transportation investments and growth policies contained within the Blueprint Plus Alternative.

Both the Blueprint Plus Alternative and the proposed 2022 RTP/SCS would expose people to significant increases in noise and vibration. Under the Blueprint Plus Alternative, development would be more concentrated, potentially exposing more people and sensitive uses to noise and vibration in urban areas (including both construction and operational noise). This alternative includes greater improvements in urban areas that would facilitate traffic movement and increase use of transit and alternate modes that could reduce individual vehicle noise (as more people take alternative modes of transportation). In balance, the Blueprint Plus Alternative would result in more roadways with substantial increases in noise but would have more traffic congestion improvements than the proposed 2022 RTP/SCS.

The increased amount of transportation and transit projects in urban areas in the Blueprint Plus Alternative would increase the amount of transportation-related construction activity near sensitive receptors, which would increase short-term noise and vibration levels. However, with a more concentrated growth pattern, more people would be exposed to substantial increases in noise as compared to the proposed 2022 RTP/SCS, resulting overall in greater construction noise impacts.

The Blueprint Plus Alternative would concentrate development in urban areas, resulting in increased exposure to groundborne source of vibration. However, a greater number of transportation improvements under the Blueprint Plus Alternative would help to move traffic more efficiently which could reduce vibration in urban areas, however not to the point of off-setting increased vehicle trips. Similar for the proposed 2022 RTP/SCS, the potential remains for individual projects in the region to result in significant vibration impacts. Impacts related to groundborne vibration under the Blueprint Plus Alternative would be greater than the proposed 2022 RTP/SCS and remain significant and unavoidable.

Similar to the proposed 2022 RTP/SCS, some land use projects under the Blueprint Plus Alternative could be located within an area covered by an airport land use plan or in the vicinity of a private airstrip. However, the Blueprint Plus Alternative along with existing plans and regulations, including the Tulare County Comprehensive Airport Land Use Plan (ALUP) and Federal Aviation Administration regulation of airports and airstrips, would minimize noise emissions levels for people residing or working in the project area. Noise impacts from airports would be similar to the proposed 2022 RTP/SCS.

m. Population and Housing

The Blueprint Plus Alternative would have the same number of households, employment, and population as the proposed 2022 RTP/SCS. The Blueprint Plus Alternative includes land use strategies that would target growth in developed urban areas to a greater extent, and therefore the more compact land use pattern would result in a similar amount of land consumed compared to the proposed 2022 RTP/SCS, but population would be more focused in existing urban areas. Compared to the proposed 2022 RTP/SCS, the Blueprint Plus Alternative would place more focus on development in urban areas and existing communities and would have a greater emphasis on infill development. As a result, the Blueprint Plus Alternative could result in an increase in the number of homes or businesses that are displaced as a result of redevelopment. Impacts would slightly increase compared to the proposed 2022 RTP/SCS but would remain less than significant.

n. Public Services and Recreation

The Blueprint Plus Alternative would include the same increases in population, housing, and jobs which would require increases in police, fire, and emergency personnel; however, these services and the people being serviced, would be located in closer, denser, urban areas. In general, urban areas are well served by fire and emergency services and as personnel would travel shorter distances to calls response times would not be substantially affected. As the Blueprint Plus Alternative would increase density and concentration of developments in urban areas, fewer emergency service personnel would be needed to serve non-urban areas of the TCAG region than with the proposed 2022 RTP/SCS. Regardless, the increase in population in urban areas could result in the need for new or expanded facilities to serve increased demand in those areas. Similar to the greater need for fire services, the Blueprint Plus Alternative would also increase the need for police and police facilities.

The Blueprint Plus Alternative would have greater impacts to schools compared to the 2022 RTP/SCS. The 2046 population would be similar under the Blueprint Plus; however, the Blueprint Plus includes a more concentrated population in urban areas and would result in the need for additional school facilities in areas which previously may not have been targeted for increased population densities, and fewer facilities in outlying areas.

The Blueprint Plus Alternative would result in fewer impacts on recreational facilities in non-urban areas as compared to the proposed 2022 RT/SCS as it would concentrate development in urban areas at a higher density. Although this alternative would have less impacts to non-urban areas that require new recreational facilities, existing urban parks would be more severely impacted under the Blueprint Plus Alternative because of intensified growth in urban areas. Impacts related to recreational facilities and use would be similar as the proposed 2022 RTP/SCS and would remain significant and unavoidable.

o. Transportation

Alternative 4 would generate 12,299,408 daily VMT in 2046 compared to 12,244,957 daily VMT for the proposed 2022 RTP/SCS – an increase of 54,451 VMT. This incremental increase would be negligible (less than one percent increase). Overall, impacts related to VMT would be similar to the proposed 2022 RTP/SCS.

The Blueprint Plus Alternative would accommodate approximately 20,818 daily transit riders, a decrease of 1,884 daily riders. Thus, compared to the proposed 2022 RTP/SCS, the Blueprint Plus Alternative would have a reduced impact on providing transit service in the TCAG region.

Overall, the Blueprint Plus Alternative would result in increased daily VMT in the TCAG region compared to the proposed 2022 RTP/SCS. Thus, overall, impacts to transportation would be greater under this Alternative.

The Blueprint Plus Alternative would not by itself result in changes in air traffic patterns. However, the similar increased population that would occur by 2046 would likely result in increased air traffic. As with the proposed project, implementation of the Tulare County Comprehensive Airport Land Use Plan (ALUP) would avoid safety risks associated with air traffic to the extent feasible. The impact to a change in air traffic patterns would similarly be less than significant.

Similar to the proposed 2022 RTP/SCS, the Blueprint Plus Alternative would not result in increased hazards due to design feature (e.g., sharp curves or dangerous intersections) or increase conflicts between incompatible uses (e.g., farm equipment and other vehicular traffic). Design of new transportation facilities, including new pedestrian and bicycle facilities, takes into account potential hazards and avoids risks to the extent feasible. Impacts would be less than significant.

p. Tribal Cultural Resources

Under the Blueprint Plus Alternative, increased development would occur in a similar pattern in urban areas compared to the proposed 2022 RTP/SCS but with less ground disturbance from capacity increasing projects. Implementation of the Blueprint Plus Alternative would involve less ground disturbance associated with capacity increasing transportation improvements than would occur under the proposed 2022 RTP/SCS. As such, the potential to disturb tribal cultural resources, including ancestral remains and sacred sites, would decrease under this alternative. Future projects would still be required to comply with AB 52, which would encourage tribal consultation with local California Native American tribes and require the identification of project specific substantial adverse effects on tribal cultural resources and appropriate project specific mitigation measures. If it is determined that a specific project would result in a substantial adverse change in the significance of a tribal cultural resource, the impact would be significant. This significant impact would occur for projects under the Blueprint Plus Alternative, as it would for the proposed 2022 RTP/SCS. Therefore, impacts would be significant and unavoidable, as they would be for the proposed 2022 RTP/SCS but would be reduced compared to the proposed 2022 RTP/SCS due to the reduced level of ground disturbance from capacity increasing projects.

q. Utilities and Service Systems

The Blueprint Plus Alternative would accommodate the same increase in total population, households, and jobs as the proposed 2022 RTP/SCS, but at a higher density along with less capacity increasing transportation projects. Demand for electricity and natural gas would be less dispersed and more focused in urban areas, slightly reducing the number of new facilities necessary, as the need would be more compact at the higher densities. The Blueprint Plus Alternative would result overall in similar electricity and natural gas demand due to increased population and economic growth. Impacts would still be significant.

The Blueprint Plus Alternative would use a similar amount of water per household compared to the proposed 2022 RTP/SCS. As under the proposed 2022 RTP/SCS, expansion of existing facilities and/or construction of new facilities would be necessary under the Blueprint Plus. As a result of further intensification of development in urban areas, impacts from the Blueprint Plus Alternative would be similar compared to the proposed 2022 RTP/SCS. Impacts to wastewater would remain significant and unavoidable.

Regarding solid waste and adequate solid waste capacity to serve the region, similar to the proposed 2022 RTP/SCS, the more compact growth pattern of the Blueprint Plus Alternative would generate increased solid waste to fewer, less spread-out service providers, and impacts would remain significant and unavoidable.

r. Wildfire

The land use pattern under the Blueprint Plus Alternative would result in increased density housing in urban areas which would reduce development within and near wildland urban interface areas similar to the proposed 2022 RTP/SCS. However, there is still the potential for development under this alternative to result in exacerbated wildfire risk. Exacerbated wildfire risk would result in additional impacts related to flooding, landslides, and other associated hazards. Under this alternative, mitigation would still be required; however, impacts would still be significant and unavoidable, as under the 2022 RTP/SCS.

While development of both land use and transportation structures under this alternative would still be required to comply with the California Fire Code, and mitigation would still be required, impacts under this alternative would remain significant and unavoidable as potential risks from wildfire cannot be feasibly reduced to less than significant. Overall, wildfire impacts would be similar when compared to the 2022 RTP/SCS and would remain significant and unavoidable.

6.7 Environmentally Superior Alternative

State CEQA Guidelines Section 15126.6 requires that an EIR identify the environmentally superior alternative among the alternatives analyzed. Section 15126.6(d)(2) states that if the No Project Alternative is identified as the environmentally superior alternative, the EIR shall also identify an environmentally superior alternative from among the other alternatives analyzed. This section compares the impacts of the four alternatives under consideration to those of the 2022 RTP/SCS, in compliance with the *State CEQA Guidelines*.

Table 6-9 shows whether each alternative would have impacts that are less than, similar to, or greater than the proposed 2022 RTP/SCS for each of the issue areas studied.

Based on the above analysis and summary in Table 6-9, Alternative 4 is the environmentally superior alternative, assuming all environmental issue areas are weighted equally. Under Alternative 4, land use patterns would be concentrated in infill and existing urban areas with a focus on transit and active transportation projects and reduction in capacity increasing projects. Alternative 4 could be considered environmentally superior to the 2022 RTP/SCS primarily because, as shown in Table 6-9, overall impacts to the following resources would be less: biological resources, cultural resources, geology and soils, hydrology and water quality, noise, and tribal cultural resources.

However, Alternative 4 would increase VMT, and as a result, would increase impacts to air quality and GHG emissions. It does meet the GHG reduction target of 16 percent per capita reduction (16.1 percent), but not to the total reduction level of the 2022 RTP/SCS (17.6 percent). This alternative does not meet the needs of the TCAG region by deemphasizing important projects that are considered capacity increasing. Alternative 4 may not be feasible in that TCAG does not have land use authority and cannot require local agencies to make changes to their general plans and zoning codes that would be required in order for Alternative 4 to be implemented.

The No Project Alternative (Alternative 1) and the Business as Usual (Alternative 2) would both result in a less dense development pattern compared to the 2022 RTP/SCS, with both alternatives continuing existing land use trends. Because of the increased land development outside of existing urbanized areas, Alternatives 1 and 2 would result in more ground disturbance than the 2022 RTP/SCS. Consequently, compared to the 2022 RTP/SCS, both alternatives would have greater overall impacts to aesthetics, air quality, agricultural resources, biological resources, cultural and tribal resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use, transportation and circulation and tribal cultural resources. As shown in Table 6-9, Alternative 1 and Alternative 2 would result in greater impacts than the 2022 RTP/SCS. Both alternatives would also fail to meet most basic project objectives.

The Blueprint (Old Plan) Alternative (Alternative 3) would result in the same development pattern as the 2018 RTP/SCS but at a slightly reduced density. As such, this alternative would result in similar conflicts with land use plans, policies, and regulations as the 2022 RTP/SCS but with greater impacts to air quality, GHG emissions, hydrology and water quality, and wildfire. As shown in Table 6-9, greater overall impacts to transportation would occur under this alternative. As shown in Table 6-9, Alternative 3 would not be considered environmentally superior to the proposed 2022 RTP/SCS.

Table 6-9 Impact Comparison of Alternatives

Impacts	2022 RTP/SCS	Alternative 1: No Project	Alternative 2: Business as Usual	Alternative 3: Blueprint (Old Plan)	Alternative 4: Blueprint Plus
Aesthetics and Visual Resources					
Impact AES-1: Have a substantial adverse effect on a scenic vista; AND Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings and historic buildings within a state scenic highway	SU	=	>	>	=
Impact AES-2: In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site or its surroundings; in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality	SU	=	>	>	=
Impact AES-3: Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area	SU	=	>	>	<
Agriculture and Forestry Resources					
Impact AG-1: 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 nonagricultural use; AND Conflict with existing zoning for agricultural use, or a Williamson Act contract; AND Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use	SU	>	>	>	=
Impact AG-2: 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)): AND Result in the loss of forest land or conversion of forest land to non-forest use	LTS	>	>	>	=
Air Quality					
Impact AQ-1: Conflict with or obstruct implementation of the applicable air quality plan	LTS	>	>	>	>
Impact AQ-2: 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 (construction)	SU	>	>	>	>
Impact AQ-3: 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 (operation)	SU	>	>	>	>

Impacts	2022 RTP/SCS	Alternative 1: No Project	Alternative 2: Business as Usual	Alternative 3: Blueprint (Old Plan)	Alternative 4: Blueprint Plus
Impact AQ-4: Expose sensitive receptors to substantial pollutant concentrations (particulate matter)	LTS	>	<	>	>
Impact AQ-5: Expose sensitive receptors to substantial pollutant concentrations (TACs)	SU	>	<	>	>
Impact AQ-6: Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people	LTS	>	>	>	>
Biological Resources					
Impact BIO-1: 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 Wildlife or U.S. Fish and Wildlife Service	SU	>	>	>	<
Impact BIO-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?; AND Would the project have a substantial adverse effect on state or federally protected wetlands (including but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means	SU	>	>	>	<
Impact BIO-3: 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	SU	>	>	>	<
Impact BIO-4: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance	LTS	>	>	>	<
Impact BIO-5: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan	LTS	>	>	>	<
Cultural Resources					
Impact CR-1: Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5	SU	=	=	=	<
Impact CR-2: Cause a substantial adverse change in the significance of an archaeological resource pursuant to *State CEQA Guidelines* Section 15064.5	SU	=	=	>	<
Impact CR-3: Disturb any human remains, including those interred outside of formal cemeteries	LTS	=	=	>	<

Impacts	2022 RTP/SCS	Alternative 1: No Project	Alternative 2: Business as Usual	Alternative 3: Blueprint (Old Plan)	Alternative 4: Blueprint Plus
Energy					
Impact E-1: Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation (including transportation), based on whether the project would result in an increase in overall per capita energy consumption relative to baseline conditions	LTS	=	>	>	=
Impact E-2: Result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resource, during project construction or operation (including transportation), based on whether the project would result in an increased reliance on fossil fuels and decreased reliance on renewable energy sources	LTS	=	>	>	=
Impact E-3: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	LTS	=	>	>	=
Geology and Soils and Mineral Resources					
Impact GEO-1: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides	LTS	>	>	=	<
Impact GEO-2: Result in substantial soil erosion or the loss of topsoil	LTS	>	>	=	<
Impact GEO-3: 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; OR Be located on expansive soil, creating substantial risks to life or property	LTS	>	>	=	<
Impact GEO-4: 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 wastewater	LTS	>	>	=	<
Impact GEO-5: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature	SU	>	>	>	=
Impact GEO-6: 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; AND 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	LTS	>	>	=	<

Impacts	2022 RTP/SCS	Alternative 1: No Project	Alternative 2: Business as Usual	Alternative 3: Blueprint (Old Plan)	Alternative 4: Blueprint Plus
Greenhouse Gas Emissions and Climate Change					
Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. An increase that exceeds the following threshold would be considered a significant impact: a) A net increase in GHG emissions by 2046 compared to existing baseline conditions	SU	>	>	>	=
Impact GHG-2: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. An increase that exceeds the following threshold would be considered a significant impact: **a)** A net increase in GHG emissions by 2046 compared to existing baseline conditions	SU	>	>	>	=
Impact GHG-3: Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. Any conflict with the following thresholds would be considered a significant impact: a) Conflict with regional SB 375 per capita passenger vehicle CO_2 emission reduction targets of 16 percent by 2035 from 2005 levels	LTS	>	>	>	=
Impact GHG-4: Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. Any conflict with the following thresholds would be considered a significant impact: b) Conflict with state's ability to achieve SB 32 GHG reduction target, which aims to reduce statewide emissions to 40 percent below 1990 levels by 2030 c) Conflict with state's ability to achieve EO S-3-05 GHG reduction 2050 goal, which aims to reduce statewide emissions to 80 percent below 1990 levels by 2050 and EO B-55-18; or d) Conflict with applicable local GHG reduction plans	SU	>	>	>	=
Hazards and Hazardous Materials					
Impact HAZ-1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials; AND 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	LTS	=	=	=	=
Impact HAZ-2: Emit hazardous emissions or handles hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school	LTS	=	=	=	=

Impacts	2022 RTP/SCS	Alternative 1: No Project	Alternative 2: Business as Usual	Alternative 3: Blueprint (Old Plan)	Alternative 4: Blueprint Plus
Impact HAZ-3: Be located on a site which is included on a list of hazardous materials compiled by the Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment	SU	=	=	=	=
Impact HAZ-4: 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, result in a safety hazard or excessive noise for people residing or working in the project area	LTS	=	=	=	=
Hydrology and Water Quality					
Impact HYD-1: Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality	LTS	=	>	>	<
Impact HYD-2: Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin	SU	=	>	>	=
Impact HYD-3: 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 substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; 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 impede or redirect flood flows	LTS	=	>	>	<
Impact HYD-4: In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation	LTS	=	>	>	<
Impact HYD-5: Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan	SU	=	>	>	<
Land Use					
Impact LU-1: Physically divide an established community	LTS	>	>	=	=
Impact LU-2: Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation (including, but not limited to, the General Plan or Zoning Ordinance) and result in a physical change to the environment not already addressed in the other resource chapters of this EIR?	LTS	>	>	>	=
Noise					
Impact N-1: 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; AND	SU	=	=	<	>

Impacts	2022 RTP/SCS	Alternative 1: No Project	Alternative 2: Business as Usual	Alternative 3: Blueprint (Old Plan)	Alternative 4: Blueprint Plus
Generation of a substantial absolute noise increase over existing noise levels					
Impact N-2: 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; AND Generation of a substantial absolute noise increase over existing noise levels	SU	=	=	>	>
Impact N-3: Generation of excessive ground-borne vibration or ground-borne noise levels	SU	=	=	=	>
Impact N-4: 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; AND Generation of a substantial absolute noise increase over existing noise levels	SU	=	=	=	>
Impact N-5: Expose people residing or working in the project area to excessive aviation related noise levels	SU	=	=	=	=
Population and Housing					
Impact POP-1: Induce substantial unplanned 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)	LTS	<	<	=	>
Impact POP-2: Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere	LTS	<	<	=	>
Public Services and Recreation					
Impact PS-1: Result in substantial adverse physical impacts associated with the provision of new of 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 fire and police protection, parks, or other public facilities	SU	=	=	<	>
Impact PS-2: Result in substantial adverse physical impacts associated with the provision of new of 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 schools	LTS	=	=	<	>
Impact PS-3: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or	SU	=	=	<	=

Impacts	2022 RTP/SCS	Alternative 1: No Project	Alternative 2: Business as Usual	Alternative 3: Blueprint (Old Plan)	Alternative 4: Blueprint Plus
be accelerated; AND Include recreational facilities or require construction or expansion of recreational facilities which might have an adverse physical effect on the environment					
Transportation					
Impact T-1: Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities	LTS	>	>	>	>
Impact T-2: Conflict with or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b) a. An overall increase in total regional VMT above baseline (2021) conditions would be considered a significant impact b. A change in VMT per capita in the region that fails to reach 15 percent below baseline (2021) VMT per capita conditions would be considered a significant impact; OR c. A substantial increase in induced travel due to roadway capacity expansions would be considered a significant impact	LTS	>	>	>	>
Impact T-3: Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)	LTS	>	>	>	=
Impact T-4: Result in inadequate emergency access; AND Impair implementation or physically interfere with an adopted emergency response plan or emergency evacuation plan	LTS	>	>	>	>
Tribal Cultural Resources					
Impact TCR-1: 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: 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	SU	>	>	>	<

Impacts	2022 RTP/SCS	Alternative 1: No Project	Alternative 2: Business as Usual	Alternative 3: Blueprint (Old Plan)	Alternative 4: Blueprint Plus
Utilities and Service Systems					
Impact UTIL-1: Require or result in the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction of which could cause significant environmental effects; AND Result in a determination by the wastewater treatment provider which serves or may serve the project that is has inadequate capacity to serve the projects projected demand in addition to the provider’s existing commitments	SU	>	>	=	=
Impact UTIL-2: 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	SU	>	>	=	=
Impact UTIL-3: Not comply with federal, state and local statutes and regulations related to solid waste	LTS	>	>	=	=
Impact UTIL-4: Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years	SU	>	>	=	=
Wildfire					
Impact W-1: If located in or near state responsibility areas or lands classified as very high fire hazard severity zones: a) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire b) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment c) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes d) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires	SU	>	>	>	=

Note: Comparison of impacts is based on the overall impact of the alternative on the resource or issue.

< Alternative impacts would be less than those of the proposed 2022 RTP/SCS

= Alternative would result in impacts similar to the proposed 2022 RTP/SCS

> Alternative impacts would be greater than those of the proposed 2022 RTP/SCS

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7.2 List of Preparers

This EIR was prepared by the Tulare County Association of Governments, with the assistance of Rincon Consultants, Inc. Staff involved in the preparation of the EIR are listed below.

Tulare County Association of Governments

Ted Smalley, Executive Director
Ben Kimball, Deputy Director
Roberto Brady, Principal Regional Planner
Gabriel Gutierrez, Senior Regional Planner

Rincon Consultants, Inc.

Megan Jones, Principal
Richard Daulton, Principal
Eric VonBerg, Supervising Planner
Jen DiCenzo, Paleontological Program Manager
Leanna L. Flaherty, RPA, Cultural Resources Project Manager
Annaliese Miller, Senior Environmental Planner
Chris Bersbach, Senior Environmental Planner
Nik Kilpelainen, Environmental Planner
Beth Wilson, Biologist
Jake Nyiri, Environmental Scientist
Victoria Chung, Environmental Planner
Eric Moland, Environmental Planner
Lucas Carneiro, Environmental Planner
Kayleigh Limbach, Environmental Planner
Ethan Knox, Environmental Planner
Taylor Freeman, Planner

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Appendix A

Air Quality Emissions Calculations

TCAG 2022 RTP/SCS Air Quality Emission Calculations

Scenario	VMT	ROG (tons/day)	NO_x (tons/day)	PM_{10} (tons/day)[1]	$PM_{2.5}$ (tons/day)[1]	Total PM (tons/day)	Fugitive PM_{10} (tons/day)[2]	Fugitive $PM_{2.5}$ (tons/day)[2]	Total Fugitive PM (tons/day)[2]	CO (tons/day)	SOx (tons/day)	CO2e (tons/day)	CO2e (metric tons/year)
2021 TCAG Baseline													
On-Road Motor Vehicles	14,566,292	3.59	7.64	0.51	0.22	0.73	0.42	0.13	0.55	30.23	0.07	7,378	2,443,074
2035 No Project													
On-Road Motor Vehicles	16,279,168	1.88	3.66	0.49	0.18	0.67	0.44	0.14	0.57	15.13	0.06		
2046 No Project													
On-Road Motor Vehicles	17,128,558	1.45	3.34	0.51	0.19	0.70	0.47	0.14	0.61	13.14	0.06	6,018	1,992,775
2046 RTP/SCS (CVC Blueprint Plus)													
On-Road Motor Vehicles	16,892,980	1.43	3.29	0.50	0.18	0.69	0.46	0.14	0.60	12.96	0.06	5,935	1,965,367
Difference (2046 RTP/SCS - Baseline)	2,326,688.00	-2.16	-4.35	-0.01	-0.04	-0.05	0.04	0.01	0.06	-17.27	-0.01	-1,442.69	-477,706.79
%	16%	-60%	-57%	-2%	-17%	-6%	10%	9%	10%	-57%	-20%	-20%	-20%

Notes

Annual emissions - Total

1) Includes tire and break wear in the total PM

2) Includes only tire and break wear

Scenario	Diesel PM2.5 (tons/day)	Diesel PM10 (tons/day)1	Diesel NOX (tons/day)	Diesel SOX (tons/day)	Diesel CO (tons/day)
2021 TCAG Baseline					
On-Road Motor Vehicles	0.07	0.07	4.83	0.02	1.09
2046 No Project					
On-Road Motor Vehicles	0.03	0.03	2.64	0.02	0.92
2046 RTP/SCS					
On-Road Motor Vehicles	0.03	0.03	2.60	0.02	0.91
	51%	51%	46%	12%	17%

Notes

Diesel annual emissions -Total Exhaust (TOTEX)

Planning Inventory Report
Date: 02/01/2022
Time: 11:58:25
EMFAC2021 Version: v1.0.1

Field Name	Pollutant	Units	Process
TOG_RUNEX	Total Organic Gases	Tons Per Day	Running Exhaust
TOG_IDLEX	Total Organic Gases	Tons Per Day	Idle Exhaust
TOG_STREX	Total Organic Gases	Tons Per Day	Start Exhaust
TOG_TOTEX	Total Organic Gases	Tons Per Day	Total Exhaust
TOG_DIURN	Total Organic Gases	Tons Per Day	Diurnal
TOG_HTSK	Total Organic Gases	Tons Per Day	Hot Soak
TOG_RUNLS	Total Organic Gases	Tons Per Day	Running Loss
TOG_TOTAL	Total Organic Gases	Tons Per Day	Total
ROG_RUNEX	Reactive Organic Gases	Tons Per Day	Running Exhaust
ROG_IDLEX	Reactive Organic Gases	Tons Per Day	Idle Exhaust
ROG_STREX	Reactive Organic Gases	Tons Per Day	Start Exhaust
ROG_TOTEX	Reactive Organic Gases	Tons Per Day	Total Exhaust
ROG_DIURN	Reactive Organic Gases	Tons Per Day	Diurnal
ROG_HTSK	Reactive Organic Gases	Tons Per Day	Hot Soak
ROG_RUNLS	Reactive Organic Gases	Tons Per Day	Running Loss
ROG_TOTAL	Reactive Organic Gases	Tons Per Day	Total
CO_RUNEX	Carbon Monoxide	Tons Per Day	Running Exhaust
CO_IDLEX	Carbon Monoxide	Tons Per Day	Idle Exhaust
CO_STREX	Carbon Monoxide	Tons Per Day	Start Exhaust
CO_TOTEX	Carbon Monoxide	Tons Per Day	Total
NOx_RUNEX	Nitrogen Dioxide	Tons Per Day	Running Exhaust
NOx_IDLEX	Nitrogen Dioxide	Tons Per Day	Idle Exhaust
NOx_STREX	Nitrogen Dioxide	Tons Per Day	Start Exhaust
NOx_TOTEX	Nitrogen Dioxide	Tons Per Day	Total
CO2_RUNEX	Carbon Dioxide	Tons Per Day	Running Exhaust
CO2_IDLEX	Carbon Dioxide	Tons Per Day	Idle Exhaust
CO2_STREX	Carbon Dioxide	Tons Per Day	Start Exhaust
CO2_TOTEX	Carbon Dioxide	Tons Per Day	Total
PM10_RUNEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Running Exhaust
PM10_IDLEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Idle Exhaust
PM10_STREX	Fine Particulate Matter (<10 microns)	Tons Per Day	Start Exhaust
PM10_TOTEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Total Exhaust
PM10_PMTW	Fine Particulate Matter (<10 microns)	Tons Per Day	Tire Wear
PM10_PMBW	Fine Particulate Matter (<10 microns)	Tons Per Day	Brake Wear
PM10_TOTAL	Fine Particulate Matter (<10 microns)	Tons Per Day	Total
PM2_5_RUNEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Running Exhaust
PM2_5_IDLEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Idle Exhaust
PM2_5_STREX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Start Exhaust
PM2_5_TOTEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Total Exhaust
PM2_5_PMTW	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Tire Wear
PM2_5_PMBW	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Brake Wear
PM2_5_TOTAL	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Total
SOx_RUNEX	Sulfur Oxides	Tons Per Day	Running Exhaust
SOx_IDLEX	Sulfur Oxides	Tons Per Day	Idle Exhaust
SOx_STREX	Sulfur Oxides	Tons Per Day	Start Exhaust
SOx_TOTEX	Sulfur Oxides	Tons Per Day	Total
Fuel_GAS	Fuel	1000 Gallons	Gasoline
Fuel_DSL	Fuel	1000 Gallons	Diesel
Fuel_NG	Fuel	1000 Gallons	Natural Gas

Area	Sub-Area	Cal. Year	Season	Veh_Tech	EMFAC2011 Category	Population	Total_VMT	cVMT	eVMT	Trips
TCAG	All Sub-Areas	2021	Annual	All Vehicles	All Vehicles	381,260.2	14,566,292.0	14,383,873.5	182,418.5	2,008,327.7
TCAG	All Sub-Areas	2021	Annual	All Other Buses-Dsl	All Other Buses - Dsl	77.9	4,065.3	4,065.3	0	693.7
TCAG	All Sub-Areas	2021	Annual	All Other Buses-NG	All Other Buses - Oth	2.05	121.3	121.3	0	18.3
TCAG	All Sub-Areas	2021	Annual	LDA-Dsl	LDA - Dsl	431.1	13,572.1	13,572.1	0	1,831.4
TCAG	All Sub-Areas	2021	Annual	LDA-Elec	LDA - Oth	2,461.3	105,898.2	0	105,898.2	12,467.6
TCAG	All Sub-Areas	2021	Annual	LDA-Gas	LDA - Gas	161,718.7	6,375,641.3	6,375,641.3	0	748,558.4
TCAG	All Sub-Areas	2021	Annual	LDA-Phe	LDA - Gas	2,780.6	134,388.4	71,625.0	62,763.4	11,497.8
TCAG	All Sub-Areas	2021	Annual	LDT1-Dsl	LDT1 - Dsl	13.7	231.1	231.1	0	41.7
TCAG	All Sub-Areas	2021	Annual	LDT1-Elec	LDT1 - Oth	6.68	220.4	0	220.4	31.0
TCAG	All Sub-Areas	2021	Annual	LDT1-Gas	LDT1 - Gas	17,756.7	543,715.1	543,715.1	0	74,445.5
TCAG	All Sub-Areas	2021	Annual	LDT1-Phe	LDT1 - Gas	2.24	119.1	60.6	58.5	9.28
TCAG	All Sub-Areas	2021	Annual	LDT2-Dsl	LDT2 - Dsl	141.6	5,935.3	5,935.3	0	672.5
TCAG	All Sub-Areas	2021	Annual	LDT2-Elec	LDT2 - Oth	45.9	1,659.0	0	1,659.0	235.8
TCAG	All Sub-Areas	2021	Annual	LDT2-Gas	LDT2 - Gas	67,085.1	2,522,840.4	2,522,840.4	0	308,354.9
TCAG	All Sub-Areas	2021	Annual	LDT2-Phe	LDT2 - Gas	176.4	9,059.9	4,687.0	4,372.9	729.6
TCAG	All Sub-Areas	2021	Annual	LHD1-Dsl	LHD1 - Dsl	9,009.3	320,647.0	320,647.0	0	113,326.0
TCAG	All Sub-Areas	2021	Annual	LHD1-Gas	LHD1 - Gas	8,024.6	265,628.1	265,628.1	0	119,554.7
TCAG	All Sub-Areas	2021	Annual	LHD2-Dsl	LHD2 - Dsl	2,937.8	106,664.6	106,664.6	0	36,953.9
TCAG	All Sub-Areas	2021	Annual	LHD2-Gas	LHD2 - Gas	1,221.1	41,154.9	41,154.9	0	18,192.0
TCAG	All Sub-Areas	2021	Annual	MCY-Gas	MCY - Gas	8,615.9	46,466.5	46,466.5	0	17,231.8
TCAG	All Sub-Areas	2021	Annual	MDV-Dsl	MDV - Dsl	1,241.8	50,586.4	50,586.4	0	5,907.3
TCAG	All Sub-Areas	2021	Annual	MDV-Elec	MDV - Oth	57.1	2,063.8	0	2,063.8	294.1
TCAG	All Sub-Areas	2021	Annual	MDV-Gas	MDV - Gas	84,774.2	2,994,830.4	2,994,830.4	0	382,602.8
TCAG	All Sub-Areas	2021	Annual	MDV-Phe	MDV - Gas	241.7	11,471.7	6,139.6	5,332.1	999.3
TCAG	All Sub-Areas	2021	Annual	MH-Dsl	MH - Dsl	580.0	4,986.3	4,986.3	0	58.0
TCAG	All Sub-Areas	2021	Annual	MH-Gas	MH - Gas	1,156.1	9,816.5	9,816.5	0	115.7
TCAG	All Sub-Areas	2021	Annual	Motor Coach-Dsl	Motor Coach - Dsl	22.0	3,152.9	3,152.9	0	505.8
TCAG	All Sub-Areas	2021	Annual	OBUS-Gas	OBUS - Gas	156.0	6,477.2	6,477.2	0	3,121.0
TCAG	All Sub-Areas	2021	Annual	PTO-Dsl	PTO-Dsl	0	9,030.1	9,030.1	0	
TCAG	All Sub-Areas	2021	Annual	PTO-Elec	PTO-Oth	0	0			
TCAG	All Sub-Areas	2021	Annual	SBUS-Dsl	SBUS - Dsl	513.7	11,418.3	11,418.3	0	7,438.2
TCAG	All Sub-Areas	2021	Annual	SBUS-Gas	SBUS - Gas	142.2	7,154.9	7,154.9	0	568.9
TCAG	All Sub-Areas	2021	Annual	SBUS-NG	SBUS-Oth	74.4	1,940.8	1,940.8	0	1,077.3
TCAG	All Sub-Areas	2021	Annual	T6 CAIRP Class 4-Dsl	T6 CAIRP small-Dsl	6.61	448.6	448.6	0	151.9
TCAG	All Sub-Areas	2021	Annual	T6 CAIRP Class 5-Dsl	T6 CAIRP small-Dsl	8.93	615.4	615.4	0	205.1
TCAG	All Sub-Areas	2021	Annual	T6 CAIRP Class 6-Dsl	T6 CAIRP small-Dsl	25.9	1,608.1	1,608.1	0	594.3
TCAG	All Sub-Areas	2021	Annual	T6 CAIRP Class 7-Dsl	T6 CAIRP heavy-Dsl	47.6	10,087.1	10,087.1	0	1,092.9
TCAG	All Sub-Areas	2021	Annual	T6 Instate Delivery Class 4-Dsl	T6 instate small-Dsl	67.9	2,244.0	2,244.0	0	968.3
TCAG	All Sub-Areas	2021	Annual	T6 Instate Delivery Class 5-Dsl	T6 instate small-Dsl	46.6	1,575.9	1,575.9	0	665.0
TCAG	All Sub-Areas	2021	Annual	T6 Instate Delivery Class 6-Dsl	T6 instate small-Dsl	281.5	9,586.0	9,586.0	0	4,017.7
TCAG	All Sub-Areas	2021	Annual	T6 Instate Delivery Class 7-Dsl	T6 instate heavy-Dsl	55.2	2,914.5	2,914.5	0	788.3
TCAG	All Sub-Areas	2021	Annual	T6 Instate Delivery Class 7-NG	T6 instate heavy-NG	0.1421	7.53	7.53	0	2.03
TCAG	All Sub-Areas	2021	Annual	T6 Instate Other Class 4-Dsl	T6 instate small-Dsl	397.2	15,550.7	15,550.7	0	4,591.8
TCAG	All Sub-Areas	2021	Annual	T6 Instate Other Class 5-Dsl	T6 instate small-Dsl	874.5	38,674.8	38,674.8	0	10,109.0
TCAG	All Sub-Areas	2021	Annual	T6 Instate Other Class 6-Dsl	T6 instate small-Dsl	847.1	34,258.0	34,258.0	0	9,792.1
TCAG	All Sub-Areas	2021	Annual	T6 Instate Other Class 7-Dsl	T6 instate heavy-Dsl	564.1	24,296.2	24,296.2	0	6,521.4
TCAG	All Sub-Areas	2021	Annual	T6 Instate Other Class 7-NG	T6 instate heavy-NG	4.74	290.8	290.8	0	54.8
TCAG	All Sub-Areas	2021	Annual	T6 Instate Tractor Class 6-Dsl	T6 instate small-Dsl	12.8	646.3	646.3	0	147.7
TCAG	All Sub-Areas	2021	Annual	T6 Instate Tractor Class 7-Dsl	T6 instate heavy-Dsl	326.6	20,320.0	20,320.0	0	3,775.8
TCAG	All Sub-Areas	2021	Annual	T6 Instate Tractor Class 7-NG	T6 instate heavy-NG	2.83	224.7	224.7	0	32.7
TCAG	All Sub-Areas	2021	Annual	T6 OOS Class 4-Dsl	T6 OOS small-Dsl	3.85	259.8	259.8	0	88.6
TCAG	All Sub-Areas	2021	Annual	T6 OOS Class 5-Dsl	T6 OOS small-Dsl	5.19	356.3	356.3	0	119.2
TCAG	All Sub-Areas	2021	Annual	T6 OOS Class 6-Dsl	T6 OOS small-Dsl	15.1	931.1	931.1	0	346.1
TCAG	All Sub-Areas	2021	Annual	T6 OOS Class 7-Dsl	T6 OOS heavy-Dsl	26.8	6,770.4	6,770.4	0	614.7
TCAG	All Sub-Areas	2021	Annual	T6 Public Class 4-Dsl	T6 Public-Dsl	32.0	1,099.8	1,099.8	0	164.3
TCAG	All Sub-Areas	2021	Annual	T6 Public Class 4-NG	T6 Public-NG	1.28	53.5	53.5	0	6.57
TCAG	All Sub-Areas	2021	Annual	T6 Public Class 5-Dsl	T6 Public-Dsl	60.2	2,242.7	2,242.7	0	308.9
TCAG	All Sub-Areas	2021	Annual	T6 Public Class 5-NG	T6 Public-NG	4.62	194.8	194.8	0	23.7
TCAG	All Sub-Areas	2021	Annual	T6 Public Class 6-Dsl	T6 Public-Dsl	83.9	2,826.0	2,826.0	0	430.6
TCAG	All Sub-Areas	2021	Annual	T6 Public Class 6-NG	T6 Public-NG	3.36	138.7	138.7	0	17.2
TCAG	All Sub-Areas	2021	Annual	T6 Public Class 7-Dsl	T6 Public-Dsl	111.3	4,736.7	4,736.7	0	570.9
TCAG	All Sub-Areas	2021	Annual	T6 Public Class 7-NG	T6 Public-NG	5.59	324.0	324.0	0	28.7
TCAG	All Sub-Areas	2021	Annual	T6 Utility Class 5-Dsl	T6 Utility-Dsl	21.0	860.1	860.1	0	269.2
TCAG	All Sub-Areas	2021	Annual	T6 Utility Class 5-NG	T6 Utility-NG	0.0554	2.22	2.22	0	0.7097
TCAG	All Sub-Areas	2021	Annual	T6 Utility Class 6-Dsl	T6 Utility-Dsl	4.04	162.2	162.2	0	51.7
TCAG	All Sub-Areas	2021	Annual	T6 Utility Class 6-NG	T6 Utility-NG	0.0204	0.8056	0.8056	0	0.2613
TCAG	All Sub-Areas	2021	Annual	T6 Utility Class 7-Dsl	T6 Utility-Dsl	4.63	226.1	226.1	0	59.2
TCAG	All Sub-Areas	2021	Annual	T6 Utility Class 7-NG	T6 Utility-NG	0.0139	0.6268	0.6268	0	0.1774
TCAG	All Sub-Areas	2021	Annual	T6TS-Gas	T6TS - Gas	466.3	18,470.4	18,470.4	0	9,330.1
TCAG	All Sub-Areas	2021	Annual	T7 CAIRP Class 8-Dsl	T7 CAIRP-Dsl	929.6	194,694.9	194,694.9	0	21,362.7
TCAG	All Sub-Areas	2021	Annual	T7 NNOOS Class 8-Dsl	T7 NNOOS-Dsl	845.3	230,189.4	230,189.4	0	19,424.1
TCAG	All Sub-Areas	2021	Annual	T7 NOOS Class 8-Dsl	T7 NOOS-Dsl	347.3	83,623.7	83,623.7	0	7,980.0
TCAG	All Sub-Areas	2021	Annual	T7 Other Port Class 8-Dsl	T7 Other Port-Dsl	19.2	3,236.3	3,236.3	0	313.5
TCAG	All Sub-Areas	2021	Annual	T7 POAK Class 8-Dsl	T7 POAK-Dsl	84.3	8,172.4	8,172.4	0	1,378.6
TCAG	All Sub-Areas	2021	Annual	T7 POLA Class 8-Dsl	T7 POLA-Dsl	85.5	11,196.5	11,196.5	0	1,398.5
TCAG	All Sub-Areas	2021	Annual	T7 POLA Class 8-NG	T7 POLA-NG	0.8011	105.1	105.1	0	13.1
TCAG	All Sub-Areas	2021	Annual	T7 Public Class 8-Dsl	T7 Public-Dsl	321.6	13,452.8	13,452.8	0	1,649.9
TCAG	All Sub-Areas	2021	Annual	T7 Public Class 8-NG	T7 Public-NG	15.6	815.2	815.2	0	80.2
TCAG	All Sub-Areas	2021	Annual	T7 SWCV Class 8-Dsl	T7 SWCV-Dsl	185.4	12,015.1	12,015.1	0	852.8
TCAG	All Sub-Areas	2021	Annual	T7 SWCV Class 8-NG	T7 SWCV-NG	62.8	4,045.6	4,045.6	0	288.8
TCAG	All Sub-Areas	2021	Annual	T7 Single Concrete/Transit Mix Class 8-Dsl	T7 Single-Dsl	15.7	1,084.0	1,084.0	0	148.3
TCAG	All Sub-Areas	2021	Annual	T7 Single Concrete/Transit Mix Class 8-NG	T7 Single-NG	0.7015	50.8	50.8	0	6.61
TCAG	All Sub-Areas	2021	Annual	T7 Single Dump Class 8-Dsl	T7 Single-Dsl	119.5	7,146.4	7,146.4	0	1,125.3
TCAG	All Sub-Areas	2021	Annual	T7 Single Dump Class 8-NG	T7 Single-NG	3.96	251.9	251.9	0	37.3
TCAG	All Sub-Areas	2021	Annual	T7 Single Other Class 8-Dsl	T7 Single-Dsl	636.8	35,647.7	35,647.7	0	5,998.7
TCAG	All Sub-Areas	2021	Annual	T7 Single Other Class 8-NG	T7 Single-NG	22.0	1,296.4	1,296.4	0	207.0
TCAG	All Sub-Areas	2021	Annual	T7 Tractor Class 8-Dsl	T7 Tractor-Dsl	1,467.6	126,089.6	126,089.6	0	21,324.0
TCAG	All Sub-Areas	2021	Annual	T7 Tractor Class 8-NG	T7 Tractor-NG	24.8	2,185.4	2,185.4	0	360.5
TCAG	All Sub-Areas	2021	Annual	T7 Utility Class 8-Dsl	T7 Utility-Dsl	14.1	680.9	680.9	0	180.3
TCAG	All Sub-Areas	2021	Annual	T7IS-Gas	T7IS - Gas	2.51	54.2	54.2	0	50.2
TCAG	All Sub-Areas	2021	Annual	UBUS-Dsl	UBUS - Dsl	6.80	607.4	607.4	0	27.2
TCAG	All Sub-Areas	2021	Annual	UBUS-Elec	UBUS - Oth	2.13	50.1	0	50.1	8.52
TCAG	All Sub-Areas	2021	Annual	UBUS-Gas	UBUS - Gas	59.8	4,209.8	4,209.8	0	239.3
TCAG	All Sub-Areas	2021	Annual	UBUS-NG	UBUS - NG	99.1	11,428.4	11,428.4	0	396.4

Planning Inventory Report
Date: 02/01/2022
Time: 11:56:21
EMFAC2021 Version: v1.0.1

Field Name	Pollutant	Units	Process
TOG_RUNEX	Total Organic Gases	Tons Per Day	Running Exhaust
TOG_IDLEX	Total Organic Gases	Tons Per Day	Idle Exhaust
TOG_STREX	Total Organic Gases	Tons Per Day	Start Exhaust
TOG_TOTEX	Total Organic Gases	Tons Per Day	Total Exhaust
TOG_DIURN	Total Organic Gases	Tons Per Day	Diurnal
TOG_HTSK	Total Organic Gases	Tons Per Day	Hot Soak
TOG_RUNLS	Total Organic Gases	Tons Per Day	Running Loss
TOG_TOTAL	Total Organic Gases	Tons Per Day	Total
ROG_RUNEX	Reactive Organic Gases	Tons Per Day	Running Exhaust
ROG_IDLEX	Reactive Organic Gases	Tons Per Day	Idle Exhaust
ROG_STREX	Reactive Organic Gases	Tons Per Day	Start Exhaust
ROG_TOTEX	Reactive Organic Gases	Tons Per Day	Total Exhaust
ROG_DIURN	Reactive Organic Gases	Tons Per Day	Diurnal
ROG_HTSK	Reactive Organic Gases	Tons Per Day	Hot Soak
ROG_RUNLS	Reactive Organic Gases	Tons Per Day	Running Loss
ROG_TOTAL	Reactive Organic Gases	Tons Per Day	Total
CO_RUNEX	Carbon Monoxide	Tons Per Day	Running Exhaust
CO_IDLEX	Carbon Monoxide	Tons Per Day	Idle Exhaust
CO_STREX	Carbon Monoxide	Tons Per Day	Start Exhaust
CO_TOTEX	Carbon Monoxide	Tons Per Day	Total
NOx_RUNEX	Nitrogen Dioxide	Tons Per Day	Running Exhaust
NOx_IDLEX	Nitrogen Dioxide	Tons Per Day	Idle Exhaust
NOx_STREX	Nitrogen Dioxide	Tons Per Day	Start Exhaust
NOx_TOTEX	Nitrogen Dioxide	Tons Per Day	Total
CO2_RUNEX	Carbon Dioxide	Tons Per Day	Running Exhaust
CO2_IDLEX	Carbon Dioxide	Tons Per Day	Idle Exhaust
CO2_STREX	Carbon Dioxide	Tons Per Day	Start Exhaust
CO2_TOTEX	Carbon Dioxide	Tons Per Day	Total
PM10_RUNEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Running Exhaust
PM10_IDLEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Idle Exhaust
PM10_STREX	Fine Particulate Matter (<10 microns)	Tons Per Day	Start Exhaust
PM10_TOTEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Total Exhaust
PM10_PMTW	Fine Particulate Matter (<10 microns)	Tons Per Day	Tire Wear
PM10_PMBW	Fine Particulate Matter (<10 microns)	Tons Per Day	Brake Wear
PM10_TOTAL	Fine Particulate Matter (<10 microns)	Tons Per Day	Total
PM2_5_RUNEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Running Exhaust
PM2_5_IDLEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Idle Exhaust
PM2_5_STREX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Start Exhaust
PM2_5_TOTEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Total Exhaust
PM2_5_PMTW	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Tire Wear
PM2_5_PMBW	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Brake Wear
PM2_5_TOTAL	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Total
SOx_RUNEX	Sulfur Oxides	Tons Per Day	Running Exhaust
SOx_IDLEX	Sulfur Oxides	Tons Per Day	Idle Exhaust
SOx_STREX	Sulfur Oxides	Tons Per Day	Start Exhaust
SOx_TOTEX	Sulfur Oxides	Tons Per Day	Total
Fuel_GAS	Fuel	1000 Gallons	Gasoline
Fuel_DSL	Fuel	1000 Gallons	Diesel
Fuel_NG	Fuel	1000 Gallons	Natural Gas

Area	Sub-Area	Cal. Year	Season	Veh_Tech	EMFAC2011 Category	Population	Total VMT	CVMT	EVMT	Trips	TOG_RUNEX
TCAG	All Sub-Areas	2035	Annual	T6 Instate Tractor Class 7-Elec	T6 instate heavy-Oth	42.5	3,384.8	0	3,384.8	491.8	
TCAG	All Sub-Areas	2035	Annual	T6 Instate Tractor Class 7-NG	T6 instate heavy-NG	8.15	473.3	473.3	0	94.2	0.0004
TCAG	All Sub-Areas	2035	Annual	T6 OOS Class 4-Dsl	T6 OOS small-Dsl	4.94	360.0	360.0	0	113.5	0.0000
TCAG	All Sub-Areas	2035	Annual	T6 OOS Class 5-Dsl	T6 OOS small-Dsl	6.13	493.9	493.9	0	140.8	0.0000
TCAG	All Sub-Areas	2035	Annual	T6 OOS Class 6-Dsl	T6 OOS small-Dsl	26.9	1,290.6	1,290.6	0	618.8	0.0000
TCAG	All Sub-Areas	2035	Annual	T6 OOS Class 7-Dsl	T6 OOS heavy-Dsl	34.1	9,384.5	9,384.5	0	784.2	0.0001
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 4-Dsl	T6 Public-Dsl	24.5	864.4	864.4	0	125.9	0.0000
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 4-Elec	T6 Public-Oth	6.42	271.1	0	271.1	32.9	
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 4-NG	T6 Public-NG	2.72	101.0	101.0	0	14.0	0.0001
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 5-Dsl	T6 Public-Dsl	51.6	1,801.9	1,801.9	0	264.5	0.0001
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 5-Elec	T6 Public-Oth	13.5	570.0	0	570.0	69.4	
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 5-NG	T6 Public-NG	6.81	241.5	241.5	0	34.9	0.0002
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 6-Dsl	T6 Public-Dsl	62.8	2,232.3	2,232.3	0	322.0	0.0001
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 6-Elec	T6 Public-Oth	16.3	675.9	0	675.9	83.8	
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 6-NG	T6 Public-NG	7.30	270.4	270.4	0	37.5	0.0003
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 7-Dsl	T6 Public-Dsl	89.4	3,760.2	3,760.2	0	458.7	0.0001
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 7-Elec	T6 Public-Oth	20.9	1,173.7	0	1,173.7	107.2	
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 7-NG	T6 Public-NG	11.5	492.0	492.0	0	59.2	0.0005
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 5-Dsl	T6 Utility-Dsl	14.8	587.3	587.3	0	190.0	0.0000
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 5-Elec	T6 Utility-Oth	7.88	335.9	0	335.9	100.8	
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 5-NG	T6 Utility-NG	0.0330	1.31	1.31	0	0.4221	0.0000
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 6-Dsl	T6 Utility-Dsl	2.80	111.0	111.0	0	35.9	0.0000
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 6-Elec	T6 Utility-Oth	1.49	63.4	0	63.4	19.0	
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 6-NG	T6 Utility-NG	0.0066	0.2588	0.2588	0	0.0846	0.0000
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 7-Dsl	T6 Utility-Dsl	3.10	147.7	147.7	0	39.7	0.0000
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 7-Elec	T6 Utility-Oth	1.66	95.0	0	95.0	21.3	
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 7-NG	T6 Utility-NG	0.0070	0.3335	0.3335	0	0.0896	0.0000
TCAG	All Sub-Areas	2035	Annual	T6TS-Elec	T6TS - Gas	71.3	5,904.6	0	5,904.6	1,425.8	
TCAG	All Sub-Areas	2035	Annual	T6TS-Gas	T6TS - Gas	267.7	14,076.4	14,076.4	0	5,356.6	0.0005
TCAG	All Sub-Areas	2035	Annual	T7 CAIRP Class 8-Dsl	T7 CAIRP-Dsl	986.4	199,136.0	199,136.0	0	22,668.2	0.0029
TCAG	All Sub-Areas	2035	Annual	T7 CAIRP Class 8-Elec	T7 CAIRP-Oth	190.6	41,393.0	0	41,393.0	4,380.0	
TCAG	All Sub-Areas	2035	Annual	T7 NNOOS Class 8-Dsl	T7 NNOOS-Dsl	1,015.0	284,379.4	284,379.4	0	23,324.6	0.0040
TCAG	All Sub-Areas	2035	Annual	T7 NOOS Class 8-Dsl	T7 NOOS-Dsl	439.9	103,310.0	103,310.0	0	10,108.6	0.0015
TCAG	All Sub-Areas	2035	Annual	T7 Other Port Class 8-Dsl	T7 Other Port-Dsl	16.9	4,501.3	4,501.3	0	276.6	0.0001
TCAG	All Sub-Areas	2035	Annual	T7 Other Port Class 8-Elec	T7 Other Port-Oth	2.52	819.8	0	819.8	41.2	
TCAG	All Sub-Areas	2035	Annual	T7 POAK Class 8-Dsl	T7 POAK-Dsl	81.9	9,367.1	9,367.1	0	1,340.4	0.0001
TCAG	All Sub-Areas	2035	Annual	T7 POAK Class 8-Elec	T7 POAK-Oth	10.7	1,193.5	0	1,193.5	174.8	
TCAG	All Sub-Areas	2035	Annual	T7 POLA Class 8-Dsl	T7 POLA-Dsl	95.9	17,884.7	17,884.7	0	1,569.7	0.0003
TCAG	All Sub-Areas	2035	Annual	T7 POLA Class 8-Elec	T7 POLA-Oth	7.13	1,287.9	0	1,287.9	116.7	
TCAG	All Sub-Areas	2035	Annual	T7 POLA Class 8-NG	T7 POLA-NG	0.2882	53.5	53.5	0	4.71	0.0001
TCAG	All Sub-Areas	2035	Annual	T7 Public Class 8-Dsl	T7 Public-Dsl	267.0	10,883.8	10,883.8	0	1,369.9	0.0007
TCAG	All Sub-Areas	2035	Annual	T7 Public Class 8-Elec	T7 Public-Oth	57.1	3,222.1	0	3,222.1	292.8	
TCAG	All Sub-Areas	2035	Annual	T7 Public Class 8-NG	T7 Public-NG	28.4	1,191.6	1,191.6	0	145.7	0.0023
TCAG	All Sub-Areas	2035	Annual	T7 SWCV Class 8-Dsl	T7 SWCV-Dsl	104.7	6,796.3	6,796.3	0	481.7	0.0002
TCAG	All Sub-Areas	2035	Annual	T7 SWCV Class 8-Elec	T7 SWCV-Oth	45.0	2,891.0	0	2,891.0	207.2	
TCAG	All Sub-Areas	2035	Annual	T7 SWCV Class 8-NG	T7 SWCV-NG	116.2	7,532.3	7,532.3	0	534.7	0.0091
TCAG	All Sub-Areas	2035	Annual	T7 Single Concrete/Transit Mix Class 8-Dsl	T7 Single-Dsl	12.0	732.7	732.7	0	113.3	0.0000
TCAG	All Sub-Areas	2035	Annual	T7 Single Concrete/Transit Mix Class 8-Elec	Single Concrete/Transit Mix	5.84	433.6	0	433.6	55.0	
TCAG	All Sub-Areas	2035	Annual	T7 Single Concrete/Transit Mix Class 8-NG	T7 Single-NG	0.4577	27.4	27.4	0	4.31	0.0000
TCAG	All Sub-Areas	2035	Annual	T7 Single Dump Class 8-Dsl	T7 Single-Dsl	118.8	5,829.6	5,829.6	0	1,119.5	0.0001
TCAG	All Sub-Areas	2035	Annual	T7 Single Dump Class 8-Elec	T7 Single Dump-Oth	22.9	1,743.6	0	1,743.6	215.5	
TCAG	All Sub-Areas	2035	Annual	T7 Single Dump Class 8-NG	T7 Single-NG	4.24	208.9	208.9	0	39.9	0.0002
TCAG	All Sub-Areas	2035	Annual	T7 Single Other Class 8-Dsl	T7 Single-Dsl	702.3	33,983.8	33,983.8	0	6,616.0	0.0006
TCAG	All Sub-Areas	2035	Annual	T7 Single Other Class 8-Elec	T7 Single Other-Oth	140.1	10,447.8	0	10,447.8	1,319.3	
TCAG	All Sub-Areas	2035	Annual	T7 Single Other Class 8-NG	T7 Single-NG	24.7	1,209.7	1,209.7	0	232.6	0.0014
TCAG	All Sub-Areas	2035	Annual	T7 Tractor Class 8-Dsl	T7 Tractor-Dsl	2,263.3	140,807.5	140,807.5	0	32,885.5	0.0019
TCAG	All Sub-Areas	2035	Annual	T7 Tractor Class 8-Elec	T7 Tractor-Oth	202.4	15,380.3	0	15,380.3	2,940.3	
TCAG	All Sub-Areas	2035	Annual	T7 Tractor Class 8-NG	T7 Tractor-NG	37.0	2,284.9	2,284.9	0	538.1	0.0026
TCAG	All Sub-Areas	2035	Annual	T7 Utility Class 8-Dsl	T7 Utility-Dsl	13.8	567.8	567.8	0	176.4	0.0000
TCAG	All Sub-Areas	2035	Annual	T7 Utility Class 8-Elec	T7 Utility-Oth	2.88	162.2	0	162.2	36.9	
TCAG	All Sub-Areas	2035	Annual	T7IS-Elec	T7IS - Gas	0.0749	17.3	0	17.3	1.50	
TCAG	All Sub-Areas	2035	Annual	T7IS-Gas	T7IS - Gas	0.2993	44.1	44.1	0	5.99	0.0000
TCAG	All Sub-Areas	2035	Annual	UBUS-Dsl	UBUS - Dsl	12.4	1,538.8	1,538.8	0	49.8	0.0001
TCAG	All Sub-Areas	2035	Annual	UBUS-Elec	UBUS - Oth	90.0	7,783.7	0	7,783.7	360.1	
TCAG	All Sub-Areas	2035	Annual	UBUS-Gas	UBUS - Gas	27.4	1,949.6	1,949.6	0	109.5	0.0000
TCAG	All Sub-Areas	2035	Annual	UBUS-NG	UBUS - NG	50.1	6,199.3	6,199.3	0	200.5	0.0160

Planning Inventory Report
Date: 02/01/2022
Time: 11:59:36
EMFAC2021 Version: v1.0.1

Field Name	Pollutant	Units	Process
TOG_RUNEX	Total Organic Gases	Tons Per Day	Running Exhaust
TOG_IDLEX	Total Organic Gases	Tons Per Day	Idle Exhaust
TOG_STREX	Total Organic Gases	Tons Per Day	Start Exhaust
TOG_TOTEX	Total Organic Gases	Tons Per Day	Total Exhaust
TOG_DIURN	Total Organic Gases	Tons Per Day	Diurnal
TOG_HTSK	Total Organic Gases	Tons Per Day	Hot Soak
TOG_RUNLS	Total Organic Gases	Tons Per Day	Running Loss
TOG_TOTAL	Total Organic Gases	Tons Per Day	Total
ROG_RUNEX	Reactive Organic Gases	Tons Per Day	Running Exhaust
ROG_IDLEX	Reactive Organic Gases	Tons Per Day	Idle Exhaust
ROG_STREX	Reactive Organic Gases	Tons Per Day	Start Exhaust
ROG_TOTEX	Reactive Organic Gases	Tons Per Day	Total Exhaust
ROG_DIURN	Reactive Organic Gases	Tons Per Day	Diurnal
ROG_HTSK	Reactive Organic Gases	Tons Per Day	Hot Soak
ROG_RUNLS	Reactive Organic Gases	Tons Per Day	Running Loss
ROG_TOTAL	Reactive Organic Gases	Tons Per Day	Total
CO_RUNEX	Carbon Monoxide	Tons Per Day	Running Exhaust
CO_IDLEX	Carbon Monoxide	Tons Per Day	Idle Exhaust
CO_STREX	Carbon Monoxide	Tons Per Day	Start Exhaust
CO_TOTEX	Carbon Monoxide	Tons Per Day	Total
NOx_RUNEX	Nitrogen Dioxide	Tons Per Day	Running Exhaust
NOx_IDLEX	Nitrogen Dioxide	Tons Per Day	Idle Exhaust
NOx_STREX	Nitrogen Dioxide	Tons Per Day	Start Exhaust
NOx_TOTEX	Nitrogen Dioxide	Tons Per Day	Total
CO2_RUNEX	Carbon Dioxide	Tons Per Day	Running Exhaust
CO2_IDLEX	Carbon Dioxide	Tons Per Day	Idle Exhaust
CO2_STREX	Carbon Dioxide	Tons Per Day	Start Exhaust
CO2_TOTEX	Carbon Dioxide	Tons Per Day	Total
PM10_RUNEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Running Exhaust
PM10_IDLEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Idle Exhaust
PM10_STREX	Fine Particulate Matter (<10 microns)	Tons Per Day	Start Exhaust
PM10_TOTEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Total Exhaust
PM10_PMTW	Fine Particulate Matter (<10 microns)	Tons Per Day	Tire Wear
PM10_PMBW	Fine Particulate Matter (<10 microns)	Tons Per Day	Brake Wear
PM10_TOTAL	Fine Particulate Matter (<10 microns)	Tons Per Day	Total
PM2_5_RUNEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Running Exhaust
PM2_5_IDLEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Idle Exhaust
PM2_5_STREX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Start Exhaust
PM2_5_TOTEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Total Exhaust
PM2_5_PMTW	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Tire Wear
PM2_5_PMBW	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Brake Wear
PM2_5_TOTAL	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Total
SOx_RUNEX	Sulfur Oxides	Tons Per Day	Running Exhaust
SOx_IDLEX	Sulfur Oxides	Tons Per Day	Idle Exhaust
SOx_STREX	Sulfur Oxides	Tons Per Day	Start Exhaust
SOx_TOTEX	Sulfur Oxides	Tons Per Day	Total
Fuel_GAS	Fuel	1000 Gallons	Gasoline
Fuel_DSL	Fuel	1000 Gallons	Diesel
Fuel_NG	Fuel	1000 Gallons	Natural Gas

Area	Sub-Area	Cal. Year	Season	Veh_Tech	EMFAC2011 Category	Population	Total_VMT
TCAG	All Sub-Areas	2035	Annual	All Vehicles	All Vehicles	383,337.5	16,108,885.0
TCAG	All Sub-Areas	2035	Annual	All Other Buses-Dsl	All Other Buses - Dsl	91.2	4,184.3
TCAG	All Sub-Areas	2035	Annual	All Other Buses-NG	All Other Buses - Oth	5.84	257.5
TCAG	All Sub-Areas	2035	Annual	LDA-Dsl	LDA - Dsl	139.3	4,969.9
TCAG	All Sub-Areas	2035	Annual	LDA-Elec	LDA - Oth	17,470.2	790,336.1
TCAG	All Sub-Areas	2035	Annual	LDA-Gas	LDA - Gas	160,158.7	6,823,568.9
TCAG	All Sub-Areas	2035	Annual	LDA-Phe	LDA - Gas	7,062.8	316,242.9
TCAG	All Sub-Areas	2035	Annual	LDT1-Dsl	LDT1 - Dsl	0.0862	3.83
TCAG	All Sub-Areas	2035	Annual	LDT1-Elec	LDT1 - Oth	165.2	8,045.1
TCAG	All Sub-Areas	2035	Annual	LDT1-Gas	LDT1 - Gas	11,412.1	423,463.2
TCAG	All Sub-Areas	2035	Annual	LDT1-Phe	LDT1 - Gas	131.9	6,337.2
TCAG	All Sub-Areas	2035	Annual	LDT2-Dsl	LDT2 - Dsl	284.2	12,162.7
TCAG	All Sub-Areas	2035	Annual	LDT2-Elec	LDT2 - Oth	2,158.4	70,989.6
TCAG	All Sub-Areas	2035	Annual	LDT2-Gas	LDT2 - Gas	82,236.1	3,382,201.9
TCAG	All Sub-Areas	2035	Annual	LDT2-Phe	LDT2 - Gas	1,684.4	76,017.5
TCAG	All Sub-Areas	2035	Annual	LHD1-Dsl	LHD1 - Dsl	4,893.4	158,946.4
TCAG	All Sub-Areas	2035	Annual	LHD1-Elec	LHD1 - Oth	1,340.2	76,889.1
TCAG	All Sub-Areas	2035	Annual	LHD1-Gas	LHD1 - Gas	5,010.8	183,401.9
TCAG	All Sub-Areas	2035	Annual	LHD2-Dsl	LHD2 - Dsl	1,982.5	65,282.8
TCAG	All Sub-Areas	2035	Annual	LHD2-Elec	LHD2 - Oth	325.6	18,017.2
TCAG	All Sub-Areas	2035	Annual	LHD2-Gas	LHD2 - Gas	668.4	22,749.4
TCAG	All Sub-Areas	2035	Annual	MCY-Gas	MCY - Gas	7,517.4	42,041.7
TCAG	All Sub-Areas	2035	Annual	MDV-Dsl	MDV - Dsl	850.6	30,227.2
TCAG	All Sub-Areas	2035	Annual	MDV-Elec	MDV - Oth	2,073.5	67,486.8
TCAG	All Sub-Areas	2035	Annual	MDV-Gas	MDV - Gas	59,948.6	2,243,317.4
TCAG	All Sub-Areas	2035	Annual	MDV-Phe	MDV - Gas	1,104.9	48,578.1
TCAG	All Sub-Areas	2035	Annual	MH-Dsl	MH - Dsl	420.7	3,596.5
TCAG	All Sub-Areas	2035	Annual	MH-Gas	MH - Gas	533.3	5,419.3
TCAG	All Sub-Areas	2035	Annual	Motor Coach-Dsl	Motor Coach - Dsl	27.2	3,288.0
TCAG	All Sub-Areas	2035	Annual	OBUS-Elec	OBUS - Oth	13.2	1,082.0
TCAG	All Sub-Areas	2035	Annual	OBUS-Gas	OBUS - Gas	82.8	2,825.1
TCAG	All Sub-Areas	2035	Annual	PTO-Dsl	PTO-Dsl	0	8,250.8
TCAG	All Sub-Areas	2035	Annual	PTO-Elec	PTO-Oth	0	2,480.6
TCAG	All Sub-Areas	2035	Annual	SBUS-Dsl	SBUS - Dsl	392.5	8,369.6
TCAG	All Sub-Areas	2035	Annual	SBUS-Elec	SBUS - Oth	8.79	2,550.6
TCAG	All Sub-Areas	2035	Annual	SBUS-Gas	SBUS - Gas	119.2	6,518.4
TCAG	All Sub-Areas	2035	Annual	SBUS-NG	SBUS-Oth	108.4	2,403.9
TCAG	All Sub-Areas	2035	Annual	T6 CAIRP Class 4-Dsl	T6 CAIRP small-Dsl	5.69	391.7
TCAG	All Sub-Areas	2035	Annual	T6 CAIRP Class 4-Elec	T6 CAIRP small-Oth	2.67	223.6
TCAG	All Sub-Areas	2035	Annual	T6 CAIRP Class 5-Dsl	T6 CAIRP small-Dsl	7.11	541.4
TCAG	All Sub-Areas	2035	Annual	T6 CAIRP Class 5-Elec	T6 CAIRP small-Oth	3.25	302.7
TCAG	All Sub-Areas	2035	Annual	T6 CAIRP Class 6-Dsl	T6 CAIRP small-Dsl	30.5	1,382.0
TCAG	All Sub-Areas	2035	Annual	T6 CAIRP Class 6-Elec	T6 CAIRP small-Oth	15.2	823.7
TCAG	All Sub-Areas	2035	Annual	T6 CAIRP Class 7-Dsl	T6 CAIRP heavy-Dsl	56.2	11,341.0
TCAG	All Sub-Areas	2035	Annual	T6 CAIRP Class 7-Elec	T6 CAIRP heavy-Oth	11.3	2,494.6
TCAG	All Sub-Areas	2035	Annual	T6 Instate Delivery Class 4-Dsl	T6 instate small-Dsl	67.2	2,209.3
TCAG	All Sub-Areas	2035	Annual	T6 Instate Delivery Class 4-Elec	T6 instate small-Oth	22.5	868.6
TCAG	All Sub-Areas	2035	Annual	T6 Instate Delivery Class 5-Dsl	T6 instate small-Dsl	47.5	1,555.4
TCAG	All Sub-Areas	2035	Annual	T6 Instate Delivery Class 5-Elec	T6 instate small-Oth	15.7	606.1
TCAG	All Sub-Areas	2035	Annual	T6 Instate Delivery Class 6-Dsl	T6 instate small-Dsl	288.8	9,458.6
TCAG	All Sub-Areas	2035	Annual	T6 Instate Delivery Class 6-Elec	T6 instate small-Oth	95.8	3,689.8
TCAG	All Sub-Areas	2035	Annual	T6 Instate Delivery Class 7-Dsl	T6 instate heavy-Dsl	66.0	3,247.7
TCAG	All Sub-Areas	2035	Annual	T6 Instate Delivery Class 7-Elec	T6 instate heavy-Oth	13.6	716.1
TCAG	All Sub-Areas	2035	Annual	T6 Instate Delivery Class 7-NG	T6 instate heavy-NG	0.8530	44.0
TCAG	All Sub-Areas	2035	Annual	T6 Instate Other Class 4-Dsl	T6 instate small-Dsl	385.6	15,034.6
TCAG	All Sub-Areas	2035	Annual	T6 Instate Other Class 4-Elec	T6 instate small-Oth	132.3	6,294.9
TCAG	All Sub-Areas	2035	Annual	T6 Instate Other Class 5-Dsl	T6 instate small-Dsl	962.4	37,352.8
TCAG	All Sub-Areas	2035	Annual	T6 Instate Other Class 5-Elec	T6 instate small-Oth	329.2	15,694.2
TCAG	All Sub-Areas	2035	Annual	T6 Instate Other Class 6-Dsl	T6 instate small-Dsl	850.0	33,216.8
TCAG	All Sub-Areas	2035	Annual	T6 Instate Other Class 6-Elec	T6 instate small-Oth	290.1	13,772.0
TCAG	All Sub-Areas	2035	Annual	T6 Instate Other Class 7-Dsl	T6 instate heavy-Dsl	687.6	24,960.0
TCAG	All Sub-Areas	2035	Annual	T6 Instate Other Class 7-Elec	T6 instate heavy-Oth	126.7	8,262.1
TCAG	All Sub-Areas	2035	Annual	T6 Instate Other Class 7-NG	T6 instate heavy-NG	12.1	501.7
TCAG	All Sub-Areas	2035	Annual	T6 Instate Tractor Class 6-Dsl	T6 instate small-Dsl	13.6	616.4
TCAG	All Sub-Areas	2035	Annual	T6 Instate Tractor Class 6-Elec	T6 instate small-Oth	4.48	270.1
TCAG	All Sub-Areas	2035	Annual	T6 Instate Tractor Class 7-Dsl	T6 instate heavy-Dsl	450.6	24,361.8
TCAG	All Sub-Areas	2035	Annual	T6 Instate Tractor Class 7-Elec	T6 instate heavy-Oth	42.1	3,349.4
TCAG	All Sub-Areas	2035	Annual	T6 Instate Tractor Class 7-NG	T6 instate heavy-NG	8.06	468.3
TCAG	All Sub-Areas	2035	Annual	T6 OOS Class 4-Dsl	T6 OOS small-Dsl	4.89	356.3
TCAG	All Sub-Areas	2035	Annual	T6 OOS Class 5-Dsl	T6 OOS small-Dsl	6.06	488.8
TCAG	All Sub-Areas	2035	Annual	T6 OOS Class 6-Dsl	T6 OOS small-Dsl	26.6	1,277.1
TCAG	All Sub-Areas	2035	Annual	T6 OOS Class 7-Dsl	T6 OOS heavy-Dsl	33.8	9,286.3
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 4-Dsl	T6 Public-Dsl	24.3	855.4
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 4-Elec	T6 Public-Oth	6.35	268.2
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 4-NG	T6 Public-NG	2.70	99.9
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 5-Dsl	T6 Public-Dsl	51.0	1,783.0
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 5-Elec	T6 Public-Oth	13.4	564.0
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 5-NG	T6 Public-NG	6.73	239.0
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 6-Dsl	T6 Public-Dsl	62.1	2,209.0
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 6-Elec	T6 Public-Oth	16.2	668.8
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 6-NG	T6 Public-NG	7.23	267.5
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 7-Dsl	T6 Public-Dsl	88.5	3,720.9
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 7-Elec	T6 Public-Oth	20.7	1,161.4
TCAG	All Sub-Areas	2035	Annual	T6 Public Class 7-NG	T6 Public-NG	11.4	486.9
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 5-Dsl	T6 Utility-Dsl	14.7	581.1
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 5-Elec	T6 Utility-Oth	7.80	332.4
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 5-NG	T6 Utility-NG	0.0326	1.30
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 6-Dsl	T6 Utility-Dsl	2.77	109.9
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 6-Elec	T6 Utility-Oth	1.47	62.7
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 6-NG	T6 Utility-NG	0.0065	0.2561
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 7-Dsl	T6 Utility-Dsl	3.07	146.2
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 7-Elec	T6 Utility-Oth	1.64	94.0
TCAG	All Sub-Areas	2035	Annual	T6 Utility Class 7-NG	T6 Utility-NG	0.0069	0.3300
TCAG	All Sub-Areas	2035	Annual	T6TS-Elec	T6TS - Gas	70.5	5,842.8
TCAG	All Sub-Areas	2035	Annual	T6TS-Gas	T6TS - Gas	264.9	13,929.1
TCAG	All Sub-Areas	2035	Annual	T7 CAIRP Class 8-Dsl	T7 CAIRP-Dsl	976.1	197,053.0
TCAG	All Sub-Areas	2035	Annual	T7 CAIRP Class 8-Elec	T7 CAIRP-Oth	188.6	40,960.0
TCAG	All Sub-Areas	2035	Annual	T7 NNOOS Class 8-Dsl	T7 NNOOS-Dsl	1,004.4	281,404.7
TCAG	All Sub-Areas	2035	Annual	T7 NOOS Class 8-Dsl	T7 NOOS-Dsl	435.3	102,229.3
TCAG	All Sub-Areas	2035	Annual	T7 Other Port Class 8-Dsl	T7 Other Port-Dsl	16.7	4,454.2
TCAG	All Sub-Areas	2035	Annual	T7 Other Port Class 8-Elec	T7 Other Port-Oth	2.49	811.3
TCAG	All Sub-Areas	2035	Annual	T7 POAK Class 8-Dsl	T7 POAK-Dsl	81.1	9,269.2
TCAG	All Sub-Areas	2035	Annual	T7 POAK Class 8-Elec	T7 POAK-Oth	10.6	1,181.0
TCAG	All Sub-Areas	2035	Annual	T7 POLA Class 8-Dsl	T7 POLA-Dsl	94.9	17,697.6
TCAG	All Sub-Areas	2035	Annual	T7 POLA Class 8-Elec	T7 POLA-Oth	7.06	1,274.4
TCAG	All Sub-Areas	2035	Annual	T7 POLA Class 8-NG	T7 POLA-NG	0.2852	53.0
TCAG	All Sub-Areas	2035	Annual	T7 Public Class 8-Dsl	T7 Public-Dsl	264.3	10,770.0
TCAG	All Sub-Areas	2035	Annual	T7 Public Class 8-Elec	T7 Public-Oth	56.5	3,188.4
TCAG	All Sub-Areas	2035	Annual	T7 Public Class 8-NG	T7 Public-NG	28.1	1,179.1
TCAG	All Sub-Areas	2035	Annual	T7 SWCV Class 8-Dsl	T7 SWCV-Dsl	103.6	6,725.2
TCAG	All Sub-Areas	2035	Annual	T7 SWCV Class 8-Elec	T7 SWCV-Oth	44.6	2,860.7
TCAG	All Sub-Areas	2035	Annual	T7 SWCV Class 8-NG	T7 SWCV-NG	115.0	7,453.5
TCAG	All Sub-Areas	2035	Annual	T7 Single Concrete/Transit Mix Class 8-Dsl	T7 Single-Dsl	11.9	725.0
TCAG	All Sub-Areas	2035	Annual	T7 Single Concrete/Transit Mix Class 8-Elec	Single Concrete/Transit Mix	5.78	429.1
TCAG	All Sub-Areas	2035	Annual	T7 Single Concrete/Transit Mix Class 8-NG	T7 Single-NG	0.4529	27.1
TCAG	All Sub-Areas	2035	Annual	T7 Single Dump Class 8-Dsl	T7 Single-Dsl	117.6	5,768.6
TCAG	All Sub-Areas	2035	Annual	T7 Single Dump Class 8-Elec	T7 Single Dump-Oth	22.6	1,725.3
TCAG	All Sub-Areas	2035	Annual	T7 Single Dump Class 8-NG	T7 Single-NG	4.19	206.7
TCAG	All Sub-Areas	2035	Annual	T7 Single Other Class 8-Dsl	T7 Single-Dsl	695.0	33,628.3
TCAG	All Sub-Areas	2035	Annual	T7 Single Other Class 8-Elec	T7 Single Other-Oth	138.6	10,338.5
TCAG	All Sub-Areas	2035	Annual	T7 Single Other Class 8-NG	T7 Single-NG	24.4	1,197.0
TCAG	All Sub-Areas	2035	Annual	T7 Tractor Class 8-Dsl	T7 Tractor-Dsl	2,239.6	139,334.6
TCAG	All Sub-Areas	2035	Annual	T7 Tractor Class 8-Elec	T7 Tractor-Oth	200.2	15,219.5
TCAG	All Sub-Areas	2035	Annual	T7 Tractor Class 8-NG	T7 Tractor-NG	36.6	2,261.0
TCAG	All Sub-Areas	2035	Annual	T7 Utility Class 8-Dsl	T7 Utility-Dsl	13.6	561.9
TCAG	All Sub-Areas	2035	Annual	T7 Utility Class 8-Elec	T7 Utility-Oth	2.85	160.5
TCAG	All Sub-Areas	2035	Annual	T7IS-Elec	T7IS - Gas	0.0741	17.1
TCAG	All Sub-Areas	2035	Annual	T7IS-Gas	T7IS - Gas	0.2961	43.6
TCAG	All Sub-Areas	2035	Annual	UBUS-Dsl	UBUS - Dsl	12.3	1,522.7
TCAG	All Sub-Areas	2035	Annual	UBUS-Elec	UBUS - Oth	89.1	7,702.3
TCAG	All Sub-Areas	2035	Annual	UBUS-Gas	UBUS - Gas	27.1	1,929.2
TCAG	All Sub-Areas	2035	Annual	UBUS-NG	UBUS - NG	49.6	6,134.4

Planning Inventory Report
Date: 02/01/2022
Time: 11:58:56
EMFAC2021 Version: v1.0.1

Field Name	Pollutant	Units	Process
TOG_RUNEX	Total Organic Gases	Tons Per Day	Running Exhaust
TOG_IDLEX	Total Organic Gases	Tons Per Day	Idle Exhaust
TOG_STREX	Total Organic Gases	Tons Per Day	Start Exhaust
TOG_TOTEX	Total Organic Gases	Tons Per Day	Total Exhaust
TOG_DIURN	Total Organic Gases	Tons Per Day	Diurnal
TOG_HTSK	Total Organic Gases	Tons Per Day	Hot Soak
TOG_RUNLS	Total Organic Gases	Tons Per Day	Running Loss
TOG_TOTAL	Total Organic Gases	Tons Per Day	Total
ROG_RUNEX	Reactive Organic Gases	Tons Per Day	Running Exhaust
ROG_IDLEX	Reactive Organic Gases	Tons Per Day	Idle Exhaust
ROG_STREX	Reactive Organic Gases	Tons Per Day	Start Exhaust
ROG_TOTEX	Reactive Organic Gases	Tons Per Day	Total Exhaust
ROG_DIURN	Reactive Organic Gases	Tons Per Day	Diurnal
ROG_HTSK	Reactive Organic Gases	Tons Per Day	Hot Soak
ROG_RUNLS	Reactive Organic Gases	Tons Per Day	Running Loss
ROG_TOTAL	Reactive Organic Gases	Tons Per Day	Total
CO_RUNEX	Carbon Monoxide	Tons Per Day	Running Exhaust
CO_IDLEX	Carbon Monoxide	Tons Per Day	Idle Exhaust
CO_STREX	Carbon Monoxide	Tons Per Day	Start Exhaust
CO_TOTEX	Carbon Monoxide	Tons Per Day	Total
NOx_RUNEX	Nitrogen Dioxide	Tons Per Day	Running Exhaust
NOx_IDLEX	Nitrogen Dioxide	Tons Per Day	Idle Exhaust
NOx_STREX	Nitrogen Dioxide	Tons Per Day	Start Exhaust
NOx_TOTEX	Nitrogen Dioxide	Tons Per Day	Total
CO2_RUNEX	Carbon Dioxide	Tons Per Day	Running Exhaust
CO2_IDLEX	Carbon Dioxide	Tons Per Day	Idle Exhaust
CO2_STREX	Carbon Dioxide	Tons Per Day	Start Exhaust
CO2_TOTEX	Carbon Dioxide	Tons Per Day	Total
PM10_RUNEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Running Exhaust
PM10_IDLEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Idle Exhaust
PM10_STREX	Fine Particulate Matter (<10 microns)	Tons Per Day	Start Exhaust
PM10_TOTEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Total Exhaust
PM10_PMTW	Fine Particulate Matter (<10 microns)	Tons Per Day	Tire Wear
PM10_PMBW	Fine Particulate Matter (<10 microns)	Tons Per Day	Brake Wear
PM10_TOTAL	Fine Particulate Matter (<10 microns)	Tons Per Day	Total
PM2_5_RUNEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Running Exhaust
PM2_5_IDLEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Idle Exhaust
PM2_5_STREX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Start Exhaust
PM2_5_TOTEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Total Exhaust
PM2_5_PMTW	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Tire Wear
PM2_5_PMBW	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Brake Wear
PM2_5_TOTAL	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Total
SOx_RUNEX	Sulfur Oxides	Tons Per Day	Running Exhaust
SOx_IDLEX	Sulfur Oxides	Tons Per Day	Idle Exhaust
SOx_STREX	Sulfur Oxides	Tons Per Day	Start Exhaust
SOx_TOTEX	Sulfur Oxides	Tons Per Day	Total
Fuel_GAS	Fuel	1000 Gallons	Gasoline
Fuel_DSL	Fuel	1000 Gallons	Diesel
Fuel_NG	Fuel	1000 Gallons	Natural Gas

Area	Sub-Area	Cal. Year	Season	Veh_Tech	EMFAC2011 Category	Population	Total_VMT	cVMT	eVMT	Trips	TOG_RUNEX
TCAG	All Sub-Areas	2046	Annual	All Vehicles	All Vehicles	406,238.5	17,128,558.0	15,103,774.6	2,024,783.4	2,119,527.2	0.1655
TCAG	All Sub-Areas	2046	Annual	All Other Buses-Dsl	All Other Buses - Dsl	98.5	4,329.2	4,329.2	0	876.3	0.0002
TCAG	All Sub-Areas	2046	Annual	All Other Buses-NG	All Other Buses - Oth	7.51	308.4	308.4	0	66.8	0.0003
TCAG	All Sub-Areas	2046	Annual	LDA-Dsl	LDA - Dsl	104.2	4,137.5	4,137.5	0	468.8	0.0000
TCAG	All Sub-Areas	2046	Annual	LDA-Elec	LDA - Oth	22,997.3	956,439.7	0	956,439.7	107,275.5	
TCAG	All Sub-Areas	2046	Annual	LDA-Gas	LDA - Gas	168,579.0	7,132,042.8	7,132,042.8	0	777,906.6	0.0307
TCAG	All Sub-Areas	2046	Annual	LDA-Phe	LDA - Gas	7,925.2	337,652.9	137,835.0	199,817.9	32,770.6	0.0005
TCAG	All Sub-Areas	2046	Annual	LDT1-Dsl	LDT1 - Dsl	0.1209	4.88	4.88	0	0.5562	0.0000
TCAG	All Sub-Areas	2046	Annual	LDT1-Elec	LDT1 - Oth	308.9	12,956.6	0	12,956.6	1,445.1	
TCAG	All Sub-Areas	2046	Annual	LDT1-Gas	LDT1 - Gas	10,748.3	416,668.0	416,668.0	0	48,320.2	0.0020
TCAG	All Sub-Areas	2046	Annual	LDT1-Phe	LDT1 - Gas	237.3	9,903.8	4,032.6	5,871.3	981.2	0.0000
TCAG	All Sub-Areas	2046	Annual	LDT2-Dsl	LDT2 - Dsl	339.4	13,788.5	13,788.5	0	1,563.1	0.0002
TCAG	All Sub-Areas	2046	Annual	LDT2-Elec	LDT2 - Oth	3,501.7	101,587.4	0	101,587.4	16,378.7	
TCAG	All Sub-Areas	2046	Annual	LDT2-Gas	LDT2 - Gas	90,447.0	3,632,514.3	3,632,514.3	0	413,619.7	0.0220
TCAG	All Sub-Areas	2046	Annual	LDT2-Phe	LDT2 - Gas	2,414.9	98,962.3	40,383.0	58,579.3	9,985.6	0.0002
TCAG	All Sub-Areas	2046	Annual	LHD1-Dsl	LHD1 - Dsl	2,687.0	88,555.9	88,555.9	0	33,798.5	0.0112
TCAG	All Sub-Areas	2046	Annual	LHD1-Elec	LHD1 - Oth	3,630.1	167,905.9	0	167,905.9	51,031.2	
TCAG	All Sub-Areas	2046	Annual	LHD1-Gas	LHD1 - Gas	3,578.5	130,168.8	130,168.8	0	53,314.7	0.0009
TCAG	All Sub-Areas	2046	Annual	LHD2-Dsl	LHD2 - Dsl	1,334.0	42,005.7	42,005.7	0	16,779.5	0.0070
TCAG	All Sub-Areas	2046	Annual	LHD2-Elec	LHD2 - Oth	858.7	38,723.4	0	38,723.4	11,362.9	
TCAG	All Sub-Areas	2046	Annual	LHD2-Gas	LHD2 - Gas	407.0	14,274.8	14,274.8	0	6,063.4	0.0001
TCAG	All Sub-Areas	2046	Annual	MCY-Gas	MCY - Gas	7,452.5	41,696.5	41,696.5	0	14,905.1	0.0418
TCAG	All Sub-Areas	2046	Annual	MDV-Dsl	MDV - Dsl	636.6	23,722.5	23,722.5	0	2,816.8	0.0001
TCAG	All Sub-Areas	2046	Annual	MDV-Elec	MDV - Oth	3,248.4	93,079.6	0	93,079.6	15,127.3	
TCAG	All Sub-Areas	2046	Annual	MDV-Gas	MDV - Gas	55,469.1	2,126,365.5	2,126,365.5	0	248,446.3	0.0148
TCAG	All Sub-Areas	2046	Annual	MDV-Phe	MDV - Gas	1,550.8	62,279.5	25,447.9	36,831.6	6,412.4	0.0001
TCAG	All Sub-Areas	2046	Annual	MH-Dsl	MH - Dsl	302.6	2,863.5	2,863.5	0	30.3	0.0003
TCAG	All Sub-Areas	2046	Annual	MH-Gas	MH - Gas	419.4	4,748.1	4,748.1	0	42.0	0.0001
TCAG	All Sub-Areas	2046	Annual	Motor Coach-Dsl	Motor Coach - Dsl	27.7	3,512.6	3,512.6	0	636.1	0.0000
TCAG	All Sub-Areas	2046	Annual	OBUS-Elec	OBUS - Oth	29.2	2,018.2	0	2,018.2	583.8	
TCAG	All Sub-Areas	2046	Annual	OBUS-Gas	OBUS - Gas	52.3	1,760.7	1,760.7	0	1,047.0	0.0001
TCAG	All Sub-Areas	2046	Annual	PTO-Dsl	PTO-Dsl	0	6,952.8	6,952.8	0		0.0001
TCAG	All Sub-Areas	2046	Annual	PTO-Elec	PTO-Oth	0	6,559.4	0	6,559.4		
TCAG	All Sub-Areas	2046	Annual	SBUS-Dsl	SBUS - Dsl	272.4	5,570.5	5,570.5	0	3,944.5	0.0000
TCAG	All Sub-Areas	2046	Annual	SBUS-Elec	SBUS - Oth	20.6	6,639.5	0	6,639.5	3,370.8	
TCAG	All Sub-Areas	2046	Annual	SBUS-Gas	SBUS - Gas	35.6	1,921.8	1,921.8	0	142.3	0.0000
TCAG	All Sub-Areas	2046	Annual	SBUS-NG	SBUS-Oth	90.2	1,809.3	1,809.3	0	1,306.5	0.0047
TCAG	All Sub-Areas	2046	Annual	T6 CAIRP Class 4-Dsl	T6 CAIRP small-Dsl	4.76	349.9	349.9	0	109.3	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 CAIRP Class 4-Elec	T6 CAIRP small-Oth	6.57	510.9	0	510.9	151.1	
TCAG	All Sub-Areas	2046	Annual	T6 CAIRP Class 5-Dsl	T6 CAIRP small-Dsl	5.85	480.6	480.6	0	134.3	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 CAIRP Class 5-Elec	T6 CAIRP small-Oth	8.05	700.3	0	700.3	185.1	
TCAG	All Sub-Areas	2046	Annual	T6 CAIRP Class 6-Dsl	T6 CAIRP small-Dsl	26.6	1,251.6	1,251.6	0	610.3	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 CAIRP Class 6-Elec	T6 CAIRP small-Oth	36.9	1,834.1	0	1,834.1	848.1	
TCAG	All Sub-Areas	2046	Annual	T6 CAIRP Class 7-Dsl	T6 CAIRP heavy-Dsl	70.9	14,634.8	14,634.8	0	1,629.4	0.0001
TCAG	All Sub-Areas	2046	Annual	T6 CAIRP Class 7-Elec	T6 CAIRP heavy-Oth	22.1	4,720.1	0	4,720.1	506.8	
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 4-Dsl	T6 instate small-Dsl	60.2	1,996.0	1,996.0	0	859.4	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 4-Elec	T6 instate small-Oth	65.2	2,309.7	0	2,309.7	930.4	
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 5-Dsl	T6 instate small-Dsl	42.2	1,400.4	1,400.4	0	602.7	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 5-Elec	T6 instate small-Oth	45.8	1,623.4	0	1,623.4	653.9	
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 6-Dsl	T6 instate small-Dsl	256.8	8,514.7	8,514.7	0	3,665.1	0.0001
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 6-Elec	T6 instate small-Oth	279.3	9,878.8	0	9,878.8	3,985.9	
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 7-Dsl	T6 instate heavy-Dsl	64.1	3,270.0	3,270.0	0	915.2	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 7-Elec	T6 instate heavy-Oth	42.2	2,269.3	0	2,269.3	602.7	
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 7-NG	T6 instate heavy-NG	1.30	67.3	67.3	0	18.5	0.0001
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 4-Dsl	T6 instate small-Dsl	343.6	13,445.9	13,445.9	0	3,971.7	0.0001
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 4-Elec	T6 instate small-Oth	372.4	16,392.4	0	16,392.4	4,304.9	
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 5-Dsl	T6 instate small-Dsl	853.7	33,426.3	33,426.3	0	9,869.3	0.0002
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 5-Elec	T6 instate small-Oth	925.7	40,782.2	0	40,782.2	10,701.5	
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 6-Dsl	T6 instate small-Dsl	757.9	29,642.4	29,642.4	0	8,761.0	0.0002
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 6-Elec	T6 instate small-Oth	820.4	36,091.3	0	36,091.3	9,483.5	
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 7-Dsl	T6 instate heavy-Dsl	626.6	25,522.3	25,522.3	0	7,243.2	0.0002
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 7-Elec	T6 instate heavy-Oth	388.5	21,063.9	0	21,063.9	4,491.4	
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 7-NG	T6 instate heavy-NG	14.1	590.7	590.7	0	163.1	0.0005
TCAG	All Sub-Areas	2046	Annual	T6 Instate Tractor Class 6-Dsl	T6 instate small-Dsl	12.1	548.3	548.3	0	139.3	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 Instate Tractor Class 6-Elec	T6 instate small-Oth	13.1	691.8	0	691.8	151.0	
TCAG	All Sub-Areas	2046	Annual	T6 Instate Tractor Class 7-Dsl	T6 instate heavy-Dsl	526.1	30,897.2	30,897.2	0	6,081.5	0.0003
TCAG	All Sub-Areas	2046	Annual	T6 Instate Tractor Class 7-Elec	T6 instate heavy-Oth	111.7	7,806.4	0	7,806.4	1,290.7	
TCAG	All Sub-Areas	2046	Annual	T6 Instate Tractor Class 7-NG	T6 instate heavy-NG	12.0	717.4	717.4	0	138.8	0.0006
TCAG	All Sub-Areas	2046	Annual	T6 OOS Class 4-Dsl	T6 OOS small-Dsl	6.66	498.4	498.4	0	153.1	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 OOS Class 5-Dsl	T6 OOS small-Dsl	8.19	683.7	683.7	0	188.2	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 OOS Class 6-Dsl	T6 OOS small-Dsl	37.2	1,786.6	1,786.6	0	854.0	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 OOS Class 7-Dsl	T6 OOS heavy-Dsl	45.9	12,990.8	12,990.8	0	1,055.1	0.0001
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 4-Dsl	T6 Public-Dsl	17.5	594.7	594.7	0	89.5	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 4-Elec	T6 Public-Oth	15.4	602.8	0	602.8	78.9	
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 4-NG	T6 Public-NG	2.32	79.9	79.9	0	11.9	0.0001
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 5-Dsl	T6 Public-Dsl	37.0	1,258.3	1,258.3	0	189.7	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 5-Elec	T6 Public-Oth	32.3	1,265.6	0	1,265.6	165.8	
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 5-NG	T6 Public-NG	5.17	176.2	176.2	0	26.5	0.0002
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 6-Dsl	T6 Public-Dsl	45.1	1,534.5	1,534.5	0	231.3	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 6-Elec	T6 Public-Oth	39.5	1,540.3	0	1,540.3	202.8	
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 6-NG	T6 Public-NG	6.11	209.1	209.1	0	31.3	0.0002
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 7-Dsl	T6 Public-Dsl	69.5	2,888.1	2,888.1	0	356.4	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 7-Elec	T6 Public-Oth	48.3	2,313.6	0	2,313.6	248.0	
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 7-NG	T6 Public-NG	9.72	404.2	404.2	0	49.8	0.0004
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 5-Dsl	T6 Utility-Dsl	9.76	387.7	387.7	0	124.9	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 5-Elec	T6 Utility-Oth	13.8	566.6	0	566.6	176.5	
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 5-NG	T6 Utility-NG	0.0220	0.8753	0.8753	0	0.2820	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 6-Dsl	T6 Utility-Dsl	1.84	73.3	73.3	0	23.6	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 6-Elec	T6 Utility-Oth	2.61	107.1	0	107.1	33.4	
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 6-NG	T6 Utility-NG	0.0042	0.1654	0.1654	0	0.0533	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 7-Dsl	T6 Utility-Dsl	2.05	100.6	100.6	0	26.3	0.0000
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 7-Elec	T6 Utility-Oth	2.90	150.3	0	150.3	37.1	
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 7-NG	T6 Utility-NG	0.0046	0.2270	0.2270	0	0.0593	0.0000
TCAG	All Sub-Areas	2046	Annual	T6TS-Elec	T6TS - Gas	167.8	11,532.4	0	11,532.4	3,356.7	
TCAG	All Sub-Areas	2046	Annual	T6TS-Gas	T6TS - Gas	189.4	9,696.0	9,696.0	0	3,789.4	0.0002
TCAG	All Sub-Areas	2046	Annual	T7 CAIRP Class 8-Dsl	T7 CAIRP-Dsl	1,165.9	240,264.9	240,264.9	0	26,792.8	0.0034
TCAG	All Sub-Areas	2046	Annual	T7 CAIRP Class 8-Elec	T7 CAIRP-Oth	321.9	68,810.9	0	68,810.9	7,397.7	
TCAG	All Sub-Areas	2046	Annual	T7 NNOOS Class 8-Dsl	T7 NNOOS-Dsl	1,287.8	365,422.9	365,422.9	0	29,593.7	0.0051
TCAG	All Sub-Areas	2046	Annual	T7 NOOS Class 8-Dsl	T7 NOOS-Dsl	555.1	132,751.6	132,751.6	0	12,755.2	0.0019
TCAG	All Sub-Areas	2046	Annual	T7 Other Port Class 8-Dsl	T7 Other Port-Dsl	18.1	4,352.7	4,352.7	0	296.1	0.0001
TCAG	All Sub-Areas	2046	Annual	T7 Other Port Class 8-Elec	T7 Other Port-Oth	4.18	1,101.8	0	1,101.8	68.4	
TCAG	All Sub-Areas	2046	Annual	T7 POAK Class 8-Dsl	T7 POAK-Dsl	92.9	10,772.6	10,772.6	0	1,519.8	0.0001
TCAG	All Sub-Areas	2046	Annual	T7 POAK Class 8-Elec	T7 POAK-Oth	21.6	2,480.4	0	2,480.4	353.9	
TCAG	All Sub-Areas	2046	Annual	T7 POLA Class 8-Dsl	T7 POLA-Dsl	87.1	16,160.2	16,160.2	0	1,425.5	0.0002
TCAG	All Sub-Areas	2046	Annual	T7 POLA Class 8-Elec	T7 POLA-Oth	15.8	2,904.6	0	2,904.6	259.1	
TCAG	All Sub-Areas	2046	Annual	T7 POLA Class 8-NG	T7 POLA-NG	0.4090	75.8	75.8	0	6.69	0.0001
TCAG	All Sub-Areas	2046	Annual	T7 Public Class 8-Dsl	T7 Public-Dsl	209.5	8,363.5	8,363.5	0	1,074.6	0.0003
TCAG	All Sub-Areas	2046	Annual	T7 Public Class 8-Elec	T7 Public-Oth	136.3	6,405.5	0	6,405.5	699.3	
TCAG	All Sub-Areas	2046	Annual	T7 Public Class 8-NG	T7 Public-NG	25.8	1,036.0	1,036.0	0	132.2	0.0020
TCAG	All Sub-Areas	2046	Annual	T7 SWCV Class 8-Dsl	T7 SWCV-Dsl	44.7	2,901.7	2,901.7	0	205.6	0.0001
TCAG	All Sub-Areas	2046	Annual	T7 SWCV Class 8-Elec	T7 SWCV-Oth	113.0	7,303.4	0	7,303.4	520.0	
TCAG	All Sub-Areas	2046	Annual	T7 SWCV Class 8-NG	T7 SWCV-NG	117.1	7,585.5	7,585.5	0	538.7	0.0039
TCAG	All Sub-Areas	2046	Annual	T7 Single Concrete/Transit Mix Class 8-Dsl	T7 Single-Dsl	8.27	516.0	516.0	0	77.9	0.0000
TCAG	All Sub-Areas	2046	Annual	T7 Single Concrete/Transit Mix Class 8-Elec	Single Concrete/Transit Mix	10.6	715.5	0	715.5	100.1	
TCAG	All Sub-Areas	2046	Annual	T7 Single Concrete/Transit Mix Class 8-NG	T7 Single-NG	0.3022	18.8	18.8	0	2.85	0.0000
TCAG	All Sub-Areas	2046	Annual	T7 Single Dump Class 8-Dsl	T7 Single-Dsl	85.8	4,168.5	4,168.5	0	808.0	0.0001
TCAG	All Sub-Areas	2046	Annual	T7 Single Dump Class 8-Elec	T7 Single Dump-Oth	60.6	3,832.1	0	3,832.1	570.9	
TCAG	All Sub-Areas	2046	Annual	T7 Single Dump Class 8-NG	T7 Single-NG	3.09	150.8	150.8	0	29.1	0.0002
TCAG	All Sub-Areas	2046	Annual	T7 Single Other Class 8-Dsl	T7 Single-Dsl	575.7	29,110.9	29,110.9	0	5,423.3	0.0004
TCAG	All Sub-Areas	2046	Annual	T7 Single Other Class 8-Elec	T7 Single Other-Oth	437.9	28,486.9	0	28,486.9	4,125.1	
TCAG	All Sub-Areas	2046	Annual	T7 Single Other Class 8-NG	T7 Single-NG	20.7	1,050.5	1,050.5	0	194.6	0.0013
TCAG	All Sub-Areas	2046	Annual	T7 Tractor Class 8-Dsl	T7 Tractor-Dsl	2,651.9	167,634.3	167,634.3	0	38,531.8	0.0022
TCAG	All Sub-Areas	2046	Annual	T7 Tractor Class 8-Elec	T7 Tractor-Oth	476.5	33,370.9	0	33,370.9	6,923.3	
TCAG	All Sub-Areas	2046	Annual	T7 Tractor Class 8-NG	T7 Tractor-NG	41.7	2,629.7	2,629.7	0	605.4	0.0030
TCAG	All Sub-Areas	2046	Annual	T7 Utility Class 8-Dsl	T7 Utility-Dsl	10.3	422.2	422.2	0	132.1	0.0000
TCAG	All Sub-Areas	2046	Annual	T7 Utility Class 8-Elec	T7 Utility-Oth	7.03	332.0	0	332.0	90.0	
TCAG	All Sub-Areas	2046	Annual	T7IS-Elec	T7IS - Gas	0.2249	37.0	0	37.0	4.50	
TCAG	All Sub-Areas	2046	Annual	T7IS-Gas	T7IS - Gas	0.2661	33.5	33.5	0	5.32	0.0000
TCAG	All Sub-Areas	2046	Annual	UBUS-Dsl	UBUS - Dsl	0.8280	59.8	59.8	0	3.31	0.0000
TCAG	All Sub-Areas	2046	Annual	UBUS-Elec	UBUS - Oth	173.7	17,239.2	0	17,239.2	694.8	
TCAG	All Sub-Areas	2046	Annual	UBUS-Gas	UBUS - Gas	8.07	511.1	511.1	0	32.3	0.0000
TCAG	All Sub-Areas	2046	Annual	UBUS-NG	UBUS - NG	3.34	240.8	240.8	0	13.3	0.0000

Planning Inventory Report
Date: 02/01/2022
Time: 11:58:24
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Field Name	Pollutant	Units	Process
TOG_RUNEX	Total Organic Gases	Tons Per Day	Running Exhaust
TOG_IDLEX	Total Organic Gases	Tons Per Day	Idle Exhaust
TOG_STREX	Total Organic Gases	Tons Per Day	Start Exhaust
TOG_TOTEX	Total Organic Gases	Tons Per Day	Total Exhaust
TOG_DIURN	Total Organic Gases	Tons Per Day	Diurnal
TOG_HTSK	Total Organic Gases	Tons Per Day	Hot Soak
TOG_RUNLS	Total Organic Gases	Tons Per Day	Running Loss
TOG_TOTAL	Total Organic Gases	Tons Per Day	Total
ROG_RUNEX	Reactive Organic Gases	Tons Per Day	Running Exhaust
ROG_IDLEX	Reactive Organic Gases	Tons Per Day	Idle Exhaust
ROG_STREX	Reactive Organic Gases	Tons Per Day	Start Exhaust
ROG_TOTEX	Reactive Organic Gases	Tons Per Day	Total Exhaust
ROG_DIURN	Reactive Organic Gases	Tons Per Day	Diurnal
ROG_HTSK	Reactive Organic Gases	Tons Per Day	Hot Soak
ROG_RUNLS	Reactive Organic Gases	Tons Per Day	Running Loss
ROG_TOTAL	Reactive Organic Gases	Tons Per Day	Total
CO_RUNEX	Carbon Monoxide	Tons Per Day	Running Exhaust
CO_IDLEX	Carbon Monoxide	Tons Per Day	Idle Exhaust
CO_STREX	Carbon Monoxide	Tons Per Day	Start Exhaust
CO_TOTEX	Carbon Monoxide	Tons Per Day	Total
NOx_RUNEX	Nitrogen Dioxide	Tons Per Day	Running Exhaust
NOx_IDLEX	Nitrogen Dioxide	Tons Per Day	Idle Exhaust
NOx_STREX	Nitrogen Dioxide	Tons Per Day	Start Exhaust
NOx_TOTEX	Nitrogen Dioxide	Tons Per Day	Total
CO2_RUNEX	Carbon Dioxide	Tons Per Day	Running Exhaust
CO2_IDLEX	Carbon Dioxide	Tons Per Day	Idle Exhaust
CO2_STREX	Carbon Dioxide	Tons Per Day	Start Exhaust
CO2_TOTEX	Carbon Dioxide	Tons Per Day	Total
PM10_RUNEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Running Exhaust
PM10_IDLEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Idle Exhaust
PM10_STREX	Fine Particulate Matter (<10 microns)	Tons Per Day	Start Exhaust
PM10_TOTEX	Fine Particulate Matter (<10 microns)	Tons Per Day	Total Exhaust
PM10_PMTW	Fine Particulate Matter (<10 microns)	Tons Per Day	Tire Wear
PM10_PMBW	Fine Particulate Matter (<10 microns)	Tons Per Day	Brake Wear
PM10_TOTAL	Fine Particulate Matter (<10 microns)	Tons Per Day	Total
PM2_5_RUNEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Running Exhaust
PM2_5_IDLEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Idle Exhaust
PM2_5_STREX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Start Exhaust
PM2_5_TOTEX	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Total Exhaust
PM2_5_PMTW	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Tire Wear
PM2_5_PMBW	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Brake Wear
PM2_5_TOTAL	Fine Particulate Matter (<2.5 microns)	Tons Per Day	Total
SOx_RUNEX	Sulfur Oxides	Tons Per Day	Running Exhaust
SOx_IDLEX	Sulfur Oxides	Tons Per Day	Idle Exhaust
SOx_STREX	Sulfur Oxides	Tons Per Day	Start Exhaust
SOx_TOTEX	Sulfur Oxides	Tons Per Day	Total
Fuel_GAS	Fuel	1000 Gallons	Gasoline
Fuel_DSL	Fuel	1000 Gallons	Diesel
Fuel_NG	Fuel	1000 Gallons	Natural Gas

Area	Sub-Area	Cal. Year	Season	Veh_Tech	EMFAC2011 Category	Population	Total_VMT	cVMT	eVMT	Trips
TCAG	All Sub-Areas	2046	Annual	All Vehicles	All Vehicles	400,651.2	16,892,980.0	14,896,044.5	1,996,935.5	2,090,376.2
TCAG	All Sub-Areas	2046	Annual	All Other Buses-Dsl	All Other Buses - Dsl	97.1	4,269.7	4,269.7	0	864.3
TCAG	All Sub-Areas	2046	Annual	All Other Buses-NG	All Other Buses - Oth	7.40	304.2	304.2	0	65.9
TCAG	All Sub-Areas	2046	Annual	LDA-Dsl	LDA - Dsl	102.8	4,080.6	4,080.6	0	462.3
TCAG	All Sub-Areas	2046	Annual	LDA-Elec	LDA - Oth	22,681.0	943,285.2	0	943,285.2	105,800.1
TCAG	All Sub-Areas	2046	Annual	LDA-Gas	LDA - Gas	166,260.4	7,033,952.1	7,033,952.1	0	767,207.7
TCAG	All Sub-Areas	2046	Annual	LDA-Phe	LDA - Gas	7,816.2	333,009.0	135,939.3	197,069.7	32,319.9
TCAG	All Sub-Areas	2046	Annual	LDT1-Dsl	LDT1 - Dsl	0.1192	4.82	4.82	0	0.5486
TCAG	All Sub-Areas	2046	Annual	LDT1-Elec	LDT1 - Oth	304.6	12,778.4	0	12,778.4	1,425.2
TCAG	All Sub-Areas	2046	Annual	LDT1-Gas	LDT1 - Gas	10,600.4	410,937.4	410,937.4	0	47,655.6
TCAG	All Sub-Areas	2046	Annual	LDT1-Phe	LDT1 - Gas	234.0	9,767.6	3,977.1	5,790.5	967.7
TCAG	All Sub-Areas	2046	Annual	LDT2-Dsl	LDT2 - Dsl	334.7	13,598.9	13,598.9	0	1,541.6
TCAG	All Sub-Areas	2046	Annual	LDT2-Elec	LDT2 - Oth	3,453.6	100,190.2	0	100,190.2	16,153.5
TCAG	All Sub-Areas	2046	Annual	LDT2-Gas	LDT2 - Gas	89,203.0	3,582,554.4	3,582,554.4	0	407,931.0
TCAG	All Sub-Areas	2046	Annual	LDT2-Phe	LDT2 - Gas	2,381.7	97,601.2	39,827.6	57,773.6	9,848.3
TCAG	All Sub-Areas	2046	Annual	LHD1-Dsl	LHD1 - Dsl	2,650.0	87,337.9	87,337.9	0	33,333.7
TCAG	All Sub-Areas	2046	Annual	LHD1-Elec	LHD1 - Oth	3,580.2	165,596.6	0	165,596.6	50,329.4
TCAG	All Sub-Areas	2046	Annual	LHD1-Gas	LHD1 - Gas	3,529.3	128,378.5	128,378.5	0	52,581.4
TCAG	All Sub-Areas	2046	Annual	LHD2-Dsl	LHD2 - Dsl	1,315.6	41,428.0	41,428.0	0	16,548.7
TCAG	All Sub-Areas	2046	Annual	LHD2-Elec	LHD2 - Oth	846.8	38,190.9	0	38,190.9	11,206.6
TCAG	All Sub-Areas	2046	Annual	LHD2-Gas	LHD2 - Gas	401.4	14,078.5	14,078.5	0	5,980.0
TCAG	All Sub-Areas	2046	Annual	MCY-Gas	MCY - Gas	7,350.0	41,123.0	41,123.0	0	14,700.1
TCAG	All Sub-Areas	2046	Annual	MDV-Dsl	MDV - Dsl	627.8	23,396.2	23,396.2	0	2,778.0
TCAG	All Sub-Areas	2046	Annual	MDV-Elec	MDV - Oth	3,203.7	91,799.5	0	91,799.5	14,919.2
TCAG	All Sub-Areas	2046	Annual	MDV-Gas	MDV - Gas	54,706.3	2,097,120.5	2,097,120.5	0	245,029.2
TCAG	All Sub-Areas	2046	Annual	MDV-Phe	MDV - Gas	1,529.4	61,423.0	25,097.9	36,325.1	6,324.2
TCAG	All Sub-Areas	2046	Annual	MH-Dsl	MH - Dsl	298.4	2,824.1	2,824.1	0	29.8
TCAG	All Sub-Areas	2046	Annual	MH-Gas	MH - Gas	413.7	4,682.8	4,682.8	0	41.4
TCAG	All Sub-Areas	2046	Annual	Motor Coach-Dsl	Motor Coach - Dsl	27.3	3,464.2	3,464.2	0	627.3
TCAG	All Sub-Areas	2046	Annual	OBUS-Elec	OBUS - Oth	28.8	1,990.5	0	1,990.5	575.8
TCAG	All Sub-Areas	2046	Annual	OBUS-Gas	OBUS - Gas	51.6	1,736.5	1,736.5	0	1,032.6
TCAG	All Sub-Areas	2046	Annual	PTO-Dsl	PTO-Dsl	0	6,857.1	6,857.1	0	
TCAG	All Sub-Areas	2046	Annual	PTO-Elec	PTO-Oth	0	6,469.2	0	6,469.2	
TCAG	All Sub-Areas	2046	Annual	SBUS-Dsl	SBUS - Dsl	268.7	5,493.9	5,493.9	0	3,890.3
TCAG	All Sub-Areas	2046	Annual	SBUS-Elec	SBUS - Oth	20.3	6,548.2	0	6,548.2	3,324.4
TCAG	All Sub-Areas	2046	Annual	SBUS-Gas	SBUS - Gas	35.1	1,895.4	1,895.4	0	140.3
TCAG	All Sub-Areas	2046	Annual	SBUS-NG	SBUS-Oth	89.0	1,784.4	1,784.4	0	1,288.5
TCAG	All Sub-Areas	2046	Annual	T6 CAIRP Class 4-Dsl	T6 CAIRP small-Dsl	4.69	345.1	345.1	0	107.8
TCAG	All Sub-Areas	2046	Annual	T6 CAIRP Class 4-Elec	T6 CAIRP small-Oth	6.48	503.9	0	503.9	149.0
TCAG	All Sub-Areas	2046	Annual	T6 CAIRP Class 5-Dsl	T6 CAIRP small-Dsl	5.76	474.0	474.0	0	132.5
TCAG	All Sub-Areas	2046	Annual	T6 CAIRP Class 5-Elec	T6 CAIRP small-Oth	7.94	690.7	0	690.7	182.5
TCAG	All Sub-Areas	2046	Annual	T6 CAIRP Class 6-Dsl	T6 CAIRP small-Dsl	26.2	1,234.3	1,234.3	0	601.9
TCAG	All Sub-Areas	2046	Annual	T6 CAIRP Class 6-Elec	T6 CAIRP small-Oth	36.4	1,808.9	0	1,808.9	836.5
TCAG	All Sub-Areas	2046	Annual	T6 CAIRP Class 7-Dsl	T6 CAIRP heavy-Dsl	69.9	14,433.5	14,433.5	0	1,607.0
TCAG	All Sub-Areas	2046	Annual	T6 CAIRP Class 7-Elec	T6 CAIRP heavy-Oth	21.7	4,655.2	0	4,655.2	499.8
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 4-Dsl	T6 instate small-Dsl	59.4	1,968.5	1,968.5	0	847.6
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 4-Elec	T6 instate small-Oth	64.3	2,278.0	0	2,278.0	917.6
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 5-Dsl	T6 instate small-Dsl	41.7	1,381.1	1,381.1	0	594.4
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 5-Elec	T6 instate small-Oth	45.2	1,601.1	0	1,601.1	644.9
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 6-Dsl	T6 instate small-Dsl	253.3	8,397.6	8,397.6	0	3,614.7
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 6-Elec	T6 instate small-Oth	275.5	9,742.9	0	9,742.9	3,931.1
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 7-Dsl	T6 instate heavy-Dsl	63.3	3,225.0	3,225.0	0	902.6
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 7-Elec	T6 instate heavy-Oth	41.7	2,238.1	0	2,238.1	594.4
TCAG	All Sub-Areas	2046	Annual	T6 Instate Delivery Class 7-NG	T6 instate heavy-NG	1.28	66.4	66.4	0	18.3
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 4-Dsl	T6 instate small-Dsl	338.8	13,261.0	13,261.0	0	3,917.0
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 4-Elec	T6 instate small-Oth	367.3	16,166.9	0	16,166.9	4,245.7
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 5-Dsl	T6 instate small-Dsl	842.0	32,966.6	32,966.6	0	9,733.5
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 5-Elec	T6 instate small-Oth	913.0	40,221.3	0	40,221.3	10,554.4
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 6-Dsl	T6 instate small-Dsl	747.4	29,234.7	29,234.7	0	8,640.5
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 6-Elec	T6 instate small-Oth	809.1	35,594.9	0	35,594.9	9,353.1
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 7-Dsl	T6 instate heavy-Dsl	618.0	25,171.3	25,171.3	0	7,143.6
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 7-Elec	T6 instate heavy-Oth	383.2	20,774.2	0	20,774.2	4,429.6
TCAG	All Sub-Areas	2046	Annual	T6 Instate Other Class 7-NG	T6 instate heavy-NG	13.9	582.6	582.6	0	160.9
TCAG	All Sub-Areas	2046	Annual	T6 Instate Tractor Class 6-Dsl	T6 instate small-Dsl	11.9	540.8	540.8	0	137.4
TCAG	All Sub-Areas	2046	Annual	T6 Instate Tractor Class 6-Elec	T6 instate small-Oth	12.9	682.3	0	682.3	148.9
TCAG	All Sub-Areas	2046	Annual	T6 Instate Tractor Class 7-Dsl	T6 instate heavy-Dsl	518.8	30,472.2	30,472.2	0	5,997.8
TCAG	All Sub-Areas	2046	Annual	T6 Instate Tractor Class 7-Elec	T6 instate heavy-Oth	110.1	7,699.0	0	7,699.0	1,273.0
TCAG	All Sub-Areas	2046	Annual	T6 Instate Tractor Class 7-NG	T6 instate heavy-NG	11.8	707.5	707.5	0	136.9
TCAG	All Sub-Areas	2046	Annual	T6 OOS Class 4-Dsl	T6 OOS small-Dsl	6.57	491.6	491.6	0	151.0
TCAG	All Sub-Areas	2046	Annual	T6 OOS Class 5-Dsl	T6 OOS small-Dsl	8.08	674.3	674.3	0	185.6
TCAG	All Sub-Areas	2046	Annual	T6 OOS Class 6-Dsl	T6 OOS small-Dsl	36.7	1,762.0	1,762.0	0	842.2
TCAG	All Sub-Areas	2046	Annual	T6 OOS Class 7-Dsl	T6 OOS heavy-Dsl	45.3	12,812.2	12,812.2	0	1,040.6
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 4-Dsl	T6 Public-Dsl	17.2	586.5	586.5	0	88.3
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 4-Elec	T6 Public-Oth	15.2	594.6	0	594.6	77.8
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 4-NG	T6 Public-NG	2.29	78.8	78.8	0	11.8
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 5-Dsl	T6 Public-Dsl	36.5	1,240.9	1,240.9	0	187.1
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 5-Elec	T6 Public-Oth	31.9	1,248.2	0	1,248.2	163.5
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 5-NG	T6 Public-NG	5.10	173.8	173.8	0	26.2
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 6-Dsl	T6 Public-Dsl	44.5	1,513.4	1,513.4	0	228.1
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 6-Elec	T6 Public-Oth	39.0	1,519.2	0	1,519.2	200.0
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 6-NG	T6 Public-NG	6.02	206.3	206.3	0	30.9
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 7-Dsl	T6 Public-Dsl	68.5	2,848.4	2,848.4	0	351.5
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 7-Elec	T6 Public-Oth	47.7	2,281.8	0	2,281.8	244.6
TCAG	All Sub-Areas	2046	Annual	T6 Public Class 7-NG	T6 Public-NG	9.58	398.6	398.6	0	49.2
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 5-Dsl	T6 Utility-Dsl	9.62	382.4	382.4	0	123.2
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 5-Elec	T6 Utility-Oth	13.6	558.8	0	558.8	174.1
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 5-NG	T6 Utility-NG	0.0217	0.8632	0.8632	0	0.2781
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 6-Dsl	T6 Utility-Dsl	1.82	72.3	72.3	0	23.3
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 6-Elec	T6 Utility-Oth	2.57	105.6	0	105.6	32.9
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 6-NG	T6 Utility-NG	0.0041	0.1632	0.1632	0	0.0526
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 7-Dsl	T6 Utility-Dsl	2.02	99.2	99.2	0	25.9
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 7-Elec	T6 Utility-Oth	2.86	148.3	0	148.3	36.6
TCAG	All Sub-Areas	2046	Annual	T6 Utility Class 7-NG	T6 Utility-NG	0.0046	0.2239	0.2239	0	0.0585
TCAG	All Sub-Areas	2046	Annual	T6TS-Elec	T6TS - Gas	165.5	11,373.8	0	11,373.8	3,310.6
TCAG	All Sub-Areas	2046	Annual	T6TS-Gas	T6TS - Gas	186.8	9,562.6	9,562.6	0	3,737.3
TCAG	All Sub-Areas	2046	Annual	T7 CAIRP Class 8-Dsl	T7 CAIRP-Dsl	1,149.9	236,960.4	236,960.4	0	26,424.4
TCAG	All Sub-Areas	2046	Annual	T7 CAIRP Class 8-Elec	T7 CAIRP-Oth	317.5	67,864.5	0	67,864.5	7,295.9
TCAG	All Sub-Areas	2046	Annual	T7 NNOOS Class 8-Dsl	T7 NNOOS-Dsl	1,270.1	360,397.0	360,397.0	0	29,186.6
TCAG	All Sub-Areas	2046	Annual	T7 NOOS Class 8-Dsl	T7 NOOS-Dsl	547.4	130,925.8	130,925.8	0	12,579.8
TCAG	All Sub-Areas	2046	Annual	T7 Other Port Class 8-Dsl	T7 Other Port-Dsl	17.8	4,292.9	4,292.9	0	292.0
TCAG	All Sub-Areas	2046	Annual	T7 Other Port Class 8-Elec	T7 Other Port-Oth	4.13	1,086.6	0	1,086.6	67.5
TCAG	All Sub-Areas	2046	Annual	T7 POAK Class 8-Dsl	T7 POAK-Dsl	91.6	10,624.4	10,624.4	0	1,498.9
TCAG	All Sub-Areas	2046	Annual	T7 POAK Class 8-Elec	T7 POAK-Oth	21.3	2,446.3	0	2,446.3	349.1
TCAG	All Sub-Areas	2046	Annual	T7 POLA Class 8-Dsl	T7 POLA-Dsl	85.9	15,937.9	15,937.9	0	1,405.9
TCAG	All Sub-Areas	2046	Annual	T7 POLA Class 8-Elec	T7 POLA-Oth	15.6	2,864.7	0	2,864.7	255.6
TCAG	All Sub-Areas	2046	Annual	T7 POLA Class 8-NG	T7 POLA-NG	0.4034	74.8	74.8	0	6.60
TCAG	All Sub-Areas	2046	Annual	T7 Public Class 8-Dsl	T7 Public-Dsl	206.6	8,248.4	8,248.4	0	1,059.8
TCAG	All Sub-Areas	2046	Annual	T7 Public Class 8-Elec	T7 Public-Oth	134.4	6,317.4	0	6,317.4	689.7
TCAG	All Sub-Areas	2046	Annual	T7 Public Class 8-NG	T7 Public-NG	25.4	1,021.7	1,021.7	0	130.4
TCAG	All Sub-Areas	2046	Annual	T7 SWCV Class 8-Dsl	T7 SWCV-Dsl	44.1	2,861.8	2,861.8	0	202.8
TCAG	All Sub-Areas	2046	Annual	T7 SWCV Class 8-Elec	T7 SWCV-Oth	111.5	7,203.0	0	7,203.0	512.9
TCAG	All Sub-Areas	2046	Annual	T7 SWCV Class 8-NG	T7 SWCV-NG	115.5	7,481.2	7,481.2	0	531.3
TCAG	All Sub-Areas	2046	Annual	T7 Single Concrete/Transit Mix Class 8-Dsl	T7 Single-Dsl	8.16	508.9	508.9	0	76.9
TCAG	All Sub-Areas	2046	Annual	T7 Single Concrete/Transit Mix Class 8-Elec	Single Concrete/Transit Mix	10.5	705.6	0	705.6	98.7
TCAG	All Sub-Areas	2046	Annual	T7 Single Concrete/Transit Mix Class 8-NG	T7 Single-NG	0.2980	18.6	18.6	0	2.81
TCAG	All Sub-Areas	2046	Annual	T7 Single Dump Class 8-Dsl	T7 Single-Dsl	84.6	4,111.1	4,111.1	0	796.9
TCAG	All Sub-Areas	2046	Annual	T7 Single Dump Class 8-Elec	T7 Single Dump-Oth	59.8	3,779.4	0	3,779.4	563.1
TCAG	All Sub-Areas	2046	Annual	T7 Single Dump Class 8-NG	T7 Single-NG	3.05	148.7	148.7	0	28.7
TCAG	All Sub-Areas	2046	Annual	T7 Single Other Class 8-Dsl	T7 Single-Dsl	567.8	28,710.6	28,710.6	0	5,348.8
TCAG	All Sub-Areas	2046	Annual	T7 Single Other Class 8-Elec	T7 Single Other-Oth	431.9	28,095.1	0	28,095.1	4,068.3
TCAG	All Sub-Areas	2046	Annual	T7 Single Other Class 8-NG	T7 Single-NG	20.4	1,036.0	1,036.0	0	192.0
TCAG	All Sub-Areas	2046	Annual	T7 Tractor Class 8-Dsl	T7 Tractor-Dsl	2,615.4	165,328.8	165,328.8	0	38,001.8
TCAG	All Sub-Areas	2046	Annual	T7 Tractor Class 8-Elec	T7 Tractor-Oth	469.9	32,911.9	0	32,911.9	6,828.1
TCAG	All Sub-Areas	2046	Annual	T7 Tractor Class 8-NG	T7 Tractor-NG	41.1	2,593.6	2,593.6	0	597.1
TCAG	All Sub-Areas	2046	Annual	T7 Utility Class 8-Dsl	T7 Utility-Dsl	10.2	416.4	416.4	0	130.3
TCAG	All Sub-Areas	2046	Annual	T7 Utility Class 8-Elec	T7 Utility-Oth	6.93	327.5	0	327.5	88.8
TCAG	All Sub-Areas	2046	Annual	T7IS-Elec	T7IS - Gas	0.2218	36.5	0	36.5	4.44
TCAG	All Sub-Areas	2046	Annual	T7IS-Gas	T7IS - Gas	0.2624	33.0	33.0	0	5.25
TCAG	All Sub-Areas	2046	Annual	UBUS-Dsl	UBUS - Dsl	0.8166	59.0	59.0	0	3.27
TCAG	All Sub-Areas	2046	Annual	UBUS-Elec	UBUS - Oth	171.3	17,002.1	0	17,002.1	685.2
TCAG	All Sub-Areas	2046	Annual	UBUS-Gas	UBUS - Gas	7.96	504.1	504.1	0	31.8
TCAG	All Sub-Areas	2046	Annual	UBUS-NG	UBUS - NG	3.29	237.5	237.5	0	13.2

TCAG DRAFT 2022 RTP/SCS Base

2005	Persons/HU	Population	HU	EMP	Regional VMT	SB375 VMT	VMT/perCapita	EMFAC 14 CO2	GHG/per capita lbs/day
SB 375 Base Year	3.15	404,148	128,388	176,896	10,153,707	8,705,754	21.54	3,440	17.02

2021	Persons/HU	Population	SF	MF	EMP	Regional VMT	SB743 VMT	SB375 VMT	VMT/perCapita	EF 14 CO2		
2022 RTP/SCS Base Year	3.12	481,649	118,928	35,508	187,137	10,617,248	14,566,292	9,176,214	19.05	3,526	14.64	**14.0%**

TCAG DRAFT 2022 RTP/SCS Metrics

Criteria Pollutants EMFAC 14

2005	Transit Ridership	DA	SR2	SR3+	Transit	Bike	Walk	Annual Heavy Duty Trucks PM10	Annual Heavy Duty Trucks PM2.5	ROG	CO	NOX	CO2	PM10	PM2.5	SOx	Fuel Gas	Fuel DSL
	10,205	38.61%	26.32%	27.74%	0.75%	1.04%	5.55%	0.7862	0.6208	9.3602	78.4561	30.2704	6511.7246	1.4096	0.9996	0.2303	478.7437	187.7021

TDM Mode Share: DA, SR2, SR3+, Transit, Bike, Walk. Annual: ROG, CO, NOX, CO2, PM10, PM2.5, SOx.

2021	Transit Ridership	DA	SR2	SR3+	Transit	Bike	Walk											
	15,665	37.53%	26.66%	27.77%	1.18%	1.03%	5.82%	0.1445	0.0666	2.2658	15.1358	6.99485	5542.3831	0.6804	0.2969	0.0546	377.7340	181.7198

TDM Mode Share: DA, SR2, SR3+, Transit, Bike, Walk.

TCAG DRAFT 2022 RTP/SCS Scenario Metrics

SB 375 Data

ARB SB 375 Target 16% in 2035

	Persons/HU	Population	SF	MF	EMP	Regional VMT	SB743 VMT	SB375 VMT	VMT/perCapita	EF 14 CO2 tons/day	GHG/per capita lbs/day	% GHG/per capita Reduction	% Off Model Reduction	Total % GHG/per capita Reduction
2035														
Trend (No Project) Scenario TIP Projects Only	2.99	535,463	135,772	43,257	206,681	11,863,879	16,279,168	10,229,666	19.10	3,904	14.58	14.3%		14.3%
Trend Scenario Transit Maintain	2.99	535,463	135,772	43,257	206,681	12,235,962	16,714,462	10,597,169	19.79	4,044	15.10	11.3%		11.3%
Blueprint (Old Plan) Scenario Transit Grow	2.99	535,463	132,621	46,408	206,681	12,137,682	16,649,626	10,500,342	19.61	4,008	14.97	12.1%		12.1%
Blueprint Plus Scenario Transit Grow	2.99	535,463	131,503	47,526	206,681	11,740,528	16,164,311	10,103,006	18.87	3,857	14.41	15.4%		15.4%
CVC Blueprint Plus Scenario Transit Grow	2.99	535,463	130,733	48,297	206,681	11,699,147	16,112,163	10,061,677	18.79	3,841	14.35	**15.7%**	0.5%	16.2%
CVC Blueprint Plus2 (Preferred) Scenario Transit CVC	2.99	535,463	130,733	48,297	206,681	11,696,238	16,108,885	10,058,761	18.79	3,840	14.34	15.7%	0.5%	**16.2%**
2046														
Trend (No Project) Scenario TIP Projects Only	2.95	567,383	144,772	47,397	218,846	12,465,620	17,128,558	10,726,027	18.90	4,115	14.51	14.8%		14.8%
Trend Scenario Transit Maintain	2.95	567,383	144,772	47,397	218,846	12,877,346	17,606,515	11,133,303	19.62	4,277	15.08	11.4%		11.4%
Blueprint (Old Plan) Scenario Transit Grow	2.95	567,383	139,938	52,232	218,846	12,725,515	17,485,835	10,981,613	19.35	4,215	14.86	12.7%		12.7%
Blueprint Plus Scenario Transit Grow	2.95	567,383	138,222	53,947	218,846	12,299,408	16,966,705	10,555,689	18.60	4,051	14.28	16.1%		16.1%
CVC Blueprint Plus Scenario Transit Grow	2.95	567,383	137,040	55,129	218,846	12,244,957	16,896,121	10,501,457	18.51	4,031	14.21	**16.5%**	1.0%	17.5%
CVC Blueprint Plus2 (Preferred) Scenario Transit CVC	2.95	567,383	137,040	55,129	218,846	12,241,939	16,892,980	10,498,443	18.50	4,030	14.21	16.6%	1.0%	**17.6%**

543,495 2035
575,894 2046

TDM Mode Share: DA, SR2, SR3+, Transit, Bike, Walk. Annual: ROG, CO, NOX, CO2, PM10, PM2.5, SOx.

	Transit Ridership	DA	SR2	SR3+	Transit	Bike	Walk	Annual Heavy Duty Trucks PM10	Annual Heavy Duty Trucks PM2.5	ROG	CO	NOX	CO2	PM10	PM2.5	SOx	Fuel Gas	Fuel DSL
2035																		
Trend (No Project) Scenario TIP Projects Only	17,466	37.39%	26.77%	27.86%	1.16%	1.05%	5.77%	0.1380	0.0555	1.1492	7.0571	3.0479	4455.8160	0.7052	0.2890	0.0436	269.4637	174.2284
Trend Scenario Transit Maintain	18,040	36.43%	27.41%	27.85%	1.14%	1.09%	6.08%	0.1424	0.0572	1.1852	7.2802	3.1434	4594.5650	0.7273	0.2981	0.0450	277.8102	179.6916
Blueprint (Old Plan) Scenario Transit Grow	21,047	36.26%	27.38%	27.75%	1.31%	1.10%	6.20%	0.1412	0.0568	1.1758	7.2216	3.1182	4558.6896	0.7215	0.2957	0.0446	275.6868	178.25
Blueprint Plus Scenario Transit Grow	19,455	37.16%	26.72%	27.74%	1.29%	1.07%	6.02%	0.1366	0.0549	1.1374	6.9812	3.0163	4411.8295	0.6979	0.2860	0.0432	266.9075	172.42
CVC Blueprint Plus (Prefered) Scenario Transit Grow	19,492	37.09%	26.72%	27.70%	1.30%	1.07%	6.11%	0.1361	0.0547	1.1334	6.9558	3.0056	4396.2241	0.6954	0.2850	0.0430	265.9606	171.8122
CVC Blueprint Plus2 Scenario Transit CVC	21,208	37.07%	26.70%	27.68%	1.38%	1.07%	6.10%	0.1361	0.0547	1.1331	6.9541	3.0049	4395.2022	0.6952	0.2850	0.0430	265.9019	171.7696
2046																		
Trend (No Project) Scenario TIP Projects Only	18,596	37.13%	26.87%	27.89%	1.17%	1.08%	5.86%	0.1391	0.0558	0.9171	5.9989	2.7327	4412.3987	0.7288	0.2955	0.0432	264.4985	174.3562
Trend Scenario Transit Maintain	19,161	36.18%	27.51%	27.88%	1.14%	1.12%	6.17%	0.1437	0.0577	0.9475	6.1927	2.8230	4560.4244	0.7529	0.3053	0.0446	273.4736	180.118
Blueprint (Old Plan) Scenario Transit Grow	22,493	35.97%	27.49%	27.76%	1.32%	1.13%	6.33%	0.1420	0.0570	0.9363	6.1229	2.7897	4505.5206	0.7440	0.3017	0.0441	270.1308	177.9932
Blueprint Plus Scenario Transit Grow	20,818	36.83%	26.83%	27.73%	1.31%	1.10%	6.19%	0.1372	0.0551	0.9050	5.9154	2.6963	4356.1311	0.7191	0.2916	0.0426	261.2402	172.035
CVC Blueprint Plus (Prefered) Scenario Transit Grow	20,848	36.74%	26.83%	27.68%	1.32%	1.11%	6.31%	0.1366	0.0548	0.9010	5.8890	2.6844	4337.2178	0.7159	0.2903	0.0424	260.1226	171.274
CVC Blueprint Plus2 Scenario Transit CVC	22,702	36.72%	26.81%	27.66%	1.40%	1.11%	6.30%	0.1366	0.0548	0.9008	5.8877	2.6837	4336.3915	0.7157	0.2902	0.0424	260.0841	171.232

ENVISION TOMORROW Metrics

	Regional Gross Residential Density	New Developed Acres Consumed	Important Ag Land outside SOI	Critical Habitat Land Acres Consumed	CO2 Emissions per Household	Water Consumption per Household	Energy Use per Household
2035							
Trend (No Project) Scenario TIP Projects Only							
Trend Scenario Transit Maintain							
Blueprint (Old Plan) Scenario Transit Grow							
Blueprint Plus Scenario Transit Grow							
CVC Blueprint Plus (Prefered) Scenario Transit Grow							
CVC Blueprint Plus2 Scenario Transit CVC							
2046							
Trend (No Project) Scenario TIP Projects Only							
Trend Scenario Transit Maintain	4.9	9,193.0	2,205.0	163.0	9.9	288.5	106.6
Blueprint (Old Plan) Scenario Transit Grow	6.1	7,308.0	1,475.0	163.0	9.0	252.1	96.9
Blueprint Plus Scenario Transit Grow	6.4	6,913.0	1,404.0	163.0	8.8	243.7	94.6
CVC Blueprint Plus (Prefered) Scenario Transit Grow	6.5	6,849.0	1,377.0	163.0	8.8	242.8	94.4
CVC Blueprint Plus2 Scenario Transit CVC	6.5	6,849.0	1,377.0	163.0	8.8	242.8	94.4

TCAG DRAFT 2022 RTP/SCS Scenario Metrics

Item	Notes	Source
Persons/HU	Persons per housing unit	DOF
Population	Total scenario population	DOF
HU	Total scenario housing units	DOF/HCD
SF	Total single family housing units	DOF/HCD
MF	Total multi-family housing units	DOF/HCD
EMP	Total employment units	EDD/Caltrans
Regional VMT	Total daily VMT including XX trips	TCAG Model
SB 743 VMT	Total daily VMT including XX trips and beyond model vmt	TCAG Model
SB 375 VMT	Total daily VMT excluding XX trips	TCAG Model
VMT/per capita	SB 375 VMT per capita	TCAG Model
EF 14 CO2	SB375 daily CO2 tons (Annual) excluding XX trips	EMFAC 14
Total % GHG/per capita Reduction	Percent CO2 per capita reductions from 2005 base	EMFAC 14
Total % GHG/per capita Reduction - Off Model	Percent CO2 per capita reductions from 2005 base	Estimate TBD
Transit Ridership	Total daily regional transit ridership	TCAG Model
TDM Mode Share	Mode Share	TCAG Model
Heavy Duty PM10	PM10 total daily tons (Annual)	EMFAC 14
Heavy Duty PM2.5	PM2.5 total daily tons (Annual)	EMFAC 14
ROG	ROG total daily tons (Annual)	EMFAC 14
CO	CO total exhaust tons (Annual)	EMFAC 14
NOX	NOX total exhaust daily tons (Annual)	EMFAC 14
CO2	CO2 daily tons (Annual) including XX trips	EMFAC 14
PM10	PM10 total daily tons (Annual)	EMFAC 14
PM2.5	PM2.5 total daily tons (Annual)	EMFAC 14
SOx	SOx total exhaust tons (Annual)	EMFAC 14
Fuel Gas	Daily regional gasoline consumption thousands of gallons (Annual)	EMFAC 14
Fuel DSL	Daily regional diesel consumption thousands of gallons (Annual)	EMFAC 14
Regional Gross Residential Density	Gross residential density housing units per acre	Envision Tomorrow
New Developed Acres Consumed	New Developed Acres Consumed	Envision Tomorrow
Prime Ag Land Acres Consumed	Prime Ag Land Acres Consumed	Envision Tomorrow/FMMP
Critical Habitat Land Acres Consumed	Critical Habitat Land Acres Consumed	Envision Tomorrow/SJV Greenprint
CO2 Emissions per Household	CO2 tons per year	Envision Tomorrow
Water Consumption per Household	Water gallons per day	Envision Tomorrow
Energy Use per Household	Energy consumption in millions of BTU per year	Envision Tomorrow

Appendix B

Special Status Species

Table B-1 Special-Status Plant Species with the Potential to Occur within TCAG Region

Scientific Name Common Name	Status Fed/State ESA Global Rank/ State Rank CRPR	Habitat Requirements
Abronia alpina Ramshaw Meadows abronia	None/None G2/S2 1B.1	Perennial herb. Blooms Jul-Aug. Occurs in meadows and seeps. Gravelly margins of meadows; in gravel and sand with *Hulsea* and *Lupinus*. Known to occur in Ramshaw, Templeton meadows, and Tulare County of the High Sierra Nevada Floristic Province. 2400-2700m (7874-8858ft).
Agrostis humilis mountain bent grass	None/None G4Q/S2 2B.3	Alpine boulder and rock field, Meadows and seeps, Subalpine coniferous forest. Sometimes on calcareous substrates. Probably under collected; high elevation grass. 2670-3200m. Blooms Jul-Sep.
Allium abramsii Abrams' onion	None/None G3/S3 1B.2	Lower montane coniferous forest, Upper montane coniferous forest. On sandy soils, derived from disintegrated granite. 885-3050m. Blooms May-Jul.
Asplenium septentrionale northern spleenwort	None/None G4G5/S3 2B.3	Chaparral, Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest. Forms grass-like tufts in granitic rock crevices. 1615-3350m. Blooms Jul-Aug.
Astragalus lentiginosus var. *kernensis* Kern Plateau milk-vetch	None/None G5T2?/S2 1B.2	Meadows and seeps, Subalpine coniferous forest. Dry, gravelly or sandy slopes or flats. 2240-2750m. Blooms Jun-Jul.
Astragalus shevockii Shevock's milk-vetch	None/None G2/S2 1B.3	Upper montane coniferous forest. Open Jeffrey pine forest, in granitic sand or volcanic soils and in pine-needle duff. 1890-1965m. Blooms Jun-Jul.
Atriplex cordulata var. *cordulata* heartscale	None/None G3T2/S2 1B.2	Chenopod scrub, Meadows and seeps, Valley and foothill grassland. Alkaline flats and scalds in the Central Valley, sandy soils. 0-560m. Blooms Apr-Oct.
Atriplex cordulata var. *erecticaulis* Earlimart orache	None/None G3T1/S1 1B.2	Valley and foothill grassland. 40-100m. Blooms Aug-Sep(Nov).
Atriplex coronata var. *vallicola* Lost Hills crownscale	None/None G4T3/S3 1B.2	Chenopod scrub, Valley and foothill grassland, Vernal pools. In powdery, alkaline soils that are vernally moist with *Frankenia*, *Atriplex* spp. and *Distichlis*. 50-635m. Blooms Apr-Sep.
Atriplex depressa brittlescale	None/None G2/S2 1B.2	Chenopod scrub, Meadows and seeps, Playas, Valley and foothill grassland, Vernal pools. Usually in alkali scalds or alkaline clay in meadows or annual grassland; rarely associated with riparian, marshes, or vernal pools. 1-320m. Blooms Apr-Oct.
Atriplex minuscula lesser saltscale	None/None G2/S2 1B.1	Chenopod scrub, Playas, Valley and foothill grassland. In alkali sink and grassland in sandy, alkaline soils. 15-200m. Blooms May-Oct.
Atriplex persistens vernal pool smallscale	None/None G2/S2 1B.2	Vernal pools. Alkaline vernal pools. 10-115m. Blooms Jun-Oct.
Atriplex subtilis subtle orache	None/None G1/S1 1B.2	Valley and foothill grassland. Alkaline 40-100m. Blooms (Apr)Jun-Sep(Oct).
Boechera bodiensis Bodie Hills rockcress	None/None G3/S3 1B.3	Alpine boulder and rock field, Great Basin scrub, Pinyon and juniper woodland, Subalpine coniferous forest. In rock crevices, outcrops, and on steep slopes. Granite and volcanic substrates. 2085-3530m. Blooms Jun-Jul(Aug).
Boechera cobrensis Masonic rockcress	None/None G5/S3 2B.3	Great Basin scrub, Pinyon and juniper woodland. Usually sandy soils. 1375-3105m. Blooms Jun-Jul.

Scientific Name Common Name	Status Fed/State ESA Global Rank/ State Rank CRPR	Habitat Requirements
Boechera dispar pinyon rockcress	None/None G3/S3 2B.3	Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland. Granitic, gravelly slopes & mesas. Often under desert shrubs which support it as it grows. 1200-2540m. Blooms Mar-Jun.
Boechera evadens hidden rockcress	None/None G1/S1 1B.3	Upper montane coniferous forest. Variable substrates; usually in rocky sites. 2560-2850m. Blooms May-Aug.
Boechera shevockii Shevock's rockcress	None/None G1/S1 1B.1	Upper montane coniferous forest. Granitic, rocky outcrops and ledges. 2470-2500m. Blooms Jun-Jul.
Boechera tularensis Tulare rockcress	None/None G3/S3 1B.3	Subalpine coniferous forest, Upper montane coniferous forest. Rocky slopes. 1825-3350m. Blooms (May)Jun-Jul(Aug).
Botrychium ascendens upswept moonwort	None/None G3G4/S2 2B.3	Lower montane coniferous forest, Meadows and seeps. Grassy fields, coniferous woods near springs and creeks. 1115-3045m. Blooms (Jun)Jul-Aug.
Botrychium crenulatum scalloped moonwort	None/None G4/S3 2B.2	Bogs and fens, Lower montane coniferous forest, Marshes and swamps, Meadows and seeps, Upper montane coniferous forest. Moist meadows, freshwater marsh, and near creeks. 1268-3280m. Blooms Jun-Sep.
Botrychium lineare slender moonwort	None/None G3/S1 1B.1	Meadows and seeps, Subalpine coniferous forest, Upper montane coniferous forest. 2560-2600m. Blooms Unk.
Botrychium minganense Mingan moonwort	None/None G4G5/S3 2B.2	Bogs and fens, Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest. Creekbanks in mixed conifer forest. 1455-2180m. Blooms Jul-Sep.
Brasenia schreberi watershield	None/None G5/S3 2B.3	Marshes and swamps. Aquatic known from water bodies both natural and artificial in California. 0-2200m. Blooms Jun-Sep.
Brodiaea insignis Kaweah brodiaea	None/SE G1/S1 1B.2	Cismontane woodland, Meadows and seeps, Valley and foothill grassland. Granite or clay soils on S-SW facing slopes; usually in grassland surrounded by foothill woodland. 150-1400m. Blooms Apr-Jun.
Calochortus striatus alkali mariposa lily	None/None G3?/S2S3 1B.2	Chaparral, Chenopod scrub, Meadows and seeps, Mojavean desert scrub. Alkaline meadows and ephemeral washes. 70-1600m. 70-1595m. Blooms Apr-Jun.
Calochortus westonii Shirley Meadows star-tulip	None/None G3/S3 1B.2	Broadleafed upland forest, Lower montane coniferous forest, Meadows and seeps. Meadows, open woodlands; granite substrates. 1500-2105m. Blooms May-Jun.
Calyptridium pygmaeum pygmy pussypaws	None/None G1G2/S1S2 1B.2	Subalpine coniferous forest, Upper montane coniferous forest. Sandy or gravelly sites. 1980-3110m. Blooms Jun-Aug.
Campylopodiella stenocarpa flagella-like atractylocarpus	None/None G5/S1? 2B.2	Cismontane woodland. All California populations are on roadsides. The ID of the California populations is under question, but whatever this is, it is rare. 100-500m.
Carlquistia muirii Muir's tarplant	None/None G2/S2 1B.3	Chaparral, Lower montane coniferous forest, Upper montane coniferous forest. Crevices of granite ledges and dry sandy soils. 755-2500m. Blooms Jul-Aug(Oct).
Caulanthus californicus California jewelflower	FE/SE G1/S1 1B.1	Chenopod scrub, Pinyon and juniper woodland, Valley and foothill grassland. Sandy soils. 61-1000m. Blooms Feb-May.

Scientific Name Common Name	Status Fed/State ESA Global Rank/ State Rank CRPR	Habitat Requirements
Chaenactis douglasii var. *alpina* alpine dusty maidens	None/None G5T5/S2 2B.3	Alpine boulder and rock field. Open, subalpine to alpine gravel and crevices; granitic substrate. 2865-3400m. Blooms Jul-Sep.
Cinna bolanderi Bolander's woodreed	None/None G2G3/S2S3 1B.2	Meadows and seeps, Upper montane coniferous forest. Stream sides and other mesic areas. 1670-2440m. Blooms Jul-Sep.
Clarkia springvillensis Springville clarkia	FT/SE G2/S2 1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland. Cutbanks and openings in blue oak woodland. Decomposed granite loam. 245-1220m. Blooms (Mar)Apr-Jul.
Cordylanthus eremicus ssp. *kernensis* Kern Plateau bird's-beak	None/None G3T2/S2 1B.3	Great Basin scrub, Joshua tree "woodland", Pinyon and juniper woodland, Upper montane coniferous forest. 1675-3000m. Blooms (May)Jul-Sep.
Cryptantha incana Tulare cryptantha	None/None G2/S2 1B.3	Lower montane coniferous forest. Gravelly or rocky sites. 1430-2150m. Blooms Jun-Aug.
Cuscuta jepsonii Jepson's dodder	None/None G3/S3 1B.2	North Coast coniferous forest. Primary host species are *Ceanothus diversifolius* and *Ceanothus prostratus*. 1200-2300m. Blooms Jul-Sep.
Deinandra mohavensis Mojave tarplant	None/SE G2/S2 1B.3	Chaparral, Coastal scrub, Riparian scrub. Low sand bars in riverbed; mostly in riparian areas or in ephemeral grassy areas. 640-1600m. Blooms (Jan-May)Jun-Oct.
Delphinium purpusii rose-flowered larkspur	None/None G3/S3 1B.3	Chaparral, Cismontane woodland, Pinyon and juniper woodland. On shady rocky slopes; often on carbonates. 300-1340m. Blooms (Mar)Apr-May.
Delphinium recurvatum recurved larkspur	None/None G2?/S2? 1B.2	Chenopod scrub, Cismontane woodland, Valley and foothill grassland. Alkaline 3-790m. Blooms Mar-Jun.
Diplacus pictus calico monkeyflower	None/None G2/S2 1B.2	Broad-leafed upland forest, Cismontane woodland. In bare ground around gooseberry bushes or around granite rock outcrops. 100-1430m. Blooms Mar-May.
Draba cruciata Mineral King draba	None/None G3/S3 1B.3	Subalpine coniferous forest. On steep rocky slopes in gravelly soils. 2500-3315m. Blooms Jun-Aug.
Draba lonchocarpa spear-fruited draba	None/None G5/S2S3 2B.3	Alpine boulder and rock field. On limestone scree. 3000-3295m. Blooms Jun-Jul.
Draba sharsmithii Mt. Whitney draba	None/None G2/S2 1B.3	Alpine boulder and rock field, Subalpine coniferous forest. Protected rock crevices. 3300-3960m. Blooms Jul-Aug.
Dudleya cymosa ssp. *costatifolia* Pierpoint Springs dudleya	None/None G5T1/S1 1B.2	Chaparral, Cismontane woodland. On limestone on south-facing slope with *Arabis*, *Cercocarpus*, *Fremontodendron*, etc. 1435-1600m. Blooms May-Jul.
Elymus scribneri Scribner's wheat grass	None/None G5/S3 2B.3	Alpine boulder and rock field. On rocky slopes. 2900-4200m. Blooms Jul-Aug.
Eremalche parryi ssp. *kernensis* Kern mallow	FE/None G3G4T3/S3 1B.2	Chenopod scrub, Pinyon and juniper woodland, Valley and foothill grassland. On dry, open, sandy to clay soils; usually within valley saltbush scrub; often at edge of balds. 70-1290m. Blooms Jan(Feb)Mar-May.

Scientific Name Common Name	Status Fed/State ESA Global Rank/ State Rank CRPR	Habitat Requirements
Ericameria gilmanii Gilman's goldenbush	None/None G2/S2 1B.3	Subalpine coniferous forest, Upper montane coniferous forest. Rocky sites in open coniferous forests; generally, on limestone; can be on granite. 2100-3400m. Blooms Aug-Sep.
Erigeron aequifolius Hall's daisy	None/None G3/S3 1B.3	Broad-leafed upland forest, Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest. On dry rock outcrops in granite walls and canyons. 1500-2440m. Blooms Jun-Aug.
Erigeron inornatus var. *keilii* Keil's daisy	None/None G5T2/S2 1B.3	Lower montane coniferous forest, Meadows and seeps. Dry slopes, meadows, generally in mixed coniferous forests. 1800-2200m. Blooms Jun-Sep.
Erigeron multiceps Kern River daisy	None/None G2G3/S2S3 1B.2	Meadows and seeps, Upper montane coniferous forest. Riverbanks and dry meadow borders; usually in open, grassy areas. 1500-2535m. Blooms Jun-Sep.
Eriogonum nudum var. *murinum* mouse buckwheat	None/None G5T2/S2 1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland. Dry sandy loam slopes in the Kaweah River drainage. 365-1130m. Blooms Jun-Nov.
Eriogonum twisselmannii Twisselmann's buckwheat	None/SR G2/S2 1B.2	Upper montane coniferous forest. Dry, granitic outcrops. 2375-2805m. Blooms Jun-Sep.
Eriogonum wrightii var. *olanchense* Olancha Peak buckwheat	None/None G5T2/S2 1B.3	Alpine boulder and rock field, Subalpine coniferous forest. Dry gravelly to rocky places; open areas at base of boulders. 3260-3535m. Blooms Jul-Sep.
Eryngium spinosepalum spiny-sepaled button-celery	None/None G2/S2 1B.2	Valley and foothill grassland, Vernal pools. Some sites on clay soil of granitic origin; vernal pools, within grassland. 80-975m. Blooms Apr-Jun.
Erythranthe norrisii Kaweah monkeyflower	None/None G2/S2 1B.3	Chaparral, Cismontane woodland. Marble outcrops, soil pockets, moss-covered ledges, cracks in outcrops, sometimes on south-facing cliffs. 365-1300m. Blooms Mar-May.
Erythronium pusaterii Kaweah fawn lily	None/None G3/S3 1B.3	Meadows and seeps, Subalpine coniferous forest. On granitic loam soils and granite outcrops; also, on metamorphic soils. 2200-2775m. 2100-2775m. Blooms May-Jul.
Euphorbia hooveri Hoover's spurge	FT/None G1/S1 1B.2	Vernal pools. Vernal pools on volcanic mudflow or clay substrate. 25-250m. Blooms Jul-Sep(Oct).
Fritillaria brandegeei Greenhorn fritillary	None/None G2G3/S2S3 1B.3	Lower montane coniferous forest. Loamy, granitic soils; often in mixed conifer-black oak community. 1330-2100m. Blooms Apr-Jun.
Fritillaria striata striped adobe-lily	None/ST G1/S1 1B.1	Cismontane woodland, Valley and foothill grassland. Heavy clay adobe soils in oak grassland. 135-1455m. Blooms Feb-Apr.
Galium angustifolium ssp. *onycense* Onyx Peak bedstraw	None/None G5T3/S3 1B.3	Cismontane woodland, Pinyon and juniper woodland. Grows from under and between large granite rocks and outcrops with scattered grey pines and oaks. 860-2300m. Blooms Apr-Jul.
Githopsis tenella delicate bluecup	None/None G2/S2 1B.3	Chaparral, Cismontane woodland. Mesic sites. Sometimes on serpentine. 325-1900m. Blooms Apr-Jun.
Glyceria grandis American manna grass	None/None G5/S3 2B.3	Bogs and fens, Marshes and swamps, Meadows and seeps. Wet meadows, ditches, streams, and ponds, in valleys and lower elevations in the mountains. 15-1980m. Blooms Jun-Aug.
Greeneocharis circumscissa var. *rosulata* rosette cushion cryptantha	None/None G5T2/S2 1B.2	Alpine boulder and rock field, Subalpine coniferous forest. Gravelly, granitic substrates. 2950-3660m. Blooms Jul-Aug.

Scientific Name Common Name	Status Fed/State ESA Global Rank/ State Rank CRPR	Habitat Requirements
Hackelia sharsmithii Sharsmith's stickseed	None/None G3/S3 2B.3	Alpine boulder and rock field, Subalpine coniferous forest. Cracks, crevices in granite cliffs; large boulder talus. 3000-3700m. Blooms Jul-Sep.
Helianthus winteri Winter's sunflower	None/None G2?/S2? 1B.2	Cismontane woodland, Valley and foothill grassland. Openings on relatively steep south-facing slopes, granitic, often rocky, often roadsides. 125-460m. Blooms Jan-Dec.
Hesperocyparis nevadensis Piute cypress	None/None G2/S2 1B.2	Chaparral, Cismontane woodland, Closed-cone coniferous forest, Pinyon and juniper woodland. On dry slopes; known from granodiorite, gabbro and limestone. 720-1830m.
Horkelia tularensis Kern Plateau horkelia	None/None G2/S2 1B.3	Upper montane coniferous forest. Metamorphic gravel along an exposed ridge top. 2255-2875m. Blooms (May)Jun-Aug.
Hosackia oblongifolia var. *cuprea* copper-flowered bird's-foot trefoil	None/None G5T2/S2 1B.3	Meadows and seeps, Upper montane coniferous forest. Wet meadow borders. 2400-2750m. Blooms Jun-Aug.
Hulsea brevifolia short-leaved hulsea	None/None G3/S3 1B.2	Lower montane coniferous forest, Upper montane coniferous forest. Granitic or volcanic soil of forest openings and road cuts. 1500-3200m. Blooms May-Aug.
Hulsea vestita ssp. *pygmaea* pygmy hulsea	None/None G5T1/S1 1B.3	Alpine boulder and rock field, Subalpine coniferous forest. Gravelly sites; on granite. 2835-3900m. Blooms Jun-Oct.
Imperata brevifolia California satintail	None/None G4/S3 2B.1	Chaparral, Coastal scrub, Meadows and seeps, Mojavean desert scrub, Riparian scrub. Mesic sites, alkali seeps, riparian areas. 0-1215m. Blooms Sep-May.
Iris munzii Munz's iris	None/None G2/S2 1B.3	Cismontane woodland. Granitic moist sandy loam soil, often along streams. 305-800m. Blooms Mar-Apr(May).
Ivesia campestris field ivesia	None/None G3/S3 1B.2	Meadows and seeps, Subalpine coniferous forest, Upper montane coniferous forest. Meadow edges. 1975-3395m. Blooms May-Aug.
Jaffueliobryum wrightii Wright's jaffueliobryum moss	None/None G5/S2S3 2B.3	Alpine dwarf scrub, Mojavean desert scrub, Pinyon and juniper woodland. Dry openings, rock crevices, carbonate. 160-2500m.
Lasthenia chrysantha alkali-sink goldfields	None/None G2/S2 1B.1	Vernal pools. Alkaline 0-200m. Blooms Feb-Apr.
Lasthenia glabrata ssp. *coulteri* Coulter's goldfields	None/None G4T2/S2 1B.1	Annual herb. Blooms February to June. Coastal salt marshes, playas, valley and foothill grassland, vernal pools. Usually found on alkaline soils in playas, sinks, and grasslands. 1-1400m (3-4595ft).
Leptosiphon serrulatus Madera leptosiphon	None/None G3/S3 1B.2	Cismontane woodland, Lower montane coniferous forest. Dry slopes; often on decomposed granite in woodland. 300-1300m. Blooms Apr-May.
Lewisia disepala Yosemite lewisia	None/None G2/S2 1B.2	Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest. Fine gravel on rock outcrops, ridges, or domes. Granitic soils. 1035-3500m. Blooms Mar-Jun.
Lupinus lepidus var. *culbertsonii* Hockett Meadows lupine	None/None G5T3/S3 1B.3	Meadows and seeps, Upper montane coniferous forest. Generally mesic, rocky sites. 2440-3000m. Blooms Jul-Aug.

Scientific Name Common Name	Status Fed/State ESA Global Rank/ State Rank CRPR	Habitat Requirements
Lupinus padre-crowleyi Father Crowley's lupine	None/SR G2/S2 1B.2	Great Basin scrub, Riparian forest, Riparian scrub, Upper montane coniferous forest. Scattered on steep avalanche chutes, in sunny sites in drainages, and in valley bottoms; decomposed granite. 2200-4000m. Blooms Jul-Aug.
Meesia uliginosa broad-nerved hump moss	None/None G5/S3 2B.2	Bogs and fens, Meadows and seeps, Subalpine coniferous forest, Upper montane coniferous forest. Moss on damp soil. Often found on the edge of fens or raised above the fen on hummocks/shrub bases. 1210-2804m. Blooms Jul-Oct.
Mielichhoferia shevockii Shevock's copper moss	None/None G2/S2 1B.2	Cismontane woodland. Moss on metamorphic rocks containing heavy metals; mesic sites. On rocks along roads, in same habitat as *Mielichhoferia elongata*. 750-1400m.
Monardella beneolens sweet-smelling monardella	None/None G2/S2 1B.3	Alpine boulder and rock field, Subalpine coniferous forest, Upper montane coniferous forest. Granitic soils; open conifer forest with *Eriogonum* spp., *Trifolium*, *Erigeron*, etc. 2475-3500m. Blooms Jun-Sep.
Monolopia congdonii San Joaquin woollythreads	FE/None G2/S2 1B.2	Chenopod scrub, Valley and foothill grassland. Alkaline or loamy plains; sandy soils, often with grasses and within chenopod scrub. 60-800m. Blooms Feb-May.
Myurella julacea small mousetail moss	None/None G5/S2 2B.3	Alpine boulder and rock field, Subalpine coniferous forest. Moss growing on damp limestone rock and soil. Crevices, under hangs, shelves; in filtered light. Sometimes on granite. 2700-3000m.
Navarretia nigelliformis ssp. *radians* shining navarretia	None/None G4T2/S2 1B.2	Cismontane woodland, Valley and foothill grassland, Vernal pools. Apparently in grassland, and not necessarily in vernal pools. 65-1000m. Blooms (Mar)Apr-Jul.
Navarretia setiloba Piute Mountains navarretia	None/None G2/S2 1B.1	Cismontane woodland, Pinyon and juniper woodland, Valley and foothill grassland. Red clay soils, or on gravelly loam. 285-2100m. Blooms Apr-Jul.
Nemacladus calcaratus Chimney Creek nemacladus	None/None G1/S1 1B.2	Pinyon and juniper woodland. Openings on granitic substrate. 1900-2100m. Blooms May-Jun.
Nemacladus twisselmannii Twisselmann's nemacladus	None/SR G1/S1 1B.2	Upper montane coniferous forest. Sandy or rocky granitic soils, open ridgetops and gentle slopes in Jeffrey pine forest. 2240-2450m. Blooms Jul.
Orcuttia inaequalis San Joaquin Valley Orcutt grass	FT/SE G1/S1 1B.1	Vernal pools. 10-755m. Blooms Apr-Sep.
Oreonana purpurascens purple mountain-parsley	None/None G3/S3 1B.2	Broad-leafed upland forest, Subalpine coniferous forest, Upper montane coniferous forest. Open, metamorphic ridgetops in red fir forest. 2395-2865m. Blooms May-Jun.
Orthotrichum holzingeri Holzinger's orthotrichum moss	None/None G3G4/S2 1B.3	Cismontane woodland, Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest. Usually on rock in and along streams; rarely on tree limbs. 715-1800m.
Orthotrichum spjutii Spjut's bristle moss	None/None G1G2/S1 1B.3	Lower montane coniferous forest, Pinyon and juniper woodland, Subalpine coniferous forest, Upper montane coniferous forest. Moss growing on granitic rock; known only from near Sonora Pass. 2100-2400m.
Packera indecora rayless mountain ragwort	None/None G5/S2? 2B.2	Meadows and seeps. Mesic sites. 1450-2000m. Blooms Jul-Aug.
Petrophytum caespitosum ssp. *acuminatum* marble rockmat	None/None G5T2/S2 1B.3	Lower montane coniferous forest, Upper montane coniferous forest. Limestone or granite. Rocky sites. 1015-2300m. Blooms Aug-Sep.

Scientific Name Common Name	Status Fed/State ESA Global Rank/ State Rank CRPR	Habitat Requirements
Phacelia nashiana Charlotte's phacelia	None/None G3/S3 1B.2	Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland. Granitic soils; sandy or rocky areas on steep slopes or flats. 600-2200m. Blooms Mar-Jun.
Phacelia novenmillensis Nine Mile Canyon phacelia	None/None G3/S3 1B.2	Broad-leafed upland forest, Cismontane woodland, Pinyon and juniper woodland, Upper montane coniferous forest. Dry disturbed banks, granitic or metamorphic soils; sandy or gravelly sites. 1645-2640m. Blooms (Feb)May-Jun.
Poa lettermanii Letterman's blue grass	None/None G4/S3 2B.3	Alpine boulder and rock field. Sandy or rocky sites. 3500-4265m. Blooms Jul-Aug.
Pohlia tundrae tundra thread moss	None/None G3/S3 2B.3	Alpine boulder and rock field. Moss growing on gravelly, damp soil. 2700-3000m.
Pseudobahia peirsonii San Joaquin adobe sunburst	FT/SE G1/S1 1B.1	Cismontane woodland, Valley and foothill grassland. Grassy valley floors and rolling foothills in heavy clay soil. 90-800m. Blooms Feb-Apr.
Puccinellia simplex California alkali grass	None/None G3/S2 1B.2	Chenopod scrub, Meadows and seeps, Valley and foothill grassland, Vernal pools. Alkaline, vernally mesic. Sinks, flats, and lake margins. 2-930m. Blooms Mar-May.
Ribes menziesii var. *ixoderme* aromatic canyon gooseberry	None/None G4T2/S2 1B.2	Chaparral, Cismontane woodland. In forest openings. 610-1160m. Blooms Apr.
Ribes tularense Sequoia gooseberry	None/None G1/S1 1B.3	Lower montane coniferous forest, Upper montane coniferous forest. In sandy loam derived from granitic soils or deep clays. With Abies, Pinus, Ribes, etc. 1500-2075m. Blooms May.
Sabulina stricta bog sandwort	None/None G5/S3 2B.3	Alpine boulder and rock field, Alpine dwarf scrub, Meadows and seeps. Moist, granitic gravelly sites in sedge meadows and other alpine habitats. 2440-3960m. Blooms Jul-Sep.
Sagittaria sanfordii Sanford's arrowhead	None/None G3/S3 1B.2	Marshes and swamps. In standing or slow-moving freshwater ponds, marshes, and ditches. 0-650m. Blooms May-Oct(Nov).
Senecio aphanactis chaparral ragwort	None/None G3/S2 2B.2	Chaparral, Cismontane woodland, Coastal scrub. Drying alkaline flats. 15-800m. Blooms Jan-Apr(May).
Sidalcea keckii Keck's checkerbloom	FE/None G2/S2 1B.1	Cismontane woodland, Valley and foothill grassland. Grassy slopes in blue oak woodland. On serpentine-derived, clay soils, at least sometimes. 75-650m. Blooms Apr-May(Jun).
Sidalcea multifida cut-leaf checkerbloom	None/None G3/S2 2B.3	Great Basin scrub, Lower montane coniferous forest, Meadows and seeps, Pinyon and juniper woodland. 1750-2800m. Blooms May-Sep.
Sphenopholis obtusata prairie wedge grass	None/None G5/S2 2B.2	Cismontane woodland, Meadows and seeps. Open moist sites, along rivers and springs, alkaline desert seeps. 300-2000m. Blooms Apr-Jul.
Streptanthus gracilis alpine jewelflower	None/None G3/S3 1B.3	Subalpine coniferous forest, Upper montane coniferous forest. Gravel pockets among granitic outcrops and talus boulders. 2800-3500m. Blooms Jul-Aug.
Trichodon cylindricus cylindrical trichodon	None/None G4G5/S2 2B.2	Broad-leafed upland forest, Meadows and seeps, Upper montane coniferous forest. Moss growing in openings on sandy or clay soils on roadsides, stream banks, trails or in fields. 50-2002m.

Scientific Name Common Name	Status Fed/State ESA Global Rank/ State Rank CRPR	Habitat Requirements
Trifolium dedeckerae Dedecker's clover	None/None G2/S2 1B.3	Lower montane coniferous forest, Pinyon and juniper woodland, Subalpine coniferous forest, Upper montane coniferous forest. Gravelly canyons and slopes, cracks in granite rock outcrops, and understory of pinyon pines. 2100-3500m. Blooms May-Jul.
Triglochin palustris marsh arrow-grass	None/None G5/S2 2B.3	Marshes and swamps, Meadows and seeps, Subalpine coniferous forest. Mesic sites. 2285-3700m. Blooms Jul-Aug.
Tuctoria greenei Greene's tuctoria	FE/SR G1/S1 1B.1	Vernal pools. Vernal pools in open grasslands. 30-1070m. Blooms May-Jul(Sep).
Utricularia intermedia flat-leaved bladderwort	None/None G5/S3 2B.2	Bogs and fens, Marshes and swamps, Meadows and seeps, Vernal pools. Mesic meadows, lake margins, marshes, fens. 1200-2700m. Blooms Jul-Aug.
Viola pinetorum ssp. *grisea* grey-leaved violet	None/None G4G5T3/S3 1B.2	Meadows and seeps, Subalpine coniferous forest, Upper montane coniferous forest. Dry mountain peaks and slopes. 1500-3400m. Blooms Apr-Jul.

FE = Federally Endangered FT = Federally Threatened DL = Delisted
SE = State Endangered ST = State Threatened SR = State Rare
G-Rank/S-Rank = Global Rank and State Rank as per NatureServe and CDFW's CNDDB RareFind5.

CRPR (California Rare Plant Rank):
1A=Presumed Extinct in California
1B=Rare, Threatened, or Endangered in California and elsewhere
2=Rare, Threatened, or Endangered in California, but more common elsewhere
3=Need more information (a Review List)
4=Plants of Limited Distribution (a Watch List)

CRPR Threat Code Extension:
.1=Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2=Fairly endangered in California (20-80% occurrences threatened)
.3=Not very endangered in California (<20% of occurrences threatened)
Sources: CNDDB (CDFW 2021a); USFWS IPaC (2021a), and CNPS Rare Plant Inventory (2021)

Table B-2 Special-Status Wildlife Species with the Potential to Occur within TCAG Region

Scientific Name Common Name	Status Fed/State ESA Global Rank/ State Rank CDFW	Habitat Requirements
Invertebrates		
Bombus crotchii Crotch bumble bee	None/SCE G3G4/S1S2	Coastal California east to the Sierra-Cascade crest and south into Mexico. Food plant genera include *Antirrhinum*, *Phacelia*, *Clarkia*, *Dendromecon*, *Eschscholzia*, and *Eriogonum*.
Bombus occidentalis western bumble bee	None/SCE G2G3/S1	Once common & widespread, species has declined precipitously from central CA to southern B.C., perhaps from disease.
Branchinecta lynchi vernal pool fairy shrimp	FT/None G3/S3	Endemic to the grasslands of the Central Valley, Central Coast mountains, and South Coast mountains, in astatic rain-filled pools. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.
Desmocerus californicus dimorphus valley elderberry longhorn beetle	FT/None G3T2/S3	Occurs only in the Central Valley of California, in association with blue elderberry (*Sambucus mexicana*). Prefers to lay eggs in elderberries 2-8 inches in diameter; some preference shown for "stressed" elderberries.
Lepidurus packardi vernal pool tadpole shrimp	FE/None G4/S3S4	Inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water. Pools commonly found in grass-bottomed swales of unplowed grasslands. Some pools are mud-bottomed and highly turbid.
Fish		
Oncorhynchus mykiss aguabonita California golden trout	None/None G5T1/S1 SSC	Native to Kern Plateau in wide, shallow and exposed streams with little riparian vegetation. Transplanted within and outside of California beyond native range. Stream bottoms of sand, gravel and some cobble. Water is clear and usually cold, but summer temperatures can vary from 3 to 22 degrees C.
Oncorhynchus mykiss gilberti Kern River rainbow trout	None/None G5T1Q/S1 SSC	Endemic to the upper Kern River and its tributaries. Cool, clear, fast flowing streams where riffles are abundant.
Oncorhynchus mykiss whitei Little Kern golden trout	FT/None G5T2/S2	Native to the Little Kern River in Tulare County. Found in clear, cold mountain streams and lakes at 5,000 to 9,000 ft. Need well-oxygenated, gravel-bottomed shallows for spawning.
Amphibians		
Hydromantes platycephalus Mount Lyell salamander	None/None G4/S4 WL	Massive rock areas in mixed conifer, red fir, lodgepole pine, and subalpine habitats, 4000 to 11,600 feet in elevation. Active on the surface only when free water is available, in the form of seeps, drips, or spray. Rocky habitat, including cliff faces and cave walls. Occasionally found under woody debris.
Lithobates pipiens northern leopard frog	None/None G5/S2 SSC	Native range is east of Sierra Nevada-Cascade Crest. Near permanent or semi-permanent water in a variety of habitats. Highly aquatic species. Shoreline cover, submerged and emergent aquatic vegetation are important habitat characteristics.
Rana boylii foothill yellow-legged frog	None/SE G3/S3 SSC	Partly shaded, shallow streams and riffles with a rocky substrate in a variety of habitats. Needs at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis.

Scientific Name Common Name	Status Fed/State ESA Global Rank/ State Rank CDFW	Habitat Requirements
Rana muscosa southern mountain yellow-legged frog	FE/SE G1/S1 WL	Federal listing refers to populations in the San Gabriel, San Jacinto, and San Bernardino mountains (southern DPS). Northern DPS was determined to warrant listing as endangered, Apr 2014, effective Jun 30, 2014. Always encountered within a few feet of water. Tadpoles may require 2 - 4 years to complete their aquatic development.
Spea hammondii western spadefoot	None/None G2G3/S3 SSC	Occurs primarily in grassland habitats, but can be found in valley-foothill hardwood woodlands. Vernal pools are essential for breeding and egg-laying.
Reptiles		
Anniella grinnelli Bakersfield legless lizard	None/None G2G3/S2S3 SSC	Southern San Joaquin Valley. Known from two disjunct areas: the east side of the Carrizo Plain and portions of the city limits of Bakersfield. Microhabitat of this species is poorly known. Other legless lizard species occur in sparsely vegetated areas with moist, loose soil. Often found underneath leaf litter, rocks, and logs.
Anniella pulchra Northern California legless lizard	None/None G3/S3 SSC	Sandy or loose loamy soils under sparse vegetation. Soil moisture is essential. They prefer soils with a high moisture content.
Anniella spp. California legless lizard	None/None G3G4/S3S4 SSC	Contra Costa County south to San Diego, within a variety of open habitats. This element represents California records of *Anniella* not yet assigned to new species within the *Anniella pulchra* complex. Variety of habitats; generally, in moist, loose soil. They prefer soils with a high moisture content.
Emys marmorata western pond turtle	None/None G3G4/S3 SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation. Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.
Gambelia sila blunt-nosed leopard lizard	FE/SE G1/S1 FP	Resident of sparsely vegetated alkali and desert scrub habitats, in areas of low topographic relief. Seeks cover in mammal burrows, under shrubs or structures such as fence posts; they do not excavate their own burrows.
Masticophis flagellum ruddocki San Joaquin coachwhip	None/None G5T2T3/S2? SSC	Open, dry habitats with little or no tree cover. Found in valley grassland and saltbush scrub in the San Joaquin Valley. Needs mammal burrows for refuge and oviposition sites.
Phrynosoma blainvillii coast horned lizard	None/None G3G4/S3S4 SSC	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.
Birds		
Accipiter cooperii Cooper's hawk	None/None G5/S4 WL	Woodland, chiefly of open, interrupted or marginal type. Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river floodplains; also, live oaks.
Accipiter gentilis northern goshawk	None/None G5/S3 SSC	Within, and in vicinity of, coniferous forest. Uses old nests and maintains alternate sites. Usually nests on north slopes, near water. Red fir, lodgepole pine, Jeffrey pine, and aspens are typical nest trees.

Scientific Name Common Name	Status Fed/State ESA Global Rank/ State Rank CDFW	Habitat Requirements
Agelaius tricolor tricolored blackbird	None/ST G1G2/S1S2 SSC	Highly colonial species, most numerous in Central Valley and vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging area with insect prey within a few km of the colony.
Aquila chrysaetos golden eagle	None/None G5/S3 FP WL	Rolling foothills, mountain areas, sage-juniper flats, and desert. Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.
Athene cunicularia burrowing owl	None/None G4/S3 SSC	Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.
Buteo swainsoni Swainson's hawk	None/ST G5/S3	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural or ranch lands with groves or lines of trees. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.
Charadrius montanus mountain plover	None/None G3/S2S3 SSC	Short grasslands, freshly plowed fields, newly sprouting grain fields, & sometimes sod farms. Short vegetation, bare ground, and flat topography. Prefers grazed areas and areas with burrowing rodents.
Charadrius nivosus nivosus western snowy plover	FT/None G3T3/S2 SSC	Sandy beaches, salt pond levees & shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting.
Coccyzus americanus occidentalis western yellow-billed cuckoo	FT/SE G5T2T3/S1	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems. Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.
Cypseloides niger black swift	None/None G4/S2 SSC	Coastal belt of Santa Cruz and Monterey counties; central & southern Sierra Nevada; San Bernardino & San Jacinto mountains. Breeds in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and sea-bluffs above the surf; forages widely.
Dendragapus fuliginosus howardi Mount Pinos sooty grouse	None/None G5T2T3/S2S3 SSC	Inhabitant of southern Sierra Nevada mountains, in small islands of populations. Mainly inhabits white fir covered slopes. Also found in other conifer types and open, brushy areas adjacent to forest.
Empidonax traillii willow flycatcher	None/SE G5/S1S2	Inhabits extensive thickets of low, dense willows on edge of wet meadows, ponds, or backwaters; 2000-8000 ft elevation. Requires dense willow thickets for nesting/roosting. Low, exposed branches are used for singing posts/hunting perches.
Gymnogyps californianus California condor	FE/SE G1/S1 FP	Require vast expanses of open savannah, grasslands, and foothill chaparral in mountain ranges of moderate altitude. Deep canyons containing clefts in the rocky walls provide nesting sites. Forages up to 100 miles from roost/nest.
Haliaeetus leucocephalus bald eagle	FD/SE G5/S3 FP	Ocean shore, lake margins, and rivers for both nesting and wintering. Most nests within 1 mile of water. Nests in large, old-growth, or dominant live tree with open branches, especially ponderosa pine. Roosts communally in winter.
Lanius ludovicianus loggerhead shrike	None/None G4/S4 SSC	Broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub & washes. Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting.

Scientific Name Common Name	Status Fed/State ESA Global Rank/ State Rank CDFW	Habitat Requirements
Strix nebulosa great gray owl	None/SE G5/S1	Resident of mixed conifer or red fir forest habitat, in or on edge of meadows. Requires large diameter snags in a forest with high canopy closure, which provide a cool sub-canopy microclimate.
Mammals		
Ammospermophilus nelsoni Nelson's antelope squirrel	None/ST G2G3/S2S3	Occurs in Western San Joaquin Valley from 200-1200 feet elevation. Uses dry, sparsely vegetated areas with a variety of soils suitable for digging. Digs burrows or uses kangaroo rat or other small mammal burrows. Needs widely scattered shrubs, forbs, and grasses in broken terrain, often with gullies and washes.
Antrozous pallidus pallid bat	None/None G4/S3 SSC	Found in a variety of habitats including deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts in crevices of rock outcrops, caves, mine tunnels, buildings, bridges, and hollows of live and dead trees which must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.
Aplodontia rufa californica Sierra Nevada mountain beaver	None/None G5T3T4/S2S3 SSC	Dense growth of small deciduous trees & shrubs, wet soil, & abundance of forbs in the Sierra Nevada & east slope. Needs dense understory for food & cover. Burrows into soft soil. Needs abundant supply of water.
Corynorhinus townsendii Townsend's big-eared bat	None/None G4/S2 SSC	Occurs throughout California in a wide variety of habitats. Most common in mesic sites, typically coniferous or deciduous forests. Roosts in the open, hanging from walls & ceilings in caves, lava tubes, bridges, and buildings. This species is extremely sensitive to human disturbance.
Dipodomys nitratoides nitratoides Tipton kangaroo rat	FE/SE G3T1T2/S1S2	Found in saltbush scrub and sink scrub communities in the Tulare Lake Basin of the southern San Joaquin Valley. Needs soft friable soils for burrowing which do not experience seasonal flooding. Often digs burrows in elevated mounds, including the base of shrubs in densely vegetated areas.
Euderma maculatum spotted bat	None/None G4/S3 SSC	Occupies a wide variety of habitats from arid deserts and grasslands through mixed conifer forests. Typically forages in open terrain; over water and along washes. Feeds almost entirely on moths. Roosts in rock crevices in cliffs or caves. Occasionally roosts in buildings.
Eumops perotis californicus western mastiff bat	None/None G4G5T4/S3S4 SSC	Occurs in open, semi-arid to arid habitats, including coniferous and deciduous woodlands, coastal scrub, grasslands, and chaparral. Roosts in crevices in cliff faces and caves, and buildings. Roosts typically occur high above ground.
Gulo gulo California wolverine	None/ST G4/S1 FP	Found in the north coast mountains and the Sierra Nevada. Found in a wide variety of high elevation habitats. Needs water source. Uses caves, logs, burrows for cover and den area. Hunts in more open areas. Can travel long distances.
Ovis canadensis sierrae Sierra Nevada bighorn sheep	FE/SE G4T2/S2 FP	Historically found along the east side and crest of the Sierra Nevada, and on the Great Western Divide. Available water and steep, open terrain free of competition from other grazing ungulates.
Pekania pennanti pop. 2 Fisher - Southern Sierra Nevada ESU	FE/ST G5T1/S1 SSC	Intermediate to large-tree stages of coniferous forests and deciduous-riparian areas with high percent canopy closure. Uses cavities, snags, logs and rocky areas for cover and denning. Needs large areas of mature, dense forest.

Scientific Name Common Name	Status Fed/State ESA Global Rank/ State Rank CDFW	Habitat Requirements
Taxidea taxus American badger	None/None G5/S3 SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.
Vulpes macrotis mutica San Joaquin kit fox	FE/ST G4T2/S2	Annual grasslands or grassy open stages with scattered shrubby vegetation. Need loose-textured sandy soils for burrowing, and suitable prey base.
Vulpes vulpes necator Sierra Nevada red fox	FE/ST G5T1T2/S1	Historically found from the Cascades down to the Sierra Nevada. Found in a variety of habitats from wet meadows to forested areas. Use dense vegetation and rocky areas for cover and den sites. Prefer forests interspersed with meadows or alpine fell-fields.

FT = Federally Threatened SE = State Endangered
FC = Federal Candidate Species ST = State Threatened
FE = Federally Endangered SR = State Rare
FS = Federally Sensitive SS = State Sensitive
DL = Delisted
G-Rank/S-Rank = Global Rank and State Rank as per NatureServe and CDFW's CNDDB RareFind3
SSC = CDFW Species of Special Concern FP = Fully Protected WL = Watch List
Sources: CNDDB (CDFW 2021a); USFWS IPaC (2021a)

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Appendix C

TCAG 2022 RTP/SCS Performance Metric Data

TCAG DRAFT 2022 RTP/SCS Base

2005	Persons/HU	Population		HU	EMP	Regional VMT		SB375 VMT	VMT/perCapita	EMFAC 14 CO2	GHG/per capita lbs/day	
SB 375 Base Year	3.15	404,148		128,388	176,896	10,153,707		8,705,754	21.54	3,440	17.02	

2021	Persons/HU	Population	SF	MF	EMP	Regional VMT	SB743 VMT	SB375 VMT	VMT/perCapita	EF 14 CO2		
2022 RTP/SCS Base Year	3.12	481,649	118,928	35,508	187,137	10,617,248	14,566,292	9,176,214	19.05	3,526	14.64	**14.0%**

TCAG DRAFT 2022 RTP/SCS Metrics

Criteria Pollutants EMFAC 14

2005	Transit Ridership	TDM Mode Share DA	SR2	SR3+	Transit	Bike	Walk	Annual Heavy Duty Trucks PM10	PM2.5	ROG	Annual CO	NOX	CO2	PM10	Annual PM2.5	SOx	Fuel Gas	Fuel DSL
	10,205	38.61%	26.32%	27.74%	0.75%	1.04%	5.55%	0.7862	0.6208	9.3602	78.4561	30.2704	6511.7246	1.4096	0.9996	0.2303	478.7437	187.7021

2021	Transit Ridership	TDM Mode Share DA	SR2	SR3+	Transit	Bike	Walk											
	15,665	37.53%	26.66%	27.77%	1.18%	1.03%	5.82%	0.1445	0.0666	2.2658	15.1358	6.99485	5542.3831	0.6804	0.2969	0.0546	377.7340	181.7198

TCAG DRAFT 2022 RTP/SCS Scenario Metrics

SB 375 Data

ARB SB 375 Target 16% in 2035

	Persons/HU	Population	SF	MF	EMP	Regional VMT	SB743 VMT	SB375 VMT	VMT/perCapita	EF 14 CO2 tons/day	GHG/per capita lbs/day	% GHG/per capita Reduction	% Off Model Reduction	Total % GHG/per capita Reduction
2035														
Trend (No Project) Scenario TIP Projects Only	2.99	535,463	135,772	43,257	206,681	11,863,879	16,279,168	10,229,666	19.10	3,904	14.58	14.3%		14.3%
Trend Scenario Transit Maintain	2.99	535,463	135,772	43,257	206,681	12,235,962	16,714,462	10,597,169	19.79	4,044	15.10	11.3%		11.3%
Blueprint (Old Plan) Scenario Transit Grow	2.99	535,463	132,621	46,408	206,681	12,137,682	16,649,626	10,500,342	19.61	4,008	14.97	12.1%		12.1%
Blueprint Plus Scenario Transit Grow	2.99	535,463	131,503	47,526	206,681	11,740,528	16,164,311	10,103,006	18.87	3,857	14.41	15.4%		15.4%
CVC Blueprint Plus Scenario Transit Grow	2.99	535,463	130,733	48,297	206,681	11,699,147	16,112,163	10,061,677	18.79	3,841	14.35	**15.7%**	0.5%	16.2%
CVC Blueprint Plus2 (Preferred) Scenario Transit CVC	2.99	535,463	130,733	48,297	206,681	11,696,238	16,108,885	10,058,761	18.79	3,840	14.34	15.7%	0.5%	**16.2%**
2046														
Trend (No Project) Scenario TIP Projects Only	2.95	567,383	144,772	47,397	218,846	12,465,620	17,128,558	10,726,027	18.90	4,115	14.51	14.8%		14.8%
Trend Scenario Transit Maintain	2.95	567,383	144,772	47,397	218,846	12,877,346	17,606,515	11,133,303	19.62	4,277	15.08	11.4%		11.4%
Blueprint (Old Plan) Scenario Transit Grow	2.95	567,383	139,938	52,232	218,846	12,725,515	17,485,835	10,981,613	19.35	4,215	14.86	12.7%		12.7%
Blueprint Plus Scenario Transit Grow	2.95	567,383	138,222	53,947	218,846	12,299,408	16,966,705	10,555,689	18.60	4,051	14.28	16.1%		16.1%
CVC Blueprint Plus Scenario Transit Grow	2.95	567,383	137,040	55,129	218,846	12,244,957	16,896,121	10,501,457	18.51	4,031	14.21	**16.5%**	1.0%	17.5%
CVC Blueprint Plus2 (Preferred) Scenario Transit CVC	2.95	567,383	137,040	55,129	218,846	12,241,939	16,892,980	10,498,443	18.50	4,030	14.21	16.6%	1.0%	**17.6%**

	Transit Ridership	TDM Mode Share DA	SR2	SR3+	Transit	Bike	Walk	Annual Heavy Duty Trucks PM10	PM2.5	ROG	Annual CO	NOX	CO2	PM10	Annual PM2.5	SOx	Fuel Gas	Fuel DSL
2035																		
Trend (No Project) Scenario TIP Projects Only	17,466	37.39%	26.77%	27.86%	1.16%	1.05%	5.77%	0.1380	0.0555	1.1492	7.0571	3.0479	4455.8160	0.7052	0.2890	0.0436	269.4637	174.2284
Trend Scenario Transit Maintain	18,040	36.43%	27.41%	27.85%	1.14%	1.09%	6.08%	0.1424	0.0572	1.1852	7.2802	3.1434	4594.5650	0.7273	0.2981	0.0450	277.8102	179.6916
Blueprint (Old Plan) Scenario Transit Grow	21,047	36.26%	27.38%	27.75%	1.31%	1.10%	6.20%	0.1412	0.0568	1.1758	7.2216	3.1182	4558.6896	0.7215	0.2957	0.0446	275.6868	178.2496
Blueprint Plus Scenario Transit Grow	19,455	37.16%	26.72%	27.74%	1.29%	1.07%	6.02%	0.1366	0.0549	1.1374	6.9812	3.0163	4411.8295	0.6979	0.2860	0.0432	266.9075	172.4199
CVC Blueprint Plus (Prefered) Scenario Transit Grow	19,492	37.09%	26.72%	27.70%	1.30%	1.07%	6.11%	0.1361	0.0547	1.1334	6.9558	3.0056	4396.2241	0.6954	0.2850	0.0430	265.9606	171.8122
CVC Blueprint Plus2 Scenario Transit CVC	21,208	37.07%	26.70%	27.68%	1.38%	1.07%	6.10%	0.1361	0.0547	1.1331	6.9541	3.0049	4395.2022	0.6952	0.2850	0.0430	265.9019	171.7696
2046																		
Trend (No Project) Scenario TIP Projects Only	18,596	37.13%	26.87%	27.89%	1.17%	1.08%	5.86%	0.1391	0.0558	0.9171	5.9989	2.7327	4412.3987	0.7288	0.2955	0.0432	264.4985	174.3562
Trend Scenario Transit Maintain	19,161	36.18%	27.51%	27.88%	1.14%	1.12%	6.17%	0.1437	0.0577	0.9475	6.1927	2.8230	4560.4244	0.7529	0.3053	0.0446	273.4736	180.1185
Blueprint (Old Plan) Scenario Transit Grow	22,493	35.97%	27.49%	27.76%	1.32%	1.13%	6.33%	0.1420	0.0570	0.9363	6.1229	2.7897	4505.5206	0.7440	0.3017	0.0441	270.1308	177.9932
Blueprint Plus Scenario Transit Grow	20,818	36.83%	26.83%	27.73%	1.31%	1.10%	6.19%	0.1372	0.0551	0.9050	5.9154	2.6963	4356.1311	0.7191	0.2916	0.0426	261.2402	172.035
CVC Blueprint Plus (Prefered) Scenario Transit Grow	20,848	36.74%	26.83%	27.68%	1.32%	1.11%	6.31%	0.1366	0.0548	0.9010	5.8890	2.6844	4337.2178	0.7159	0.2903	0.0424	260.1226	171.2739
CVC Blueprint Plus2 Scenario Transit CVC	22,702	36.72%	26.81%	27.66%	1.40%	1.11%	6.30%	0.1366	0.0548	0.9008	5.8877	2.6837	4336.3915	0.7157	0.2902	0.0424	260.0841	171.2319

ENVISION TOMORROW Metrics

	Regional Gross Residential Density	New Developed Acres Consumed	Important Ag Land outside SOI	Critical Habitat Land Acres Consumed	CO2 Emissions per Household	Water Consumption per Household	Energy Use per Household
2046							
Trend Scenario Transit Maintain	4.9	9,193.0	2,205.0	163.0	9.9	288.5	106.6
Blueprint (Old Plan) Scenario Transit Grow	6.1	7,308.0	1,475.0	163.0	9.0	252.1	96.9
Blueprint Plus Scenario Transit Grow	6.4	6,913.0	1,404.0	163.0	8.8	243.7	94.6
CVC Blueprint Plus (Prefered) Scenario Transit Grow	6.5	6,849.0	1,377.0	163.0	8.8	242.8	94.4
CVC Blueprint Plus2 Scenario Transit CVC	6.5	6,849.0	1,377.0	163.0	8.8	242.8	94.4

543,495 2035
575,894 2046

TCAG DRAFT 2022 RTP/SCS Scenario Metrics

Item	Notes	Source
Persons/HU	Persons per housing unit	DOF
Population	Total scenario population	DOF
HU	Total scenario housing units	DOF/HCD
SF	Total single family housing units	DOF/HCD
MF	Total multi-family housing units	DOF/HCD
EMP	Total employment units	EDD/Caltrans
Regional VMT	Total daily VMT including XX trips	TCAG Model
SB 743 VMT	Total daily VMT including XX trips and beyond model vmt	TCAG Model
SB 375 VMT	Total daily VMT excluding XX trips	TCAG Model
VMT/per capita	SB 375 VMT per capita	TCAG Model
EF 14 CO2	SB375 daily CO2 tons (Annual) excluding XX trips	EMFAC 14
Total % GHG/per capita Reduction	Percent CO2 per capita reductions from 2005 base	EMFAC 14
Total % GHG/per capita Reduction - Off Model	Percent CO2 per capita reductions from 2005 base	Estimate TBD
Transit Ridership	Total daily regional transit ridership	TCAG Model
TDM Mode Share	Mode Share	TCAG Model
Heavy Duty PM10	PM10 total daily tons (Annual)	EMFAC 14
Heavy Duty PM2.5	PM2.5 total daily tons (Annual)	EMFAC 14
ROG	ROG total daily tons (Annual)	EMFAC 14
CO	CO total exhaust tons (Annual)	EMFAC 14
NOX	NOX total exhaust daily tons (Annual)	EMFAC 14
CO2	CO2 daily tons (Annual) including XX trips	EMFAC 14
PM10	PM10 total daily tons (Annual)	EMFAC 14
PM2.5	PM2.5 total daily tons (Annual)	EMFAC 14
SOx	SOx total exhaust tons (Annual)	EMFAC 14
Fuel Gas	Daily regional gasoline consumption thousands of gallons (Annual)	EMFAC 14
Fuel DSL	Daily regional diesel consumption thousands of gallons (Annual)	EMFAC 14
Regional Gross Residential Density	Gross residential density housing units per acre	Envision Tomorrow
New Developed Acres Consumed	New Developed Acres Consumed	Envision Tomorrow
Prime Ag Land Acres Consumed	Prime Ag Land Acres Consumed	Envision Tomorrow/FMMP
Critical Habitat Land Acres Consumed	Critical Habitat Land Acres Consumed	Envision Tomorrow/SJV Greenprint
CO2 Emissions per Household	CO2 tons per year	Envision Tomorrow
Water Consumption per Household	Water gallons per day	Envision Tomorrow
Energy Use per Household	Energy consumption in millions of BTU per year	Envision Tomorrow

SB 32 Analysis - CO_2 Emissions Estimates						
Annual Emissions (metric tons per year)						
		TCAG				
Year	**Regional VMT**	**CO_2 (tons/day)**	**CO_2 (lbs/day)**	**Population**	**Per Capita CO_2 (lbs/person/day)**	**% change from 1990 Baseline**
1990*	n/a	n/a	n/a	n/a	25.2	n/a
2005	10,153,707	5,980.4	11,960,790.87	404,148	29.6	n/a
Existing (2021)	10,617,248	5,377.9	10,755,752.15	481,649	22.3	-11%
2030 with 2022 RTP/SCS**	11,310,884	4,665.0	9,330,000.00	516,244	18.1	-28%
2046 with 2022 RTP/SCS	12,241,939	4,301.3	8,602,582.59	567,383	15.2	-40%

*1990 levels assumed to be 15% below 2005 levels

**2030 Regional VMT & population calculated via linear interpolation using 2021 and 2035 Regional VMT & population (See TCAG provided metrics)

Appendix D

Greenhouse Gas Emissions Calculations

Emissions Estimates				
Annual Emissions (metric tons per year)				
	TCAG			
Year	CO_2	CH_4	N_2O	CO_2e
Existing (2021)	2,482,806	115	181	2,539,741
2046 No Project	2,018,002	38	131	2,058,050
2046 Project	1,990,248	38	129	2,029,745
Net Change (2021 to 2046 Project)	(492,558)	(77)	(52)	(509,996)
Net Change (2046 No Project to 2046 Project)	(27,755)	(1)	(2)	(28,305)

2021 Population	481,649
2046 Population	567,383

**GWPs of 25 for CH_4 and 298 for N_2O were utilized to calculate CO_2e (consistent with CARB's 2017 Scoping Plan, which relied on IPCC AR4 estimates).*

	TCAG		
	Existing (2021)	2046 No Project	2046 RTP/SCS
Daily VMT	14,566,292	17,128,558	16,892,980
Daily Trips	2,008,328	2,119,527	2,090,376
Daily Vehicles	381,260	406,239	400,651

- Daily VMT provided by TCAG. Daily Trips and Daily Vehicles based on EMFAC Planning Inventory outputs for the respective year.

Days per Year	365

SCENARIO	TCAG 2021 - RUNEX

Source	EMFAC2021 (v1.0.1) Emission Rates
Region Type	MPO
Region	TCAG
Calendar Year	2021
Season	Annual
Vehicle Classification	EMFAC202x Categories
Emissions Rate and Vehicle Activity Units	Units: miles/day for VMT, g/mile for RUNEX

Daily VMT	14,566,292

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	CO_2 RUNEX	CH_4 RUNEX	N_2O RUNEX	Fleet Mix (by VMT)	VMT per Day	CO_2 RUNEX Emissions (tons/day)	CH_4 RUNEX Emissions (tons/day)	N_2O RUNEX Emissions (tons/day)
TCAG	2021	All Other Buses	Aggregate	Aggregate	Diesel	1130.239363	0.011779085	0.178069672	0.03%	4,065.34	4.59E+00	4.79E-05	7.24E-04
TCAG	2021	All Other Buses	Aggregate	Aggregate	Natural Gas	1082.261172	0.850610538	0.22062602	0.00%	121.34	1.31E-01	1.03E-04	2.68E-05
TCAG	2021	LDA	Aggregate	Aggregate	Gasoline	292.5553046	0.003154437	0.005865268	43.77%	6,375,641.30	1.87E+03	2.01E-02	3.74E-02
TCAG	2021	LDA	Aggregate	Aggregate	Diesel	238.9050532	0.00163448	0.037639588	0.09%	13,572.05	3.24E+00	2.22E-05	5.11E-04
TCAG	2021	LDA	Aggregate	Aggregate	Electricity	0	0	0	0.73%	105,898.21	0.00E+00	0.00E+00	0.00E+00
TCAG	2021	LDA	Aggregate	Aggregate	Plug-in Hybr	143.2785108	0.000427718	0.000605293	0.92%	134,388.43	1.93E+01	5.75E-05	8.13E-05
TCAG	2021	LDT1	Aggregate	Aggregate	Gasoline	355.8387444	0.016164069	0.021876208	3.73%	543,715.15	1.93E+02	8.79E-03	1.19E-02
TCAG	2021	LDT1	Aggregate	Aggregate	Diesel	397.6910213	0.013840007	0.062656382	0.00%	231.14	9.19E-02	3.20E-06	1.45E-05
TCAG	2021	LDT1	Aggregate	Aggregate	Electricity	0	0	0	0.00%	220.39	0.00E+00	0.00E+00	0.00E+00
TCAG	2021	LDT1	Aggregate	Aggregate	Plug-in Hybr	136.8275725	0.000410701	0.000583993	0.00%	119.10	1.63E-02	4.89E-08	6.96E-08
TCAG	2021	LDT2	Aggregate	Aggregate	Gasoline	371.063058	0.005057606	0.009977234	17.32%	2,522,840.37	9.36E+02	1.28E-02	2.52E-02
TCAG	2021	LDT2	Aggregate	Aggregate	Diesel	322.2981492	0.000888809	0.050778205	0.04%	5,935.28	1.91E+00	5.28E-06	3.01E-04
TCAG	2021	LDT2	Aggregate	Aggregate	Electricity	0	0	0	0.01%	1,659.01	0.00E+00	0.00E+00	0.00E+00
TCAG	2021	LDT2	Aggregate	Aggregate	Plug-in Hybr	139.0748345	0.0004166	0.00059134	0.06%	9,059.92	1.26E+00	3.77E-06	5.36E-06
TCAG	2021	LHD1	Aggregate	Aggregate	Gasoline	959.3052338	0.017231708	0.018828621	1.82%	265,628.13	2.55E+02	4.58E-03	5.00E-03
TCAG	2021	LHD1	Aggregate	Aggregate	Diesel	640.8552246	0.011583281	0.100967002	2.20%	320,646.98	2.05E+02	3.71E-03	3.24E-02
TCAG	2021	LHD2	Aggregate	Aggregate	Gasoline	1068.205675	0.01038665	0.015826997	0.28%	41,154.94	4.40E+01	4.27E-04	6.51E-04
TCAG	2021	LHD2	Aggregate	Aggregate	Diesel	783.1155987	0.010463571	0.123380181	0.73%	106,664.64	8.35E+01	1.12E-03	1.32E-02
TCAG	2021	MCY	Aggregate	Aggregate	Gasoline	188.9662374	0.200289208	0.046087342	0.32%	46,466.46	8.78E+00	9.31E-03	2.14E-03
TCAG	2021	MDV	Aggregate	Aggregate	Gasoline	452.2069718	0.007116896	0.013200745	20.56%	2,994,830.38	1.35E+03	2.13E-02	3.95E-02
TCAG	2021	MDV	Aggregate	Aggregate	Diesel	426.1969005	0.000659171	0.067147495	0.35%	50,586.37	2.16E+01	3.33E-05	3.40E-03
TCAG	2021	MDV	Aggregate	Aggregate	Electricity	0	0	0	0.01%	2,063.83	0.00E+00	0.00E+00	0.00E+00
TCAG	2021	MDV	Aggregate	Aggregate	Plug-in Hybr	143.8764916	0.000428672	0.000605622	0.08%	11,471.66	1.65E+00	4.92E-06	6.95E-06
TCAG	2021	MH	Aggregate	Aggregate	Gasoline	1951.779828	0.022283918	0.032926719	0.07%	9,816.45	1.92E+01	2.19E-04	3.23E-04
TCAG	2021	MH	Aggregate	Aggregate	Diesel	1077.204011	0.007220356	0.169713931	0.03%	4,986.30	5.37E+00	3.60E-05	8.46E-04
TCAG	2021	Motor Coach	Aggregate	Aggregate	Diesel	1768.087881	0.001989964	0.278562966	0.02%	3,152.90	5.57E+00	6.27E-06	8.78E-04
TCAG	2021	OBUS	Aggregate	Aggregate	Gasoline	1842.999461	0.027380565	0.040912928	0.04%	6,477.21	1.19E+01	1.77E-04	2.65E-04
TCAG	2021	PTO	Aggregate	Aggregate	Diesel	2180.209481	0.00468591	0.343492892	0.06%	9,030.06	1.97E+01	4.23E-05	3.10E-03
TCAG	2021	SBUS	Aggregate	Aggregate	Gasoline	846.7976819	0.012025788	0.027231629	0.05%	7,154.87	6.06E+00	8.60E-05	1.95E-04
TCAG	2021	SBUS	Aggregate	Aggregate	Diesel	1146.260599	0.00379057	0.180593824	0.08%	11,418.29	1.31E+01	4.33E-05	2.06E-03
TCAG	2021	SBUS	Aggregate	Aggregate	Natural Gas	1223.041061	2.936845968	0.249324921	0.01%	1,940.78	2.37E+00	5.70E-03	4.84E-04
TCAG	2021	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	1149.664273	0.000805227	0.181130074	0.00%	448.63	5.16E-01	3.61E-07	8.13E-05
TCAG	2021	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	1144.788211	0.000490316	0.180361849	0.00%	615.43	7.05E-01	3.02E-07	1.11E-04
TCAG	2021	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	1137.693481	0.000693754	0.179244071	0.01%	1,608.15	1.83E+00	1.12E-06	2.88E-04
TCAG	2021	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	1063.897905	0.000986773	0.167617548	0.07%	10,087.10	1.07E+01	9.95E-06	1.69E-03
TCAG	2021	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	1198.815278	0.009235054	0.188873835	0.02%	2,243.97	2.69E+00	2.07E-05	4.24E-04
TCAG	2021	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	1201.121868	0.006714924	0.189237239	0.01%	1,575.89	1.89E+00	1.06E-05	2.98E-04
TCAG	2021	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	1194.576183	0.004597243	0.188205964	0.07%	9,586.01	1.15E+01	4.41E-05	1.80E-03
TCAG	2021	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	1170.652891	0.00399312	0.18443684	0.02%	2,914.46	3.41E+00	1.16E-05	5.38E-04
TCAG	2021	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	1108.473104	0.867378059	0.225969494	0.00%	7.53	8.35E-03	6.53E-06	1.70E-06
TCAG	2021	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	1145.779699	0.00499734	0.180518058	0.11%	15,550.67	1.78E+01	7.77E-05	2.81E-03
TCAG	2021	T6 Instate Other Class 5	Aggregate	Aggregate	Diesel	1149.530531	0.00121557	0.181109003	0.27%	38,674.82	4.45E+01	4.70E-05	7.00E-03
TCAG	2021	T6 Instate Other Class 6	Aggregate	Aggregate	Diesel	1142.190302	0.004675153	0.179952547	0.24%	34,258.04	3.91E+01	1.60E-04	6.16E-03
TCAG	2021	T6 Instate Other Class 7	Aggregate	Aggregate	Diesel	1108.170406	0.0023858	0.174592699	0.17%	24,296.18	2.69E+01	5.80E-05	4.24E-03
TCAG	2021	T6 Instate Other Class 7	Aggregate	Aggregate	Natural Gas	968.2076785	0.695278643	0.197375469	0.00%	290.76	2.82E-01	2.02E-04	5.74E-05
TCAG	2021	T6 Instate Tractor Class 6	Aggregate	Aggregate	Diesel	1128.71806	0.001274306	0.17782999	0.00%	646.32	7.30E-01	8.24E-07	1.15E-04
TCAG	2021	T6 Instate Tractor Class 7	Aggregate	Aggregate	Diesel	1069.200106	0.001880835	0.168452912	0.14%	20,320.04	2.17E+01	3.82E-05	3.42E-03
TCAG	2021	T6 Instate Tractor Class 7	Aggregate	Aggregate	Natural Gas	965.1885111	0.694100289	0.196759992	0.00%	224.74	2.17E-01	1.56E-04	4.42E-05
TCAG	2021	T6 OOS Class 4	Aggregate	Aggregate	Diesel	1149.215997	0.000905623	0.181059448	0.00%	259.75	2.99E-01	2.35E-07	4.70E-05
TCAG	2021	T6 OOS Class 5	Aggregate	Aggregate	Diesel	1144.705297	0.000511335	0.180348786	0.00%	356.34	4.08E-01	1.82E-07	6.43E-05
TCAG	2021	T6 OOS Class 6	Aggregate	Aggregate	Diesel	1137.587606	0.000782986	0.179227391	0.01%	931.12	1.06E+00	7.29E-07	1.67E-04
TCAG	2021	T6 OOS Class 7	Aggregate	Aggregate	Diesel	1061.424562	0.001087905	0.167227872	0.05%	6,770.36	7.19E+00	7.37E-06	1.13E-03
TCAG	2021	T6 Public Class 4	Aggregate	Aggregate	Diesel	1256.637482	0.003428969	0.197983747	0.01%	1,099.80	1.38E+00	3.77E-06	2.18E-04
TCAG	2021	T6 Public Class 4	Aggregate	Aggregate	Natural Gas	1031.918128	0.815034297	0.210363261	0.00%	53.45	5.52E-02	4.36E-05	1.12E-05
TCAG	2021	T6 Public Class 5	Aggregate	Aggregate	Diesel	1244.872782	0.003276869	0.196130214	0.02%	2,242.66	2.79E+00	7.35E-06	4.40E-04
TCAG	2021	T6 Public Class 5	Aggregate	Aggregate	Natural Gas	1045.671147	0.838812913	0.213166904	0.00%	194.81	2.04E-01	1.63E-04	4.15E-05

SCENARIO	TCAG 2021 - STREX and IDLEX

Source	EMFAC2021 (v1.0.1) Emission Rates
Region Type	MPO
Region	TCAG
Calendar Year	2021
Season	Annual
Vehicle Classification	EMFAC202x Categories
Emissions Rate and Vehicle Activity Units	Units: trips/day for Trips, g/trip for STREX, g/vehicle/day for IDLEX

Daily Trips	2,008,328
Daily Vehicles	381,260

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	CO_2 IDLEX	CO_2 STREX	CH_4 IDLEX	CH_4 STREX	N_2O IDLEX	N_2O STREX	Fleet Mix (by Vehicle Trips)	Vehicle Trips per Day	Fleet Mix (by Vehicle Population)	Vehicles per Day	CO_2 STREX Emissions (tons/day)	CO_2 IDLEX Emissions (tons/day)	CH_4 STREX Emissions (tons/day)	CH_4 IDLEX Emissions (tons/day)	N_2O STREX Emissions (tons/day)	N_2O IDLEX Emissions (tons/day)
TCAG	2021	All Other Buses	Aggregate	Aggregate	Diesel	657.3334398	0	0.007174086	0	0.103563151	0	0.03%	693.66	0.02%	77.94	0.00E+00	5.12E-02	0.00E+00	5.59E-07	0.00E+00	8.07E-06
TCAG	2021	All Other Buses	Aggregate	Aggregate	Natural Gas	1380.577396	0	3.484524859	0	0.281439734	0	0.00%	18.26	0.00%	2.05	0.00E+00	2.83E-03	0.00E+00	7.15E-06	0.00E+00	5.77E-07
TCAG	2021	LDA	Aggregate	Aggregate	Gasoline	0	74.93692732	0	0.085085335	0	0.036072187	37.27%	748,558.50	42.42%	161,718.64	5.61E+01	0.00E+00	6.37E-02	0.00E+00	2.70E-02	0.00E+00
TCAG	2021	LDA	Aggregate	Aggregate	Diesel	0	0	0	0	0	0	0.09%	1,831.44	0.11%	431.09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2021	LDA	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.62%	12,467.64	0.65%	2,461.28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2021	LDA	Aggregate	Aggregate	Plug-in Hybrid	0	67.90956352	0	0.041791202	0	0.021301782	0.57%	11,497.78	0.73%	2,780.60	7.81E-01	0.00E+00	4.81E-04	0.00E+00	2.45E-04	0.00E+00
TCAG	2021	LDT1	Aggregate	Aggregate	Gasoline	0	102.053391	0	0.188087546	0	0.051267619	3.71%	74,445.53	4.66%	17,756.67	7.60E+00	0.00E+00	1.40E-02	0.00E+00	3.82E-03	0.00E+00
TCAG	2021	LDT1	Aggregate	Aggregate	Diesel	0	0	0	0	0	0	0.00%	41.74	0.00%	13.70	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2021	LDT1	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.00%	30.98	0.00%	6.68	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2021	LDT1	Aggregate	Aggregate	Plug-in Hybrid	0	74.54073269	0	0.042046527	0	0.021546298	0.00%	9.28	0.00%	2.24	6.91E-04	0.00E+00	3.90E-07	0.00E+00	2.00E-07	0.00E+00
TCAG	2021	LDT2	Aggregate	Aggregate	Gasoline	0	97.72654533	0	0.111846229	0	0.045701163	15.35%	308,354.96	17.60%	67,085.08	3.01E+01	0.00E+00	3.45E-02	0.00E+00	1.41E-02	0.00E+00
TCAG	2021	LDT2	Aggregate	Aggregate	Diesel	0	0	0	0	0	0	0.03%	672.52	0.04%	141.59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2021	LDT2	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.01%	235.84	0.01%	45.93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2021	LDT2	Aggregate	Aggregate	Plug-in Hybrid	0	80.93055166	0	0.041958484	0	0.021462131	0.04%	729.60	0.05%	176.45	5.90E-02	0.00E+00	3.06E-05	0.00E+00	1.57E-05	0.00E+00
TCAG	2021	LHD1	Aggregate	Aggregate	Gasoline	123.447591	25.23280406	0.120715837	0.039041095	0.002970796	0.052366219	5.95%	119,554.74	2.10%	8,024.61	3.02E+00	9.91E-01	4.67E-03	9.69E-04	6.26E-03	2.38E-05
TCAG	2021	LHD1	Aggregate	Aggregate	Diesel	138.3177285	0	0.005098128	0	0.021792014	0	5.64%	113,325.98	2.36%	9,009.32	0.00E+00	1.25E+00	0.00E+00	4.59E-05	0.00E+00	1.96E-04
TCAG	2021	LHD2	Aggregate	Aggregate	Gasoline	142.3459808	26.22410471	0.123550796	0.037523773	0.003062203	0.053830108	0.91%	18,191.99	0.32%	1,221.06	4.77E-01	1.74E-01	6.83E-04	1.51E-04	9.79E-04	3.74E-06
TCAG	2021	LHD2	Aggregate	Aggregate	Diesel	221.524329	0	0.005098128	0	0.034901248	0	1.84%	36,953.94	0.77%	2,937.81	0.00E+00	6.51E-01	0.00E+00	1.50E-05	0.00E+00	1.03E-04
TCAG	2021	MCY	Aggregate	Aggregate	Gasoline	0	57.56303707	0	0.21809666	0	0.010416577	0.86%	17,231.83	2.26%	8,615.91	9.92E-01	0.00E+00	3.76E-03	0.00E+00	1.79E-04	0.00E+00
TCAG	2021	MDV	Aggregate	Aggregate	Gasoline	0	119.1768169	0	0.146480904	0	0.052653783	19.05%	382,602.86	22.24%	84,774.16	4.56E+01	0.00E+00	5.60E-02	0.00E+00	2.01E-02	0.00E+00
TCAG	2021	MDV	Aggregate	Aggregate	Diesel	0	0	0	0	0	0	0.29%	5,907.33	0.33%	1,241.81	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2021	MDV	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.01%	294.10	0.01%	57.10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2021	MDV	Aggregate	Aggregate	Plug-in Hybrid	0	102.0091894	0	0.041732098	0	0.021245564	0.05%	999.29	0.06%	241.67	1.02E-01	0.00E+00	4.17E-05	0.00E+00	2.12E-05	0.00E+00
TCAG	2021	MH	Aggregate	Aggregate	Gasoline	0	32.13287725	0	0.038392395	0	0.039398695	0.01%	115.66	0.30%	1,156.13	3.72E-03	0.00E+00	4.44E-06	0.00E+00	4.56E-06	0.00E+00
TCAG	2021	MH	Aggregate	Aggregate	Diesel	0	0	0	0	0	0	0.00%	58.00	0.15%	579.97	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2021	Motor Coach	Aggregate	Aggregate	Diesel	10907.2565	0	0.198761008	0	1.718442703	0	0.03%	505.79	0.01%	22.01	0.00E+00	2.40E-01	0.00E+00	4.37E-06	0.00E+00	3.78E-05
TCAG	2021	OBUS	Aggregate	Aggregate	Gasoline	388.731146	33.31835549	0.185220056	0.038930351	0.004693067	0.029002147	0.16%	3,121.03	0.04%	155.99	1.04E-01	6.06E-02	1.22E-04	2.89E-05	9.05E-05	7.32E-07
TCAG	2021	PTO	Aggregate	Aggregate	Diesel	0	0	0	0	0	0	0.00%	-	0.00%	-	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2021	SBUS	Aggregate	Aggregate	Gasoline	2695.830966	58.71603796	2.44938689	0.073078434	0.084147519	0.064802589	0.03%	568.86	0.04%	142.22	3.34E-02	3.83E-01	4.16E-05	3.48E-04	3.69E-05	1.20E-05
TCAG	2021	SBUS	Aggregate	Aggregate	Diesel	2258.889097	0	0.008870729	0	0.355888897	0	0.37%	7,438.24	0.13%	513.69	0.00E+00	1.16E+00	0.00E+00	4.56E-06	0.00E+00	1.83E-04
TCAG	2021	SBUS	Aggregate	Aggregate	Natural Gas	4274.512653	0	14.15856066	0	0.871387367	0	0.05%	1,077.32	0.02%	74.40	0.00E+00	3.18E-01	0.00E+00	1.05E-03	0.00E+00	6.48E-05
TCAG	2021	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	623.5311976	0	0.002850662	0	0.098237594	0	0.01%	151.91	0.00%	6.61	0.00E+00	4.12E-03	0.00E+00	1.88E-08	0.00E+00	6.49E-07
TCAG	2021	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	624.1253102	0	0.002422399	0	0.098331197	0	0.01%	205.13	0.00%	8.93	0.00E+00	5.57E-03	0.00E+00	2.16E-08	0.00E+00	8.78E-07
TCAG	2021	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	611.9419597	0	0.002673299	0	0.096411705	0	0.03%	594.26	0.01%	25.86	0.00E+00	1.58E-02	0.00E+00	6.91E-08	0.00E+00	2.49E-06
TCAG	2021	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	626.5108934	0	0.0026192	0	0.098707046	0	0.05%	1,092.85	0.01%	47.56	0.00E+00	2.98E-02	0.00E+00	1.25E-07	0.00E+00	4.69E-06
TCAG	2021	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	2135.628598	0	0.022129244	0	0.336469155	0	0.05%	968.26	0.02%	67.85	0.00E+00	1.45E-01	0.00E+00	1.50E-06	0.00E+00	2.28E-05
TCAG	2021	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	2176.543292	0	0.016433211	0	0.342915282	0	0.03%	664.96	0.01%	46.60	0.00E+00	1.01E-01	0.00E+00	7.66E-07	0.00E+00	1.60E-05
TCAG	2021	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	2148.411487	0	0.013760682	0	0.338483105	0	0.20%	4,017.71	0.07%	281.55	0.00E+00	6.05E-01	0.00E+00	3.87E-06	0.00E+00	9.53E-05
TCAG	2021	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	2244.636233	0	0.013540128	0	0.353643353	0	0.04%	788.27	0.01%	55.24	0.00E+00	1.24E-01	0.00E+00	7.48E-07	0.00E+00	1.95E-05
TCAG	2021	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	4688.525242	0	11.57022379	0	0.955786542	0	0.00%	2.03	0.00%	0.14	0.00E+00	6.66E-04	0.00E+00	1.64E-06	0.00E+00	1.36E-07
TCAG	2021	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	2370.384527	0	0.021208906	0	0.373455048	0	0.23%	4,591.85	0.10%	397.22	0.00E+00	9.42E-01	0.00E+00	8.42E-06	0.00E+00	1.48E-04
TCAG	2021	T6 Instate Other Class 5	Aggregate	Aggregate	Diesel	2293.597197	0	0.010400085	0	0.361357172	0	0.50%	10,109.00	0.23%	874.48	0.00E+00	2.01E+00	0.00E+00	9.09E-06	0.00E+00	3.16E-04
TCAG	2021	T6 Instate Other Class 6	Aggregate	Aggregate	Diesel	2307.070385	0	0.02552009	0	0.363479879	0	0.49%	9,792.12	0.22%	847.07	0.00E+00	1.95E+00	0.00E+00	2.16E-05	0.00E+00	3.08E-04
TCAG	2021	T6 Instate Other Class 7	Aggregate	Aggregate	Diesel	2393.780259	0	0.019017228	0	0.377141055	0	0.32%	6,521.39	0.15%	564.13	0.00E+00	1.35E+00	0.00E+00	1.07E-05	0.00E+00	2.13E-04
TCAG	2021	T6 Instate Other Class 7	Aggregate	Aggregate	Natural Gas	5056.120659	0	12.34347384	0	1.030723272	0	0.00%	54.81	0.00%	4.74	0.00E+00	2.40E-02	0.00E+00	5.85E-05	0.00E+00	4.89E-06
TCAG	2021	T6 Instate Tractor Class 6	Aggregate	Aggregate	Diesel	2282.640239	0	0.012617237	0	0.359630899	0	0.01%	147.71	0.00%	12.78	0.00E+00	2.92E-02	0.00E+00	1.61E-07	0.00E+00	4.60E-06
TCAG	2021	T6 Instate Tractor Class 7	Aggregate	Aggregate	Diesel	2371.283343	0	0.011759434	0	0.373596656	0	0.19%	3,775.77	0.09%	326.62	0.00E+00	7.75E-01	0.00E+00	3.84E-06	0.00E+00	1.22E-04
TCAG	2021	T6 Instate Tractor Class 7	Aggregate	Aggregate	Natural Gas	5034.431283	0	12.38910028	0	1.026301751	0	0.00%	32.70	0.00%	2.83	0.00E+00	1.42E-02	0.00E+00	3.50E-05	0.00E+00	2.90E-06
TCAG	2021	T6 OOS Class 4	Aggregate	Aggregate	Diesel	624.1226757	0	0.002967188	0	0.098330782	0	0.00%	88.56	0.00%	3.85	0.00E+00	2.41E-03	0.00E+00	1.14E-08	0.00E+00	3.79E-07
TCAG	2021	T6 OOS Class 5	Aggregate	Aggregate	Diesel	624.4416123	0	0.002435884	0	0.09838103	0	0.01%	119.16	0.00%	5.19	0.00E+00	3.24E-03	0.00E+00	1.26E-08	0.00E+00	5.10E-07
TCAG	2021	T6 OOS Class 6	Aggregate	Aggregate	Diesel	612.4710583	0	0.002753918	0	0.096495065	0	0.02%	346.09	0.00%	15.06	0.00E+00	9.22E-03	0.00E+00	4.15E-08	0.00E+00	1.45E-06
TCAG	2021	T6 OOS Class 7	Aggregate	Aggregate	Diesel	625.8868753	0	0.002644988	0	0.098608732	0	0.03%	614.74	0.01%	26.75	0.00E+00	1.67E-02	0.00E+00	7.08E-08	0.00E+00	2.64E-06
TCAG	2021	T6 Public Class 4	Aggregate	Aggregate	Diesel	3553.896426	0	0.012086804	0	0.559917829	0	0.01%	164.29	0.01%	32.03	0.00E+00	1.14E-01	0.00E+00	3.87E-07	0.00E+00	1.79E-05
TCAG	2021	T6 Public Class 4	Aggregate	Aggregate	Natural Gas	6417.940293	0	22.3088341	0	1.308339113	0	0.00%	6.57	0.00%	1.28	0.00E+00	8.22E-03	0.00E+00	2.86E-05	0.00E+00	1.68E-06
TCAG	2021	T6 Public Class 5	Aggregate	Aggregate	Diesel	3619.863392	0	0.013611138	0	0.570310951	0	0.02%	308.94	0.02%	60.22	0.00E+00	2.18E-01	0.00E+00	8.20E-07	0.00E+00	3.43E-05
TCAG	2021	T6 Public Class 5	Aggregate	Aggregate	Natural Gas	6520.354077	0	21.66496923	0	1.329216833	0	0.00%	23.68	0.00%	4.62	0.00E+00	3.01E-02	0.00E+00	1.00E-04	0.00E+00	6.14E-06
TCAG	2021	T6 Public Class 6	Aggregate	Aggregate	Diesel	3540.29279	0	0.015579283	0	0.557774571	0	0.02%	430.57	0.02%	83.93	0.00E+00	2.97E-01	0.00E+00	1.31E-06	0.00E+00	4.68E-05

Source: EMFAC2021 (v1.0.1) Emissions Inventory
Region Type: MPO
Region: TCAG
Calendar Year: 2021
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Fleet Mix (Population)	VMT	Fleet Mix (VMT)	Trips	Fleet Mix (Trips)
TCAG	2021	All Other Buses	Aggregate	Aggregate	Diesel	76.2333868	0.02%	3976.38739	0.03%	678.477143	0.03%
TCAG	2021	All Other Buses	Aggregate	Aggregate	Natural Gas	2.006548136	0.00%	118.6803345	0.00%	17.8582784	0.00%
TCAG	2021	LDA	Aggregate	Aggregate	Gasoline	158180.1642	42.42%	6236136.098	43.77%	732179.214	37.27%
TCAG	2021	LDA	Aggregate	Aggregate	Diesel	421.6555359	0.11%	13275.08316	0.09%	1791.36818	0.09%
TCAG	2021	LDA	Aggregate	Aggregate	Electricity	2407.423072	0.65%	103581.0588	0.73%	12194.8355	0.62%
TCAG	2021	LDA	Aggregate	Aggregate	Plug-in Hyb	2719.758236	0.73%	131447.8763	0.92%	11246.2003	0.57%
TCAG	2021	LDT1	Aggregate	Aggregate	Gasoline	17368.15004	4.66%	531818.1315	3.73%	72816.5754	3.71%
TCAG	2021	LDT1	Aggregate	Aggregate	Diesel	13.40320551	0.00%	226.0807611	0.00%	40.8227738	0.00%
TCAG	2021	LDT1	Aggregate	Aggregate	Electricity	6.529525	0.00%	215.570242	0.00%	30.3030997	0.00%
TCAG	2021	LDT1	Aggregate	Aggregate	Plug-in Hyb	2.194201008	0.00%	116.4909889	0.00%	9.07302117	0.00%
TCAG	2021	LDT2	Aggregate	Aggregate	Gasoline	65617.22346	17.60%	2467638.181	17.32%	301607.812	15.35%
TCAG	2021	LDT2	Aggregate	Aggregate	Diesel	138.4888389	0.04%	5805.415037	0.04%	657.802517	0.03%
TCAG	2021	LDT2	Aggregate	Aggregate	Electricity	44.92604546	0.01%	1622.713444	0.01%	230.676437	0.01%
TCAG	2021	LDT2	Aggregate	Aggregate	Plug-in Hyb	172.5852597	0.05%	8861.676043	0.06%	713.640049	0.04%
TCAG	2021	LHD1	Aggregate	Aggregate	Gasoline	7849.02299	2.10%	259815.9263	1.82%	116938.748	5.95%
TCAG	2021	LHD1	Aggregate	Aggregate	Diesel	8812.191175	2.36%	313630.9091	2.20%	110846.279	5.64%
TCAG	2021	LHD2	Aggregate	Aggregate	Gasoline	1194.342939	0.32%	40254.42617	0.28%	17793.9302	0.91%
TCAG	2021	LHD2	Aggregate	Aggregate	Diesel	2873.526123	0.77%	104330.7176	0.73%	36145.3437	1.84%
TCAG	2021	MCY	Aggregate	Aggregate	Gasoline	8427.389158	2.26%	45449.72865	0.32%	16854.7783	0.86%
TCAG	2021	MDV	Aggregate	Aggregate	Gasoline	82919.26534	22.24%	2929300.59	20.56%	374231.088	19.05%
TCAG	2021	MDV	Aggregate	Aggregate	Diesel	1214.642683	0.33%	49479.49097	0.35%	5778.07527	0.29%
TCAG	2021	MDV	Aggregate	Aggregate	Electricity	55.85319654	0.01%	2018.672222	0.01%	287.665736	0.01%
TCAG	2021	MDV	Aggregate	Aggregate	Plug-in Hyb	236.3778178	0.06%	11220.64496	0.08%	977.422277	0.05%
TCAG	2021	MH	Aggregate	Aggregate	Gasoline	1130.828516	0.30%	9601.657907	0.07%	113.128085	0.01%
TCAG	2021	MH	Aggregate	Aggregate	Diesel	567.2761507	0.15%	4877.197406	0.03%	56.7276151	0.00%
TCAG	2021	Motor Coach	Aggregate	Aggregate	Diesel	21.52838718	0.01%	3083.912282	0.02%	494.722337	0.03%
TCAG	2021	OBUS	Aggregate	Aggregate	Gasoline	152.575829	0.04%	6335.477727	0.04%	3052.73719	0.16%
TCAG	2021	PTO	Aggregate	Aggregate	Diesel	0	0.00%	8832.473514	0.06%	0	0.00%
TCAG	2021	SBUS	Aggregate	Aggregate	Gasoline	139.1041809	0.04%	6998.311841	0.05%	556.416724	0.03%
TCAG	2021	SBUS	Aggregate	Aggregate	Diesel	502.450561	0.13%	11168.44377	0.08%	7275.48412	0.37%
TCAG	2021	SBUS	Aggregate	Aggregate	Natural Gas	72.77284716	0.02%	1898.313573	0.01%	1053.75083	0.05%
TCAG	2021	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	6.46582606	0.00%	438.8091278	0.00%	148.584683	0.01%
TCAG	2021	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	8.731045489	0.00%	601.9672149	0.00%	200.639425	0.01%
TCAG	2021	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	25.29402199	0.01%	1572.957555	0.01%	581.256625	0.03%
TCAG	2021	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	46.51610214	0.01%	9866.384844	0.07%	1068.94003	0.05%
TCAG	2021	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	66.36827233	0.02%	2194.868592	0.02%	947.075246	0.05%
TCAG	2021	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	45.57916586	0.01%	1541.411741	0.01%	650.414697	0.03%
TCAG	2021	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	275.3885642	0.07%	9376.255371	0.07%	3929.79481	0.20%
TCAG	2021	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	54.03120863	0.01%	2850.68982	0.02%	771.025347	0.04%
TCAG	2021	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	0.138988384	0.00%	7.364471399	0.00%	1.98336424	0.00%
TCAG	2021	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	388.5269121	0.10%	15210.40429	0.11%	4491.3711	0.23%
TCAG	2021	T6 Instate Other Class 5	Aggregate	Aggregate	Diesel	855.3460625	0.23%	37828.58154	0.27%	9887.80048	0.50%
TCAG	2021	T6 Instate Other Class 6	Aggregate	Aggregate	Diesel	828.534718	0.22%	33508.44236	0.24%	9577.86134	0.49%
TCAG	2021	T6 Instate Other Class 7	Aggregate	Aggregate	Diesel	551.7902757	0.15%	23764.55151	0.17%	6378.69559	0.32%
TCAG	2021	T6 Instate Other Class 7	Aggregate	Aggregate	Natural Gas	4.637412281	0.00%	284.3987806	0.00%	53.608486	0.00%
TCAG	2021	T6 Instate Tractor Class 6	Aggregate	Aggregate	Diesel	12.4978716	0.00%	632.1779484	0.00%	144.475396	0.01%
TCAG	2021	T6 Instate Tractor Class 7	Aggregate	Aggregate	Diesel	319.4768087	0.09%	19875.42242	0.14%	3693.15191	0.19%
TCAG	2021	T6 Instate Tractor Class 7	Aggregate	Aggregate	Natural Gas	2.766611815	0.00%	219.8227035	0.00%	31.9820326	0.00%
TCAG	2021	T6 OOS Class 4	Aggregate	Aggregate	Diesel	3.76934844	0.00%	254.0701762	0.00%	86.6196271	0.00%
TCAG	2021	T6 OOS Class 5	Aggregate	Aggregate	Diesel	5.072119344	0.00%	348.5385938	0.00%	116.557303	0.01%
TCAG	2021	T6 OOS Class 6	Aggregate	Aggregate	Diesel	14.73092525	0.00%	910.7413176	0.01%	338.516662	0.02%
TCAG	2021	T6 OOS Class 7	Aggregate	Aggregate	Diesel	26.16593046	0.01%	6622.221875	0.05%	601.293082	0.03%
TCAG	2021	T6 Public Class 4	Aggregate	Aggregate	Diesel	31.32529085	0.01%	1075.732081	0.01%	160.698742	0.01%
TCAG	2021	T6 Public Class 4	Aggregate	Aggregate	Natural Gas	1.252566354	0.00%	52.28217616	0.00%	6.4256654	0.00%
TCAG	2021	T6 Public Class 5	Aggregate	Aggregate	Diesel	58.90517015	0.02%	2193.58931	0.02%	302.183523	0.02%
TCAG	2021	T6 Public Class 5	Aggregate	Aggregate	Natural Gas	4.515271188	0.00%	190.5467434	0.00%	23.1633412	0.00%

SCENARIO	TCAG 2046 No Project - RUNEX

Source	EMFAC2021 (v1.0.1) Emission Rates
Region Type	MPO
Region	TCAG
Calendar Year	2046
Season	Annual
Vehicle Classification	EMFAC202x Categories
Emissions Rate and Vehicle Activity Units	Units: miles/day for VMT, g/mile for RUNEX

Daily VMT	17,128,558

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	CO_2 RUNEX	CH_4 RUNEX	N_2O RUNEX	Fleet Mix	VMT per Day	CO_2 RUNEX Emissions (tons/day)	CH_4 RUNEX Emissions (tons/day)	N_2O RUNEX Emissions (tons/day)
TCAG	2046	All Other Buses	Aggregate	Aggregate	Diesel	1027.523956	0.001656871	0.161886818	0.03%	4,329.24	4.45E+00	7.17E-06	7.01E-04
TCAG	2046	All Other Buses	Aggregate	Aggregate	Natural Gas	912.9226048	0.857196383	0.186105245	0.00%	308.41	2.82E-01	2.64E-04	5.74E-05
TCAG	2046	LDA	Aggregate	Aggregate	Gasoline	232.4983008	0.000937715	0.00322952	41.64%	7,132,042.84	1.66E+03	6.69E-03	2.30E-02
TCAG	2046	LDA	Aggregate	Aggregate	Diesel	184.8866559	0.000158912	0.029128968	0.02%	4,137.47	7.65E-01	6.57E-07	1.21E-04
TCAG	2046	LDA	Aggregate	Aggregate	Electricity	0	0	0	5.58%	956,439.66	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDA	Aggregate	Aggregate	Plug-in Hybrid	109.2466121	0.00030976	0.000422717	1.97%	337,652.89	3.69E+01	1.05E-04	1.43E-04
TCAG	2046	LDT1	Aggregate	Aggregate	Gasoline	268.3768769	0.001021091	0.003381343	2.43%	416,668.02	1.12E+02	4.25E-04	1.41E-03
TCAG	2046	LDT1	Aggregate	Aggregate	Diesel	345.4687594	0.000449079	0.054428744	0.00%	4.88	1.69E-03	2.19E-09	2.66E-07
TCAG	2046	LDT1	Aggregate	Aggregate	Electricity	0	0	0	0.08%	12,956.59	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDT1	Aggregate	Aggregate	Plug-in Hybrid	108.9674478	0.000307784	0.000418448	0.06%	9,903.81	1.08E+00	3.05E-06	4.14E-06
TCAG	2046	LDT2	Aggregate	Aggregate	Gasoline	285.2345393	0.001251549	0.003470033	21.21%	3,632,514.30	1.04E+03	4.55E-03	1.26E-02
TCAG	2046	LDT2	Aggregate	Aggregate	Diesel	262.1772727	0.00044724	0.041306136	0.08%	13,788.50	3.62E+00	6.17E-06	5.70E-04
TCAG	2046	LDT2	Aggregate	Aggregate	Electricity	0	0	0	0.59%	101,587.36	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDT2	Aggregate	Aggregate	Plug-in Hybrid	109.2063091	0.000307843	0.000417719	0.58%	98,962.31	1.08E+01	3.05E-05	4.13E-05
TCAG	2046	LHD1	Aggregate	Aggregate	Gasoline	751.1402844	0.001253028	0.001857813	0.76%	130,168.81	9.78E+01	1.63E-04	2.42E-04
TCAG	2046	LHD1	Aggregate	Aggregate	Diesel	608.0141113	0.004670186	0.095792871	0.52%	88,555.90	5.38E+01	4.14E-04	8.48E-03
TCAG	2046	LHD1	Aggregate	Aggregate	Electricity	0	0	0	0.98%	167,905.88	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LHD2	Aggregate	Aggregate	Gasoline	850.2723344	0.001172669	0.002374275	0.08%	14,274.85	1.21E+01	1.67E-05	3.39E-05
TCAG	2046	LHD2	Aggregate	Aggregate	Diesel	713.2707938	0.006147851	0.112376104	0.25%	42,005.70	3.00E+01	2.58E-04	4.72E-03
TCAG	2046	LHD2	Aggregate	Aggregate	Electricity	0	0	0	0.23%	38,723.44	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	MCY	Aggregate	Aggregate	Gasoline	178.4908665	0.123210464	0.035052728	0.24%	41,696.50	7.44E+00	5.14E-03	1.46E-03
TCAG	2046	MDV	Aggregate	Aggregate	Gasoline	346.6667125	0.001383075	0.003728394	12.41%	2,126,365.54	7.37E+02	2.94E-03	7.93E-03
TCAG	2046	MDV	Aggregate	Aggregate	Diesel	346.6749716	0.000192594	0.054618783	0.14%	23,722.45	8.22E+00	4.57E-06	1.30E-03
TCAG	2046	MDV	Aggregate	Aggregate	Electricity	0	0	0	0.54%	93,079.64	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	MDV	Aggregate	Aggregate	Plug-in Hybrid	109.351591	0.000307558	0.000416423	0.36%	62,279.52	6.81E+00	1.92E-05	2.59E-05
TCAG	2046	MH	Aggregate	Aggregate	Gasoline	1947.469635	0.004066375	0.018758448	0.03%	4,748.06	9.25E+00	1.93E-05	8.91E-05
TCAG	2046	MH	Aggregate	Aggregate	Diesel	1088.694362	0.004244392	0.17152424	0.02%	2,863.49	3.12E+00	1.22E-05	4.91E-04
TCAG	2046	Motor Coach	Aggregate	Aggregate	Diesel	1528.724587	0.000489033	0.240851181	0.02%	3,512.56	5.37E+00	1.72E-06	8.46E-04
TCAG	2046	OBUS	Aggregate	Aggregate	Gasoline	1543.697715	0.004784705	0.016907305	0.01%	1,760.68	2.72E+00	8.42E-06	2.98E-05
TCAG	2046	OBUS	Aggregate	Aggregate	Electricity	0	0	0	0.01%	2,018.23	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	PTO	Aggregate	Aggregate	Diesel	1751.381662	0.000724737	0.275930894	0.04%	6,952.76	1.22E+01	5.04E-06	1.92E-03
TCAG	2046	PTO	Aggregate	Aggregate	Electricity	0	0	0	0.04%	6,559.40	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	SBUS	Aggregate	Aggregate	Gasoline	737.2495468	0.001981189	0.012394053	0.01%	1,921.81	1.42E+00	3.81E-06	2.38E-05
TCAG	2046	SBUS	Aggregate	Aggregate	Diesel	1036.150355	0.000305625	0.16324591	0.03%	5,570.53	5.77E+00	1.70E-06	9.09E-04
TCAG	2046	SBUS	Aggregate	Aggregate	Electricity	0	0	0	0.04%	6,639.53	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	SBUS	Aggregate	Aggregate	Natural Gas	1076.686251	2.309647194	0.219489536	0.01%	1,809.28	1.95E+00	4.18E-03	3.97E-04
TCAG	2046	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	1013.817986	0.000245409	0.159727437	0.00%	349.88	3.55E-01	8.59E-08	5.59E-05
TCAG	2046	T6 CAIRP Class 4	Aggregate	Aggregate	Electricity	0	0	0	0.00%	510.94	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	1014.090897	0.000245742	0.159770434	0.00%	480.58	4.87E-01	1.18E-07	7.68E-05
TCAG	2046	T6 CAIRP Class 5	Aggregate	Aggregate	Electricity	0	0	0	0.00%	700.31	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	1013.087843	0.00024501	0.159612402	0.01%	1,251.56	1.27E+00	3.07E-07	2.00E-04
TCAG	2046	T6 CAIRP Class 6	Aggregate	Aggregate	Electricity	0	0	0	0.01%	1,834.12	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	895.4099955	0.0002644	0.141072209	0.09%	14,634.80	1.31E+01	3.87E-06	2.06E-03
TCAG	2046	T6 CAIRP Class 7	Aggregate	Aggregate	Electricity	0	0	0	0.03%	4,720.13	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	1042.503708	0.000277556	0.164246884	0.01%	1,995.96	2.08E+00	5.54E-07	3.28E-04
TCAG	2046	T6 Instate Delivery Class 4	Aggregate	Aggregate	Electricity	0	0	0	0.01%	2,309.73	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	1043.39349	0.000277692	0.164387069	0.01%	1,400.40	1.46E+00	3.89E-07	2.30E-04
TCAG	2046	T6 Instate Delivery Class 5	Aggregate	Aggregate	Electricity	0	0	0	0.01%	1,623.39	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	1043.128554	0.00027881	0.164345328	0.05%	8,514.66	8.88E+00	2.37E-06	1.40E-03
TCAG	2046	T6 Instate Delivery Class 6	Aggregate	Aggregate	Electricity	0	0	0	0.06%	9,878.78	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	1054.661185	0.000411602	0.166162299	0.02%	3,270.01	3.45E+00	1.35E-06	5.43E-04
TCAG	2046	T6 Instate Delivery Class 7	Aggregate	Aggregate	Electricity	0	0	0	0.01%	2,269.31	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	1017.971575	0.872876854	0.207520165	0.00%	67.33	6.85E-02	5.88E-05	1.40E-05
TCAG	2046	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	1010.662878	0.000251338	0.159230348	0.08%	13,445.93	1.36E+01	3.38E-06	2.14E-03
TCAG	2046	T6 Instate Other Class 4	Aggregate	Aggregate	Electricity	0	0	0	0.10%	16,392.40	0.00E+00	0.00E+00	0.00E+00

SCENARIO	TCAG 2046 No Project - STREX and IDLEX

Source	EMFAC2021 (v1.0.1) Emission Rates
Region Type	MPO
Region	TCAG
Calendar Year	2046
Season	Annual
Vehicle Classification	EMFAC202x Categories
Emissions Rate and Vehicle Activity Units	Units: trips/day for Trips, g/trip for STREX, g/vehicle/day for IDLEX

Daily Trips	2,119,527
Daily Vehicles	406,239

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	CO_2 IDLEX	CO_2 STREX	CH_4 IDLEX	CH_4 STREX	N_2O IDLEX	N_2O STREX	Fleet Mix (by Vehicle Trips)	Vehicle Trips per Day	Fleet Mix (by Vehicle Population)	Vehicles per Day	CO_2 STREX Emissions (tons/day)	CO_2 IDLEX Emissions (tons/day)	CH_4 STREX Emissions (tons/day)	CH_4 IDLEX Emissions (tons/day)	N_2O STREX Emissions (tons/day)	N_2O IDLEX Emissions (tons/day)
TCAG	2046	All Other Buses	Aggregate	Aggregate	Diesel	547.0079545	0	0.00241929	0	0.086181326	0	0.04%	876.31	0.02%	98.41	0.00E+00	5.38E-02	0.00E+00	2.38E-07	0.00E+00	8.48E-06
TCAG	2046	All Other Buses	Aggregate	Aggregate	Natural Gas	1168.19704	0	3.419458847	0	0.238144609	0	0.00%	66.81	0.00%	7.50	0.00E+00	8.76E-03	0.00E+00	2.57E-05	0.00E+00	1.79E-06
TCAG	2046	LDA	Aggregate	Aggregate	Gasoline	0	55.98829185	0	0.03190167	0	0.026256163	36.70%	777,906.56	41.47%	168,485.51	4.36E+01	0.00E+00	2.48E-02	0.00E+00	2.04E-02	0.00E+00
TCAG	2046	LDA	Aggregate	Aggregate	Diesel	0	0	0	0	0	0	0.02%	468.77	0.03%	104.15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDA	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	5.06%	107,275.49	5.66%	22,984.57	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDA	Aggregate	Aggregate	Plug-in Hybrid	0	58.05865237	0	0.039680007	0	0.019281032	1.55%	32,770.57	1.95%	7,920.77	1.90E+00	0.00E+00	1.30E-03	0.00E+00	6.32E-04	0.00E+00
TCAG	2046	LDT1	Aggregate	Aggregate	Gasoline	0	65.29500708	0	0.034457102	0	0.027688839	2.28%	48,320.16	2.64%	10,742.31	3.16E+00	0.00E+00	1.66E-03	0.00E+00	1.34E-03	0.00E+00
TCAG	2046	LDT1	Aggregate	Aggregate	Diesel	0	0	0	0	0	0	0.00%	0.56	0.00%	0.12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDT1	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.07%	1,445.08	0.08%	308.71	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDT1	Aggregate	Aggregate	Plug-in Hybrid	0	66.59087989	0	0.0396052	0	0.019207604	0.05%	981.21	0.06%	237.16	6.53E-02	0.00E+00	3.89E-05	0.00E+00	1.88E-05	0.00E+00
TCAG	2046	LDT2	Aggregate	Aggregate	Gasoline	0	70.35801044	0	0.041426105	0	0.031209701	19.51%	413,619.64	22.25%	90,396.82	2.91E+01	0.00E+00	1.71E-02	0.00E+00	1.29E-02	0.00E+00
TCAG	2046	LDT2	Aggregate	Aggregate	Diesel	0	0	0	0	0	0	0.07%	1,563.12	0.08%	339.20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDT2	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.77%	16,378.72	0.86%	3,499.79	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDT2	Aggregate	Aggregate	Plug-in Hybrid	0	71.6994694	0	0.039524311	0	0.019130101	0.47%	9,985.64	0.59%	2,413.57	7.16E-01	0.00E+00	3.95E-04	0.00E+00	1.91E-04	0.00E+00
TCAG	2046	LHD1	Aggregate	Aggregate	Gasoline	107.9913581	23.60643091	0.085292379	0.020098342	0.002495912	0.040064456	2.52%	53,314.69	0.88%	3,576.54	1.26E+00	3.86E-01	1.07E-03	3.05E-04	2.14E-03	8.93E-06
TCAG	2046	LHD1	Aggregate	Aggregate	Diesel	119.9239949	0	0.005098128	0	0.018894074	0	1.59%	33,798.50	0.66%	2,685.46	0.00E+00	3.22E-01	0.00E+00	1.37E-05	0.00E+00	5.07E-05
TCAG	2046	LHD1	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	2.41%	51,031.22	0.89%	3,628.08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LHD2	Aggregate	Aggregate	Gasoline	125.2608354	23.42167277	0.07828031	0.018406915	0.002267066	0.03663021	0.29%	6,063.41	0.10%	406.76	1.42E-01	5.10E-02	1.12E-04	3.18E-05	2.22E-04	9.22E-07
TCAG	2046	LHD2	Aggregate	Aggregate	Diesel	196.837153	0	0.005098128	0	0.031011774	0	0.79%	16,779.48	0.33%	1,333.22	0.00E+00	2.62E-01	0.00E+00	6.80E-06	0.00E+00	4.13E-05
TCAG	2046	LHD2	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.54%	11,362.86	0.21%	858.18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	MCY	Aggregate	Aggregate	Gasoline	0	37.90669589	0	0.134844753	0	0.004754119	0.70%	14,905.07	1.83%	7,448.41	5.65E-01	0.00E+00	2.01E-03	0.00E+00	7.09E-05	0.00E+00
TCAG	2046	MDV	Aggregate	Aggregate	Gasoline	0	86.68942069	0	0.045800903	0	0.032862614	11.72%	248,446.24	13.65%	55,438.40	2.15E+01	0.00E+00	1.14E-02	0.00E+00	8.16E-03	0.00E+00
TCAG	2046	MDV	Aggregate	Aggregate	Diesel	0	0	0	0	0	0	0.13%	2,816.79	0.16%	636.25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	MDV	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.71%	15,127.28	0.80%	3,246.56	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	MDV	Aggregate	Aggregate	Plug-in Hybrid	0	87.41268413	0	0.0394255	0	0.019035731	0.30%	6,412.36	0.38%	1,549.89	5.61E-01	0.00E+00	2.53E-04	0.00E+00	1.22E-04	0.00E+00
TCAG	2046	MH	Aggregate	Aggregate	Gasoline	0	29.94307286	0	0.032183508	0	0.044549038	0.00%	41.96	0.10%	419.19	1.26E-03	0.00E+00	1.35E-06	0.00E+00	1.87E-06	0.00E+00
TCAG	2046	MH	Aggregate	Aggregate	Diesel	0	0	0	0	0	0	0.00%	30.26	0.07%	302.39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	Motor Coach	Aggregate	Aggregate	Diesel	8334.136335	0	0.185553219	0	1.313046574	0	0.03%	636.08	0.01%	27.66	0.00E+00	2.31E-01	0.00E+00	5.13E-06	0.00E+00	3.63E-05
TCAG	2046	OBUS	Aggregate	Aggregate	Gasoline	350.8941853	27.99226377	0.190410415	0.030478003	0.003905224	0.024875832	0.05%	1,046.98	0.01%	52.30	2.93E-02	1.84E-02	3.19E-05	9.96E-06	2.60E-05	2.04E-07
TCAG	2046	OBUS	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.03%	583.84	0.01%	29.16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	PTO	Aggregate	Aggregate	Diesel	0	0	0	0	0	0	0.00%	-	0.00%	-	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	PTO	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.00%	-	0.00%	-	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	SBUS	Aggregate	Aggregate	Gasoline	2375.864138	50.75731409	2.526397819	0.068788284	0.0707055	0.068725875	0.01%	142.29	0.01%	35.55	7.22E-03	8.45E-02	9.79E-06	8.98E-05	9.78E-06	2.51E-06
TCAG	2046	SBUS	Aggregate	Aggregate	Diesel	1859.809839	0	0.007748371	0	0.293013798	0	0.19%	3,944.51	0.07%	272.26	0.00E+00	5.06E-01	0.00E+00	2.11E-06	0.00E+00	7.98E-05
TCAG	2046	SBUS	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.16%	3,370.81	0.06%	245.82	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	SBUS	Aggregate	Aggregate	Natural Gas	4316.467411	0	12.06952948	0	0.879940119	0	0.06%	1,306.49	0.02%	90.18	0.00E+00	3.89E-01	0.00E+00	1.09E-03	0.00E+00	7.94E-05
TCAG	2046	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	512.6599269	0	0.00229138	0	0.08076978	0	0.01%	109.32	0.00%	4.75	0.00E+00	2.44E-03	0.00E+00	1.09E-08	0.00E+00	3.84E-07
TCAG	2046	T6 CAIRP Class 4	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.01%	151.06	0.00%	6.57	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	512.9436837	0	0.002291406	0	0.080814486	0	0.01%	134.32	0.00%	5.84	0.00E+00	3.00E-03	0.00E+00	1.34E-08	0.00E+00	4.72E-07
TCAG	2046	T6 CAIRP Class 5	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.01%	185.07	0.00%	8.05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	512.0825119	0	0.002291355	0	0.080678808	0	0.03%	610.28	0.01%	26.54	0.00E+00	1.36E-02	0.00E+00	6.08E-08	0.00E+00	2.14E-06
TCAG	2046	T6 CAIRP Class 6	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.04%	848.13	0.01%	36.89	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	501.4718158	0	0.002291357	0	0.079007089	0	0.08%	1,629.38	0.02%	70.86	0.00E+00	3.55E-02	0.00E+00	1.62E-07	0.00E+00	5.60E-06
TCAG	2046	T6 CAIRP Class 7	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.02%	506.76	0.01%	22.04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	1749.639374	0	0.007729409	0	0.275656396	0	0.04%	859.37	0.01%	60.19	0.00E+00	1.05E-01	0.00E+00	4.65E-07	0.00E+00	1.66E-05
TCAG	2046	T6 Instate Delivery Class 4	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.04%	930.38	0.02%	65.16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	1751.264444	0	0.007729366	0	0.275912426	0	0.03%	602.72	0.01%	42.21	0.00E+00	7.39E-02	0.00E+00	3.26E-07	0.00E+00	1.16E-05
TCAG	2046	T6 Instate Delivery Class 5	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.03%	653.93	0.01%	45.80	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	1750.857961	0	0.007729733	0	0.275848385	0	0.17%	3,665.13	0.06%	256.70	0.00E+00	4.49E-01	0.00E+00	1.98E-06	0.00E+00	7.08E-05
TCAG	2046	T6 Instate Delivery Class 6	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.19%	3,985.87	0.07%	279.16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	1827.310019	0	0.007751037	0	0.287893438	0	0.04%	915.23	0.02%	64.10	0.00E+00	1.17E-01	0.00E+00	4.97E-07	0.00E+00	1.85E-05
TCAG	2046	T6 Instate Delivery Class 7	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.03%	602.71	0.01%	42.21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	4330.600492	0	11.40117915	0	0.88282124	0	0.00%	18.53	0.00%	1.30	0.00E+00	5.62E-03	0.00E+00	1.48E-05	0.00E+00	1.15E-06
TCAG	2046	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	1883.104844	0	0.008309781	0	0.296683935	0	0.19%	3,971.66	0.08%	343.38	0.00E+00	6.47E-01	0.00E+00	2.85E-06	0.00E+00	1.02E-04
TCAG	2046	T6 Instate Other Class 4	Aggregate	Aggregate	Electricity	0	0	0	0	0	0	0.20%	4,304.90	0.09%	372.19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

SCENARIO	TCAG 2046 RTP/SCS - RUNEX

Source	EMFAC2021 (v1.0.1) Emission Rates
Region Type	MPO
Region	TCAG
Calendar Year	2046
Season	Annual
Vehicle Classification	EMFAC202X Categories
Emissions Rate and Vehicle Activity Units	Units: miles/day for CVMT and EVMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip

Daily VMT	16,892,980

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	CO_2 RUNEX	CH_4 RUNEX	N_2O RUNEX	Fleet Mix	VMT per Day	CO_2 RUNEX Emissions (tons/day)	CH_4 RUNEX Emissions (tons/day)	N_2O RUNEX Emissions (tons/day)
TCAG	2046	All Other Buses	Aggregate	Aggregate	Diesel	1027.523956	0.001656871	0.161886818	0.03%	4,269.69	4.39E+00	7.07E-06	6.91E-04
TCAG	2046	All Other Buses	Aggregate	Aggregate	Natural Gas	912.9226048	0.857196383	0.186105245	0.00%	304.17	2.78E-01	2.61E-04	5.66E-05
TCAG	2046	LDA	Aggregate	Aggregate	Gasoline	232.4983008	0.000937715	0.00322952	41.64%	7,033,952.13	1.64E+03	6.60E-03	2.27E-02
TCAG	2046	LDA	Aggregate	Aggregate	Diesel	184.8866559	0.000158912	0.029128968	0.02%	4,080.57	7.54E-01	6.48E-07	1.19E-04
TCAG	2046	LDA	Aggregate	Aggregate	Electricity	0	0	0	5.58%	943,285.24	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDA	Aggregate	Aggregate	Plug-in Hybrid	109.2466121	0.00030976	0.000422717	1.97%	333,008.98	3.64E+01	1.03E-04	1.41E-04
TCAG	2046	LDT1	Aggregate	Aggregate	Gasoline	268.3768769	0.001021091	0.003381343	2.43%	410,937.37	1.10E+02	4.20E-04	1.39E-03
TCAG	2046	LDT1	Aggregate	Aggregate	Diesel	345.4687594	0.000449079	0.054428744	0.00%	4.82	1.66E-03	2.16E-09	2.62E-07
TCAG	2046	LDT1	Aggregate	Aggregate	Electricity	0	0	0	0.08%	12,778.39	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDT1	Aggregate	Aggregate	Plug-in Hybrid	108.9674478	0.000307784	0.000418448	0.06%	9,767.60	1.06E+00	3.01E-06	4.09E-06
TCAG	2046	LDT2	Aggregate	Aggregate	Gasoline	285.2345393	0.001251549	0.003470033	21.21%	3,582,554.43	1.02E+03	4.48E-03	1.24E-02
TCAG	2046	LDT2	Aggregate	Aggregate	Diesel	262.1772727	0.00044724	0.041306136	0.08%	13,598.86	3.57E+00	6.08E-06	5.62E-04
TCAG	2046	LDT2	Aggregate	Aggregate	Electricity	0	0	0	0.59%	100,190.18	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDT2	Aggregate	Aggregate	Plug-in Hybrid	109.2063091	0.000307843	0.000417719	0.58%	97,601.23	1.07E+01	3.00E-05	4.08E-05
TCAG	2046	LHD1	Aggregate	Aggregate	Gasoline	751.1402844	0.001253028	0.001857813	0.76%	128,378.53	9.64E+01	1.61E-04	2.39E-04
TCAG	2046	LHD1	Aggregate	Aggregate	Diesel	608.0141113	0.004670186	0.095792871	0.52%	87,337.95	5.31E+01	4.08E-04	8.37E-03
TCAG	2046	LHD1	Aggregate	Aggregate	Electricity	0	0	0	0.98%	165,596.58	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LHD2	Aggregate	Aggregate	Gasoline	850.2723344	0.001172669	0.002374275	0.08%	14,078.52	1.20E+01	1.65E-05	3.34E-05
TCAG	2046	LHD2	Aggregate	Aggregate	Diesel	713.2707938	0.006147851	0.112376104	0.25%	41,427.98	2.95E+01	2.55E-04	4.66E-03
TCAG	2046	LHD2	Aggregate	Aggregate	Electricity	0	0	0	0.23%	38,190.85	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	MCY	Aggregate	Aggregate	Gasoline	178.4908665	0.123210464	0.035052728	0.24%	41,123.02	7.34E+00	5.07E-03	1.44E-03
TCAG	2046	MDV	Aggregate	Aggregate	Gasoline	346.6667125	0.001383075	0.003728394	12.41%	2,097,120.53	7.27E+02	2.90E-03	7.82E-03
TCAG	2046	MDV	Aggregate	Aggregate	Diesel	346.6749716	0.000192594	0.054618783	0.14%	23,396.19	8.11E+00	4.51E-06	1.28E-03
TCAG	2046	MDV	Aggregate	Aggregate	Electricity	0	0	0	0.54%	91,799.47	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	MDV	Aggregate	Aggregate	Plug-in Hybrid	109.351591	0.000307558	0.000416423	0.36%	61,422.96	6.72E+00	1.89E-05	2.56E-05
TCAG	2046	MH	Aggregate	Aggregate	Gasoline	1947.469635	0.004066375	0.018758448	0.03%	4,682.75	9.12E+00	1.90E-05	8.78E-05
TCAG	2046	MH	Aggregate	Aggregate	Diesel	1088.694362	0.004244392	0.17152424	0.02%	2,824.11	3.07E+00	1.20E-05	4.84E-04
TCAG	2046	Motor Coach	Aggregate	Aggregate	Diesel	1528.724587	0.000489033	0.240851181	0.02%	3,464.25	5.30E+00	1.69E-06	8.34E-04
TCAG	2046	OBUS	Aggregate	Aggregate	Gasoline	1543.697715	0.004784705	0.016907305	0.01%	1,736.47	2.68E+00	8.31E-06	2.94E-05
TCAG	2046	OBUS	Aggregate	Aggregate	Electricity	0	0	0	0.01%	1,990.48	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	PTO	Aggregate	Aggregate	Diesel	1751.381662	0.000724737	0.275930894	0.04%	6,857.14	1.20E+01	4.97E-06	1.89E-03
TCAG	2046	PTO	Aggregate	Aggregate	Electricity	0	0	0	0.04%	6,469.18	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	SBUS	Aggregate	Aggregate	Gasoline	737.2495468	0.001981189	0.012394053	0.01%	1,895.38	1.40E+00	3.76E-06	2.35E-05
TCAG	2046	SBUS	Aggregate	Aggregate	Diesel	1036.150355	0.000305625	0.16324591	0.03%	5,493.92	5.69E+00	1.68E-06	8.97E-04
TCAG	2046	SBUS	Aggregate	Aggregate	Electricity	0	0	0	0.04%	6,548.21	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	SBUS	Aggregate	Aggregate	Natural Gas	1076.686251	2.309647194	0.219489536	0.01%	1,784.40	1.92E+00	4.12E-03	3.92E-04
TCAG	2046	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	1013.817986	0.000245409	0.159727437	0.00%	345.07	3.50E-01	8.47E-08	5.51E-05
TCAG	2046	T6 CAIRP Class 4	Aggregate	Aggregate	Electricity	0	0	0	0.00%	503.91	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	1014.090897	0.000245742	0.159770434	0.00%	473.97	4.81E-01	1.16E-07	7.57E-05
TCAG	2046	T6 CAIRP Class 5	Aggregate	Aggregate	Electricity	0	0	0	0.00%	690.67	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	1013.087843	0.00024501	0.159612402	0.01%	1,234.35	1.25E+00	3.02E-07	1.97E-04
TCAG	2046	T6 CAIRP Class 6	Aggregate	Aggregate	Electricity	0	0	0	0.01%	1,808.89	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	895.4099955	0.0002644	0.141072209	0.09%	14,433.52	1.29E+01	3.82E-06	2.04E-03
TCAG	2046	T6 CAIRP Class 7	Aggregate	Aggregate	Electricity	0	0	0	0.03%	4,655.21	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	1042.503708	0.000277556	0.164246884	0.01%	1,968.51	2.05E+00	5.46E-07	3.23E-04
TCAG	2046	T6 Instate Delivery Class 4	Aggregate	Aggregate	Electricity	0	0	0	0.01%	2,277.96	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	1043.39349	0.000277692	0.164387069	0.01%	1,381.14	1.44E+00	3.84E-07	2.27E-04
TCAG	2046	T6 Instate Delivery Class 5	Aggregate	Aggregate	Electricity	0	0	0	0.01%	1,601.06	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	1043.128554	0.00027881	0.164345328	0.05%	8,397.56	8.76E+00	2.34E-06	1.38E-03
TCAG	2046	T6 Instate Delivery Class 6	Aggregate	Aggregate	Electricity	0	0	0	0.06%	9,742.91	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	1054.661185	0.000411602	0.166162299	0.02%	3,225.04	3.40E+00	1.33E-06	5.36E-04
TCAG	2046	T6 Instate Delivery Class 7	Aggregate	Aggregate	Electricity	0	0	0	0.01%	2,238.10	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	1017.971575	0.872876854	0.207520165	0.00%	66.41	6.76E-02	5.80E-05	1.38E-05
TCAG	2046	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	1010.662878	0.000251338	0.159230348	0.08%	13,261.00	1.34E+01	3.33E-06	2.11E-03
TCAG	2046	T6 Instate Other Class 4	Aggregate	Aggregate	Electricity	0	0	0	0.10%	16,166.94	0.00E+00	0.00E+00	0.00E+00

SCENARIO	TCAG 2046 RTP/SCS - STREX and IDLEX

Source	EMFAC2021 (v1.0.1) Emission Rates
Region Type	MPO
Region	TCAG
Calendar Year	2046
Season	Annual
Vehicle Classification	EMFAC202X Categories
Emissions Rate and Vehicle Activity Units	Units: miles/day for CVMT and EVMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW,

Daily Trips	2,090,376
Daily Vehicles	400,651

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	CO_2 IDLEX	CO_2 STREX	CH_4 IDLEX	CH_4 STREX	N_2O IDLEX	N_2O STREX	Fleet Mix (by Vehicle Trips)	Vehicle Trips per Day	Fleet Mix (by Vehicle Population)	Vehicles per Day	CO_2 STREX Emissions (tons/day)	CO_2 IDLEX Emissions (tons/day)	CH_4 STREX Emissions (tons/day)	CH_4 IDLEX Emissions (tons/day)	N_2O STREX Emissions (tons/day)	N_2O IDLEX Emissions (tons/day)
TCAG	2046	All Other Buses	Aggregate	Aggregate	Diesel	547.0080	0.0000	0.0024	0.0000	0.0862	0.0000	0.04%	864.26	0.02%	97.05	0.00E+00	5.31E-02	0.00E+00	2.35E-07	0.00E+00	8.36E-06
TCAG	2046	All Other Buses	Aggregate	Aggregate	Natural Gas	1168.1970	0.0000	3.4195	0.0000	0.2381	0.0000	0.00%	65.89	0.00%	7.40	0.00E+00	8.64E-03	0.00E+00	2.53E-05	0.00E+00	1.76E-06
TCAG	2046	LDA	Aggregate	Aggregate	Gasoline	0.0000	55.9883	0.0000	0.0319	0.0000	0.0263	36.70%	767,207.66	41.47%	166,168.21	4.30E+01	0.00E+00	2.45E-02	0.00E+00	2.01E-02	0.00E+00
TCAG	2046	LDA	Aggregate	Aggregate	Diesel	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.02%	462.32	0.03%	102.72	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDA	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	5.06%	105,800.08	5.66%	22,668.44	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDA	Aggregate	Aggregate	Plug-in Hybrid	0.0000	58.0587	0.0000	0.0397	0.0000	0.0193	1.55%	32,319.86	1.95%	7,811.83	1.88E+00	0.00E+00	1.28E-03	0.00E+00	6.23E-04	0.00E+00
TCAG	2046	LDT1	Aggregate	Aggregate	Gasoline	0.0000	65.2950	0.0000	0.0345	0.0000	0.0277	2.28%	47,655.59	2.64%	10,594.56	3.11E+00	0.00E+00	1.64E-03	0.00E+00	1.32E-03	0.00E+00
TCAG	2046	LDT1	Aggregate	Aggregate	Diesel	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00%	0.55	0.00%	0.12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDT1	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.07%	1,425.21	0.08%	304.46	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDT1	Aggregate	Aggregate	Plug-in Hybrid	0.0000	66.5909	0.0000	0.0396	0.0000	0.0192	0.05%	967.71	0.06%	233.90	6.44E-02	0.00E+00	3.83E-05	0.00E+00	1.86E-05	0.00E+00
TCAG	2046	LDT2	Aggregate	Aggregate	Gasoline	0.0000	70.3580	0.0000	0.0414	0.0000	0.0312	19.51%	407,930.95	22.25%	89,153.53	2.87E+01	0.00E+00	1.69E-02	0.00E+00	1.27E-02	0.00E+00
TCAG	2046	LDT2	Aggregate	Aggregate	Diesel	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.07%	1,541.62	0.08%	334.53	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDT2	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.77%	16,153.45	0.86%	3,451.65	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LDT2	Aggregate	Aggregate	Plug-in Hybrid	0.0000	71.6995	0.0000	0.0395	0.0000	0.0191	0.47%	9,848.30	0.59%	2,380.37	7.06E-01	0.00E+00	3.89E-04	0.00E+00	1.88E-04	0.00E+00
TCAG	2046	LHD1	Aggregate	Aggregate	Gasoline	107.9914	23.6064	0.0853	0.0201	0.0025	0.0401	2.52%	52,581.43	0.88%	3,527.35	1.24E+00	3.81E-01	1.06E-03	3.01E-04	2.11E-03	8.80E-06
TCAG	2046	LHD1	Aggregate	Aggregate	Diesel	119.9240	0.0000	0.0051	0.0000	0.0189	0.0000	1.59%	33,333.66	0.66%	2,648.53	0.00E+00	3.18E-01	0.00E+00	1.35E-05	0.00E+00	5.00E-05
TCAG	2046	LHD1	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.41%	50,329.36	0.89%	3,578.18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	LHD2	Aggregate	Aggregate	Gasoline	125.2608	23.4217	0.0783	0.0184	0.0023	0.0366	0.29%	5,980.02	0.10%	401.16	1.40E-01	5.02E-02	1.10E-04	3.14E-05	2.19E-04	9.09E-07
TCAG	2046	LHD2	Aggregate	Aggregate	Diesel	196.8372	0.0000	0.0051	0.0000	0.0310	0.0000	0.79%	16,548.70	0.33%	1,314.88	0.00E+00	2.59E-01	0.00E+00	6.70E-06	0.00E+00	4.08E-05
TCAG	2046	LHD2	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.54%	11,206.58	0.21%	846.38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	MCY	Aggregate	Aggregate	Gasoline	0.0000	37.9067	0.0000	0.1348	0.0000	0.0048	0.70%	14,700.08	1.83%	7,345.96	5.57E-01	0.00E+00	1.98E-03	0.00E+00	6.99E-05	0.00E+00
TCAG	2046	MDV	Aggregate	Aggregate	Gasoline	0.0000	86.6894	0.0000	0.0458	0.0000	0.0329	11.72%	245,029.25	13.65%	54,675.91	2.12E+01	0.00E+00	1.12E-02	0.00E+00	8.05E-03	0.00E+00
TCAG	2046	MDV	Aggregate	Aggregate	Diesel	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.13%	2,778.05	0.16%	627.50	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	MDV	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.71%	14,919.23	0.80%	3,201.91	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	MDV	Aggregate	Aggregate	Plug-in Hybrid	0.0000	87.4127	0.0000	0.0394	0.0000	0.0190	0.30%	6,324.17	0.38%	1,528.58	5.53E-01	0.00E+00	2.49E-04	0.00E+00	1.20E-04	0.00E+00
TCAG	2046	MH	Aggregate	Aggregate	Gasoline	0.0000	29.9431	0.0000	0.0322	0.0000	0.0445	0.00%	41.38	0.10%	413.43	1.24E-03	0.00E+00	1.33E-06	0.00E+00	1.84E-06	0.00E+00
TCAG	2046	MH	Aggregate	Aggregate	Diesel	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00%	29.84	0.07%	298.23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	Motor Coach	Aggregate	Aggregate	Diesel	8334.1363	0.0000	0.1856	0.0000	1.3130	0.0000	0.03%	627.33	0.01%	27.28	0.00E+00	2.27E-01	0.00E+00	5.06E-06	0.00E+00	3.58E-05
TCAG	2046	OBUS	Aggregate	Aggregate	Gasoline	350.8942	27.9923	0.1904	0.0305	0.0039	0.0249	0.05%	1,032.58	0.01%	51.58	2.89E-02	1.81E-02	3.15E-05	9.82E-06	2.57E-05	2.01E-07
TCAG	2046	OBUS	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.03%	575.81	0.01%	28.76	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	PTO	Aggregate	Aggregate	Diesel	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00%	-	0.00%	-	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	PTO	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00%	-	0.00%	-	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	SBUS	Aggregate	Aggregate	Gasoline	2375.8641	50.7573	2.5264	0.0688	0.0707	0.0687	0.01%	140.33	0.01%	35.06	7.12E-03	8.33E-02	9.65E-06	8.86E-05	9.64E-06	2.48E-06
TCAG	2046	SBUS	Aggregate	Aggregate	Diesel	1859.8098	0.0000	0.0077	0.0000	0.2930	0.0000	0.19%	3,890.26	0.07%	268.52	0.00E+00	4.99E-01	0.00E+00	2.08E-06	0.00E+00	7.87E-05
TCAG	2046	SBUS	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.16%	3,324.45	0.06%	242.44	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	SBUS	Aggregate	Aggregate	Natural Gas	4316.4674	0.0000	12.0695	0.0000	0.8799	0.0000	0.06%	1,288.52	0.02%	88.94	0.00E+00	3.84E-01	0.00E+00	1.07E-03	0.00E+00	7.83E-05
TCAG	2046	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	512.6599	0.0000	0.0023	0.0000	0.0808	0.0000	0.01%	107.82	0.00%	4.69	0.00E+00	2.40E-03	0.00E+00	1.07E-08	0.00E+00	3.79E-07
TCAG	2046	T6 CAIRP Class 4	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.01%	148.98	0.00%	6.48	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	512.9437	0.0000	0.0023	0.0000	0.0808	0.0000	0.01%	132.48	0.00%	5.76	0.00E+00	2.96E-03	0.00E+00	1.32E-08	0.00E+00	4.66E-07
TCAG	2046	T6 CAIRP Class 5	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.01%	182.53	0.00%	7.94	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	512.0825	0.0000	0.0023	0.0000	0.0807	0.0000	0.03%	601.89	0.01%	26.18	0.00E+00	1.34E-02	0.00E+00	6.00E-08	0.00E+00	2.11E-06
TCAG	2046	T6 CAIRP Class 6	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.04%	836.47	0.01%	36.38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	501.4718	0.0000	0.0023	0.0000	0.0790	0.0000	0.08%	1,606.97	0.02%	69.89	0.00E+00	3.50E-02	0.00E+00	1.60E-07	0.00E+00	5.52E-06
TCAG	2046	T6 CAIRP Class 7	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.02%	499.79	0.01%	21.74	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	1749.6394	0.0000	0.0077	0.0000	0.2757	0.0000	0.04%	847.55	0.01%	59.36	0.00E+00	1.04E-01	0.00E+00	4.59E-07	0.00E+00	1.64E-05
TCAG	2046	T6 Instate Delivery Class 4	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.04%	917.59	0.02%	64.27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	1751.2644	0.0000	0.0077	0.0000	0.2759	0.0000	0.03%	594.43	0.01%	41.63	0.00E+00	7.29E-02	0.00E+00	3.22E-07	0.00E+00	1.15E-05
TCAG	2046	T6 Instate Delivery Class 5	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.03%	644.93	0.01%	45.17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	1750.8580	0.0000	0.0077	0.0000	0.2758	0.0000	0.17%	3,614.73	0.06%	253.17	0.00E+00	4.43E-01	0.00E+00	1.96E-06	0.00E+00	6.98E-05
TCAG	2046	T6 Instate Delivery Class 6	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.19%	3,931.05	0.07%	275.32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	1827.3100	0.0000	0.0078	0.0000	0.2879	0.0000	0.04%	902.64	0.02%	63.22	0.00E+00	1.16E-01	0.00E+00	4.90E-07	0.00E+00	1.82E-05
TCAG	2046	T6 Instate Delivery Class 7	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.03%	594.42	0.01%	41.63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TCAG	2046	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	4330.6005	0.0000	11.4012	0.0000	0.8828	0.0000	0.00%	18.28	0.00%	1.28	0.00E+00	5.54E-03	0.00E+00	1.46E-05	0.00E+00	1.13E-06
TCAG	2046	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	1883.1048	0.0000	0.0083	0.0000	0.2967	0.0000	0.19%	3,917.04	0.08%	338.66	0.00E+00	6.38E-01	0.00E+00	2.81E-06	0.00E+00	1.00E-04
TCAG	2046	T6 Instate Other Class 4	Aggregate	Aggregate	Electricity	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.20%	4,245.70	0.09%	367.07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Source: EMFAC2021 (v1.0.1) Emission Rates
Region Type: MPO
Region: TCAG
Calendar Year: 2046
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HOTSOAK and RUNLOSS, g/vehicle/day for IDLEX and DIURN. PHEV calculated based on total VMT.

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Fleet Mix (Population)	VMT	Fleet Mix (VMT)	Trips	Fleet Mix (Trips)
TCAG	2046	All Other Buses	Aggregate	Aggregate	Diesel	98.66458783	0.02%	4338.132711	0.03%	878.1148317	0.04%
TCAG	2046	All Other Buses	Aggregate	Aggregate	Natural Gas	7.521904323	0.00%	309.0438629	0.00%	66.94494848	0.00%
TCAG	2046	LDA	Aggregate	Aggregate	Gasoline	168925.4288	41.47%	7146700.225	41.64%	779505.3352	36.70%
TCAG	2046	LDA	Aggregate	Aggregate	Diesel	104.4232846	0.03%	4145.975185	0.02%	469.7328915	0.02%
TCAG	2046	LDA	Aggregate	Aggregate	Electricity	23044.57897	5.66%	958405.2796	5.58%	107495.9656	5.06%
TCAG	2046	LDA	Aggregate	Aggregate	Plug-in Hybi	7941.455176	1.95%	338346.819	1.97%	32837.91715	1.55%
TCAG	2046	LDT1	Aggregate	Aggregate	Gasoline	10770.35584	2.64%	417524.3356	2.43%	48419.46849	2.28%
TCAG	2046	LDT1	Aggregate	Aggregate	Diesel	0.121112226	0.00%	4.894159037	0.00%	0.557345332	0.00%
TCAG	2046	LDT1	Aggregate	Aggregate	Electricity	309.5169701	0.08%	12983.21731	0.08%	1448.054355	0.07%
TCAG	2046	LDT1	Aggregate	Aggregate	Plug-in Hybi	237.7810101	0.06%	9924.164502	0.06%	983.224477	0.05%
TCAG	2046	LDT2	Aggregate	Aggregate	Gasoline	90632.84585	22.25%	3639979.642	21.21%	414469.7281	19.51%
TCAG	2046	LDT2	Aggregate	Aggregate	Diesel	340.0822518	0.08%	13816.83734	0.08%	1566.333299	0.07%
TCAG	2046	LDT2	Aggregate	Aggregate	Electricity	3508.926885	0.86%	101796.1359	0.59%	16412.38033	0.77%
TCAG	2046	LDT2	Aggregate	Aggregate	Plug-in Hybi	2419.869387	0.59%	99165.69106	0.58%	10006.15991	0.47%
TCAG	2046	LHD1	Aggregate	Aggregate	Gasoline	3585.879453	0.88%	130436.3219	0.76%	53424.26089	2.52%
TCAG	2046	LHD1	Aggregate	Aggregate	Diesel	2692.476421	0.66%	88737.89798	0.52%	33867.96624	1.59%
TCAG	2046	LHD1	Aggregate	Aggregate	Electricity	3637.550831	0.89%	168250.952	0.98%	51136.09762	2.41%
TCAG	2046	LHD2	Aggregate	Aggregate	Gasoline	407.8176907	0.10%	14304.18646	0.08%	6075.875944	0.29%
TCAG	2046	LHD2	Aggregate	Aggregate	Diesel	1336.696697	0.33%	42092.03133	0.25%	16813.96288	0.79%
TCAG	2046	LHD2	Aggregate	Aggregate	Electricity	860.4225874	0.21%	38803.01839	0.23%	11386.21533	0.54%
TCAG	2046	MCY	Aggregate	Aggregate	Gasoline	7467.853881	1.83%	41782.19061	0.24%	14935.70776	0.70%
TCAG	2046	MDV	Aggregate	Aggregate	Gasoline	55583.14477	13.65%	2130735.532	12.41%	248956.8532	11.72%
TCAG	2046	MDV	Aggregate	Aggregate	Diesel	637.9109947	0.16%	23771.20672	0.14%	2822.577438	0.13%
TCAG	2046	MDV	Aggregate	Aggregate	Electricity	3255.03898	0.80%	93270.93244	0.54%	15158.37428	0.71%
TCAG	2046	MDV	Aggregate	Aggregate	Plug-in Hybi	1553.939719	0.38%	62407.51345	0.36%	6425.540738	0.30%
TCAG	2046	MH	Aggregate	Aggregate	Gasoline	420.2872658	0.10%	4757.815184	0.03%	42.04553807	0.00%
TCAG	2046	MH	Aggregate	Aggregate	Diesel	303.1786476	0.07%	2869.378318	0.02%	30.31786476	0.00%
TCAG	2046	Motor Coach	Aggregate	Aggregate	Diesel	27.73667841	0.01%	3519.775772	0.02%	637.3888698	0.03%
TCAG	2046	OBUS	Aggregate	Aggregate	Gasoline	52.4354161	0.01%	1764.300779	0.01%	1049.127805	0.05%
TCAG	2046	OBUS	Aggregate	Aggregate	Electricity	29.24022734	0.01%	2022.381735	0.01%	585.0384686	0.03%
TCAG	2046	PTO	Aggregate	Aggregate	Diesel	0	0.00%	6967.050638	0.04%	0	0.00%
TCAG	2046	PTO	Aggregate	Aggregate	Electricity	0	0.00%	6572.87657	0.04%	0	0.00%
TCAG	2046	SBUS	Aggregate	Aggregate	Gasoline	35.64537959	0.01%	1925.760341	0.01%	142.5815184	0.01%
TCAG	2046	SBUS	Aggregate	Aggregate	Diesel	272.970683	0.07%	5581.978142	0.03%	3952.615489	0.19%
TCAG	2046	SBUS	Aggregate	Aggregate	Electricity	246.4611416	0.06%	6653.175779	0.04%	3377.734621	0.16%
TCAG	2046	SBUS	Aggregate	Aggregate	Natural Gas	90.4123303	0.02%	1813.001682	0.01%	1309.170543	0.06%
TCAG	2046	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	4.766923089	0.00%	350.5979185	0.00%	109.5438926	0.01%
TCAG	2046	T6 CAIRP Class 4	Aggregate	Aggregate	Electricity	6.58715883	0.00%	511.9851804	0.00%	151.3729099	0.01%
TCAG	2046	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	5.857256233	0.00%	481.5633599	0.00%	134.5997482	0.01%
TCAG	2046	T6 CAIRP Class 5	Aggregate	Aggregate	Electricity	8.070258373	0.00%	701.7455388	0.00%	185.4545374	0.01%
TCAG	2046	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	26.61161677	0.01%	1254.13109	0.01%	611.5349534	0.03%
TCAG	2046	T6 CAIRP Class 6	Aggregate	Aggregate	Electricity	36.98324117	0.01%	1837.888918	0.01%	849.8748822	0.04%
TCAG	2046	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	71.04984739	0.02%	14664.87896	0.09%	1632.725493	0.08%
TCAG	2046	T6 CAIRP Class 7	Aggregate	Aggregate	Electricity	22.09757312	0.01%	4729.833396	0.03%	507.8022303	0.02%
TCAG	2046	T6 Instate Delivery Class 4	Aggregate	Aggregate	Diesel	60.34609763	0.01%	2000.059682	0.01%	861.1388132	0.04%
TCAG	2046	T6 Instate Delivery Class 4	Aggregate	Aggregate	Electricity	65.33259118	0.02%	2314.473521	0.01%	932.2960761	0.04%
TCAG	2046	T6 Instate Delivery Class 5	Aggregate	Aggregate	Diesel	42.32359415	0.01%	1403.282606	0.01%	603.9576886	0.03%
TCAG	2046	T6 Instate Delivery Class 5	Aggregate	Aggregate	Electricity	45.91940906	0.01%	1626.726645	0.01%	655.2699673	0.03%
TCAG	2046	T6 Instate Delivery Class 6	Aggregate	Aggregate	Diesel	257.3698327	0.06%	8532.161776	0.05%	3672.667512	0.17%
TCAG	2046	T6 Instate Delivery Class 6	Aggregate	Aggregate	Electricity	279.8922375	0.07%	9899.085212	0.06%	3994.062229	0.19%
TCAG	2046	T6 Instate Delivery Class 7	Aggregate	Aggregate	Diesel	64.26812991	0.02%	3276.730792	0.02%	917.1062138	0.04%
TCAG	2046	T6 Instate Delivery Class 7	Aggregate	Aggregate	Electricity	42.32303006	0.01%	2273.977892	0.01%	603.949639	0.03%
TCAG	2046	T6 Instate Delivery Class 7	Aggregate	Aggregate	Natural Gas	1.301494882	0.00%	67.47282462	0.00%	18.57233197	0.00%
TCAG	2046	T6 Instate Other Class 4	Aggregate	Aggregate	Diesel	344.275536	0.08%	13473.5615	0.08%	3979.825196	0.19%
TCAG	2046	T6 Instate Other Class 4	Aggregate	Aggregate	Electricity	373.1618874	0.09%	16426.0847	0.10%	4313.751418	0.20%

Appendix E

TCAG Regional Travel Demand Model

TCAG DRAFT 2022 RTP/SCS Base

2005	Persons/HU	Population		HU	EMP	Regional VMT		SB375 VMT	VMT/perCapita	EMFAC 14 CO2	GHG/per capita lbs/day	
SB 375 Base Year	3.15	404,148		128,388	176,896	10,153,707		8,705,754	21.54	3,440	17.02	

2021	Persons/HU	Population	SF	MF	EMP	Regional VMT	SB743 VMT	SB375 VMT	VMT/perCapita	EF 14 CO2		
2022 RTP/SCS Base Year	3.12	481,649	118,928	35,508	187,137	10,617,248	14,566,292	9,176,214	19.05	3,526	14.64	**14.0%**

TCAG DRAFT 2022 RTP/SCS Metrics

Criteria Pollutants EMFAC 14

2005	Transit Ridership	DA	SR2	SR3+ (TDM Mode Share)	Transit	Bike	Walk	Annual Heavy Duty Trucks PM10	PM2.5	ROG	CO	NOX (Annual)	CO2	PM10	PM2.5	SOx (Annual)	Fuel Gas	Fuel DSL
	10,205	38.61%	26.32%	27.74%	0.75%	1.04%	5.55%	0.7862	0.6208	9.3602	78.4561	30.2704	6511.7246	1.4096	0.9996	0.2303	########	########

2021	Transit Ridership	DA	SR2	SR3+ (TDM Mode Share)	Transit	Bike	Walk											
	15,665	37.53%	26.66%	27.77%	1.18%	1.03%	5.82%	0.1445	0.0666	2.2658	15.1358	6.99485	5542.3831	0.6804	0.2969	0.0546	########	########

TCAG DRAFT 2022 RTP/SCS Scenario Metrics

SB 375 Data

ARB SB 375 Target 16% in 2035

	Persons/HU	Population	SF	MF	EMP	Regional VMT	SB743 VMT	SB375 VMT	VMT/perCapita	EF 14 CO2 tons/day	GHG/per capita lbs/day	% GHG/per capita Reduction	% Off Model Reduction	Total % GHG/per capita Reduction
2035														
Trend (No Project) Scenario TIP Projects Only	2.99	535,463	135,772	43,257	206,681	11,863,879	16,279,168	10,229,666	19.10	3,904	14.58	14.3%		14.3%
Trend Scenario Transit Maintain	2.99	535,463	135,772	43,257	206,681	12,235,962	16,714,462	10,597,169	19.79	4,044	15.10	11.3%		11.3%
Blueprint (Old Plan) Scenario Transit Grow	2.99	535,463	132,621	46,408	206,681	12,137,682	16,649,626	10,500,342	19.61	4,008	14.97	12.1%		12.1%
Blueprint Plus Scenario Transit Grow	2.99	535,463	131,503	47,526	206,681	11,740,528	16,164,311	10,103,006	18.87	3,857	14.41	15.4%		15.4%
CVC Blueprint Plus (Prefered) Scenario Transit Grow	2.99	535,463	130,733	48,297	206,681	11,699,147	16,112,163	10,061,677	18.79	3,841	14.35	**15.7%**	0.5%	16.2%
CVC Blueprint Plus2 **(Preferred)** Scenario Transit CVC	2.99	535,463	130,733	48,297	206,681	11,696,238	16,108,885	10,058,761	18.79	3,840	14.34	15.7%	0.5%	**16.2%**
2046														
Trend (No Project) Scenario TIP Projects Only	2.95	567,383	144,772	47,397	218,846	12,465,620	17,128,558	10,726,027	18.90	4,115	14.51	14.8%		14.8%
Trend Scenario Transit Maintain	2.95	567,383	144,772	47,397	218,846	12,877,346	17,606,515	11,133,303	19.62	4,277	15.08	11.4%		11.4%
Blueprint (Old Plan) Scenario Transit Grow	2.95	567,383	139,938	52,232	218,846	12,725,515	17,485,835	10,981,613	19.35	4,215	14.86	12.7%		12.7%
Blueprint Plus Scenario Transit Grow	2.95	567,383	138,222	53,947	218,846	12,299,408	16,966,705	10,555,689	18.60	4,051	14.28	16.1%		16.1%
CVC Blueprint Plus (Prefered) Scenario Transit Grow	2.95	567,383	137,040	55,129	218,846	12,244,957	16,896,121	10,501,457	18.51	4,031	14.21	**16.5%**	1.0%	17.5%
CVC Blueprint Plus2 **(Preferred)** Scenario Transit CVC	2.95	567,383	137,040	55,129	218,846	12,241,939	16,892,980	10,498,443	18.50	4,030	14.21	16.6%	1.0%	**17.6%**

	Transit Ridership	DA	SR2	SR3+ (TDM Mode Share)	Transit	Bike	Walk	Annual Heavy Duty Trucks PM10	PM2.5	ROG	CO	NOX (Annual)	CO2	PM10	PM2.5	SOx (Annual)	Fuel Gas	Fuel DSL
2035																		
Trend (No Project) Scenario TIP Projects Only	17,466	37.39%	26.77%	27.86%	1.16%	1.05%	5.77%	0.1380	0.0555	1.1492	7.0571	3.0479	4455.8160	0.7052	0.2890	0.0436	########	########
Trend Scenario Transit Maintain	18,040	36.43%	27.41%	27.85%	1.14%	1.09%	6.08%	0.1424	0.0572	1.1852	7.2802	3.1434	4594.5650	0.7273	0.2981	0.0450	########	########
Blueprint (Old Plan) Scenario Transit Grow	21,047	36.26%	27.38%	27.75%	1.31%	1.10%	6.20%	0.1412	0.0568	1.1758	7.2216	3.1182	4558.6896	0.7215	0.2957	0.0446	########	178.25
Blueprint Plus Scenario Transit Grow	19,455	37.16%	26.72%	27.74%	1.29%	1.07%	6.02%	0.1366	0.0549	1.1374	6.9812	3.0163	4411.8295	0.6979	0.2860	0.0432	########	172.42
CVC Blueprint Plus (Prefered) Scenario Transit Grow	19,492	37.09%	26.72%	27.70%	1.30%	1.07%	6.11%	0.1361	0.0547	1.1334	6.9558	3.0056	4396.2241	0.6954	0.2850	0.0430	########	########
CVC Blueprint Plus2 Scenario Transit CVC	21,208	37.07%	26.70%	27.68%	1.38%	1.07%	6.10%	0.1361	0.0547	1.1331	6.9541	3.0049	4395.2022	0.6952	0.2850	0.0430	########	########
2046																		
Trend (No Project) Scenario TIP Projects Only	18,596	37.13%	26.87%	27.89%	1.17%	1.08%	5.86%	0.1391	0.0558	0.9171	5.9989	2.7327	4412.3987	0.7288	0.2955	0.0432	########	########
Trend Scenario Transit Maintain	19,161	36.18%	27.51%	27.88%	1.14%	1.12%	6.17%	0.1437	0.0577	0.9475	6.1927	2.8230	4560.4244	0.7529	0.3053	0.0446	########	180.118
Blueprint (Old Plan) Scenario Transit Grow	22,493	35.97%	27.49%	27.76%	1.32%	1.13%	6.33%	0.1420	0.0570	0.9363	6.1229	2.7897	4505.5206	0.7440	0.3017	0.0441	########	########
Blueprint Plus Scenario Transit Grow	20,818	36.83%	26.83%	27.73%	1.31%	1.10%	6.19%	0.1372	0.0551	0.9050	5.9154	2.6963	4356.1311	0.7191	0.2916	0.0426	########	172.035
CVC Blueprint Plus (Prefered) Scenario Transit Grow	20,848	36.74%	26.83%	27.68%	1.32%	1.11%	6.31%	0.1366	0.0548	0.9010	5.8890	2.6844	4337.2178	0.7159	0.2903	0.0424	########	171.274
CVC Blueprint Plus2 Scenario Transit CVC	22,702	36.72%	26.81%	27.66%	1.40%	1.11%	6.30%	0.1366	0.0548	0.9008	5.8877	2.6837	4336.3915	0.7157	0.2902	0.0424	########	171.232

ENVISION TOMORROW Metrics

	Regional Gross Residential Density	New Developed Acres Consumed	Important Ag Land outside SOI	Critical Habitat Land Acres	CO2 Emissions per Household	Water Consumption per Household	Energy Use per Household
2046 Trend Scenario Transit Maintain	4.9	9,193.0	2,205.0	163.0	9.9	288.5	106.6
2046 Blueprint (Old Plan) Scenario Transit Grow	6.1	7,308.0	1,475.0	163.0	9.0	252.1	96.9
2046 Blueprint Plus Scenario Transit Grow	6.4	6,913.0	1,404.0	163.0	8.8	243.7	94.6
2046 CVC Blueprint Plus (Prefered) Scenario Transit Grow	6.5	6,849.0	1,377.0	163.0	8.8	242.8	94.4
2046 CVC Blueprint Plus2 Scenario Transit CVC	6.5	6,849.0	1,377.0	163.0	8.8	242.8	94.4

543,495	2035
575,894	2046

TCAG DRAFT 2022 RTP/SCS Scenario Metrics

Item	Notes	Source
Persons/HU	Persons per housing unit	DOF
Population	Total scenario population	DOF
HU	Total scenario housing units	DOF/HCD
SF	Total single family housing units	DOF/HCD
MF	Total multi-family housing units	DOF/HCD
EMP	Total employment units	EDD/Caltrans
Regional VMT	Total daily VMT including XX trips	TCAG Model
SB 743 VMT	Total daily VMT including XX trips and beyond model vmt	TCAG Model
SB 375 VMT	Total daily VMT excluding XX trips	TCAG Model
VMT/per capita	SB 375 VMT per capita	TCAG Model
EF 14 CO2	SB375 daily CO2 tons (Annual) excluding XX trips	EMFAC 14
Total % GHG/per capita Reduction	Percent CO2 per capita reductions from 2005 base	EMFAC 14
Total % GHG/per capita Reduction - Off Model	Percent CO2 per capita reductions from 2005 base	Estimate TBD
Transit Ridership	Total daily regional transit ridership	TCAG Model
TDM Mode Share	Mode Share	TCAG Model
Heavy Duty PM10	PM10 total daily tons (Annual)	EMFAC 14
Heavy Duty PM2.5	PM2.5 total daily tons (Annual)	EMFAC 14
ROG	ROG total daily tons (Annual)	EMFAC 14
CO	CO total exhaust tons (Annual)	EMFAC 14
NOX	NOX total exhaust daily tons (Annual)	EMFAC 14
CO2	CO2 daily tons (Annual) including XX trips	EMFAC 14
PM10	PM10 total daily tons (Annual)	EMFAC 14
PM2.5	PM2.5 total daily tons (Annual)	EMFAC 14
SOx	SOx total exhaust tons (Annual)	EMFAC 14
Fuel Gas	Daily regional gasoline consumption thousands of gallons (Annual)	EMFAC 14
Fuel DSL	Daily regional diesel consumption thousands of gallons (Annual)	EMFAC 14
Regional Gross Residential Density	Gross residential density housing units per acre	Envision Tomorrow
New Developed Acres Consumed	New Developed Acres Consumed	Envision Tomorrow
Prime Ag Land Acres Consumed	Prime Ag Land Acres Consumed	Envision Tomorrow/FMMP
Critical Habitat Land Acres Consumed	Critical Habitat Land Acres Consumed	Envision Tomorrow/SJV Greenprint
CO2 Emissions per Household	CO2 tons per year	Envision Tomorrow
Water Consumption per Household	Water gallons per day	Envision Tomorrow
Energy Use per Household	Energy consumption in millions of BTU per year	Envision Tomorrow

Final Tulare CAG VMIP 2

Model Development Report

Prepared for:
Tulare CAG

July 2017

WC12-2954

FEHR PEERS

Table of Contents

OVERVIEW

The San Joaquin Valley Model Improvement Plan (VMIP 1) began in 2010 and resulted in substantial enhancements to the modeling capabilities of the Metropolitan Planning Organizations (MPOs) within the San Joaquin Valley (SJV). Due to the timing of the original VMIP 1, many data sources pertinent to understanding travel behavior and developing travel forecasting models were not available. As such, older sources were used to supplement data for the base year, making calibration and validation difficult due to the economic downturn relative to the 2001/2003 California Household Travel Survey (CHTS) and 2000 Census which were collected before calibration efforts commenced. VMIP 2 not only takes advantage of the most recent Census and CHTS data and the model structure enhancements developed as part of the VMIP 1, but also new Big Data.

This document provides guidance on the model specifications and data used in developing the components for the San Joaquin Valley Model Improvement Plan, Phase 2 (VMIP 2). The objective of this document is to provide an overview and full technical details of the VMIP 2 models: this includes aspects common to all VMIP 2 models as well as specific calibration and model validation for the Tulare County Association of Governments (TCAG) model. Changes between the original VMIP 1 models and the VMIP 2 models receive special emphasis.

In addition to the updated data, VMIP 2 implemented changes to the model structure are based on feedback from the Air Resources Board (ARB) provided during the Regional Transportation Plan (RTP) and Sustainable Communities Strategy (SCS) review process, and MPO staff who applied the models over the last several years. Key enhancements to model sensitivity and usability include:

- Land Use: Simplified residential and employment categories and addition of group quarters population
- Socio-economic: Employee salary and household income relationship for home-work trips
- Inter-regional Travel: Improved control over scenario evaluation of inter-regional assumptions
- Updated Scenario Development: Created single scenario spreadsheets and clear documentation
- Sensitivity to the "Ds:" Used GIS centerline network and included accessibility variables
- Refined Post-Processors: Added flexibility to summary processes including select link assignment

Listed below are recommendations for updating the model, data, or usability beyond VMIP 2.

- Refine trip generation such that person trips and vehicle trips account for under-reporting of travel in the CHTS, and assigned traffic volumes reflect roadway counts.
- Refine economic factors at a more specific geography and calibrate the land use allocation model using the refined data.
- Continue to collect traffic count and transit ridership data, land use development (residential, school, and employees) to perform near-term forecasts.
- Review and update the highway and transit networks for future years, creating a link between the RTP projects and the model.
- Coordinate with other MPOs and update the inter-regional travel components as needed.
- Track demographics, economics, and related Ds variables over time to inform future scenario development.
- Evaluate shifts in future assumptions such as autonomous vehicles, demographics, fuel price, and land use development patterns.

The following sections describe the data collected for model estimation, calibration, and validation.

DATA ACQUISITION, REVIEW, AND SUMMARY

This section describes the data collection, review processes, and provides a summary of the data used in the estimation, calibration, and validation of the VMIP 2 models.

2010 CENSUS/2012 ACS

Updated land use cross-classification tables used 2012 ACS Census data and the finest available geography. Most required data were available at the level of census block group or census tract, but a few multi-dimension tables were only available at the Public Use Microdata Areas (PUMA) level. These cross-classification tables are in a percentage format. Each MPO/County provides the control totals for demographic variables including total population, total numbers of households, and total number of residential units at transportation analysis zone (TAZ) level. The base year for most models is 2008, although some MPOs/Counties have opted to update model base years to 2014 under separate contracts. ACS 2012 cross-classified tables represent demographic characteristic of each TAZ regardless of the model base year. The control total can easily be updated to a new base year after each MPO/County provides recent demographic data at the TAZ level.

2012 CHTS

The original VMIP 1, completed before 2012 CHTS data were available, used the 2001/2003 CHTS for validation of household variables. VMIP 2 used newer data from the 2012 CHTS to re-estimate most model components.

PREPARATION AND CLEANING OF CHTS DATA

The publically available version of the 2012 CHTS required a substantial amount of preparation, including re-weighting, before it was suitable for model development. Details of the data preparation are in Appendix A: Preparation of California Household Travel Survey Data. Data dictionaries for the cleaned and prepared CHTS data, including households, trips, and persons files, are in Appendix B: California Household Travel Survey Data Dictionary.

The following pages describe portions of the CHTS data preparation most relevant to VMIP 2; for full details please see the appendices.

Identification of Trip Purposes

The 2012 CHTS data does not describe trip purposes directly; instead, it contains a "place" file whose attributes include a listing of up to three activities the respondent participated in at that place. A small list of place purposes was distilled from this activity information: HOME, WORK, COLLEGE, K12, SHOP, or OTHER.

Once the purpose for each place has been determined, assigning a purpose to each trip is straightforward.

- If one end of the trip is "HOME" and the other is "WORK," the trip is home-based work ("HBW").
- If one end of the trip is "HOME" and the other is "K12," the trip is home-based K-12 ("HBK").
- If one end of the trip is "HOME" and the other is "COLLEGE," the trip is home-based college ("HBC").
- If one end of the trip is "HOME" and the other is "SHOP," the trip is home-based shop ("HBS").
- If one end of the trip is "HOME" and the other is either "OTHER" or "HOME," the trip is home-based other ("HBO").
- If one end of the trip is "WORK" and the other end is anything but "HOME," the trip is work-based other ("WBO").
- In all other cases, the trip is non-home-based ("NHB").

Identification and Consolidation of Transit Trip Chains

In recording transit trips, the CHTS treats each portion of the transit trip chain as a separate trip. For example, a trip in which the traveler drives to a rail station, takes the train to a second rail station, and then walks to a workplace is listed in the survey as three separate consecutive trips, with three separate modes. This method of record-keeping makes it possible to track the mode of access and egress for a transit trip, but for most travel behavior analyses it is preferable to consider these three trips as a single unit or linked trip. Thus, a necessary step of data preparation is identification and consolidation of chains which make up a single linked transit trip. Details of this process are in Appendix A: Preparation of California Household Travel Survey Data.

Estimation of Survey Weights

Surveys capture the characteristics of an entire population by randomly sampling a small proportion of the population. Often, a perfectly random sample is hard to achieve — some groups are difficult to survey and are under-represented, other groups are over-represented. To balance this bias, estimated sample weights "reshape" the sample. Fehr & Peers estimated household sample weights for the CHTS to balance the survey sample to match county-level percentages for several variables as reported in the 2012 ACS 5-year estimates. Listed below are variables used as controls for the re-weighting.

- Household size (one to seven or more).
- Household income (nine income categories).
- Number of workers per household (zero to three or more).
- Number of vehicles owned per household (zero to four or more).
- Household residential unit type (three categories).
- Household size (one to five or more) cross-classified by household income (five categories).
- Household size (one to five or more) cross-classified by number of vehicles per household (zero to four or more).
- Household size (one to five or more) cross-classified by number of workers per household (zero to three or more).

Details of the survey weight estimation are in Appendix A: Preparation of California Household Travel Survey Data.

Census Designated Places

Census Designated Places (CDPs) are a useful identification that includes cities as well as unincorporated but named places. The fact that publically-available CHTS data is geo-coded only by census tract made the process of identifying a CDP for each location slightly more complex. Because the boundaries of CDPs do not neatly match census tracts, each census tract may have multiple CDPs associated with them. In cases where multiple CDPs make up a single census tract, the CDP with the largest population in the tract (as identified at the census block level) is used. The CDP is identified as an unincorporated portion of the relevant county if the largest population in the tract is outside all named CDPs.

Place Type

In addition to locating households and trip ends using census tracts, CDPs, and counties, each household location and trip end is assigned a place type category. The place type is based on the number of jobs and the working-age population accessible from the household or trip end. These accessibility metrics are available as part of the EPA Smart Location Database (http://www2.epa.gov/smartgrowth/smart-location-mapping#SLD), and are weighted so nearby jobs and population are more influential than distant jobs and population. The resulting sum of accessible jobs and potential workers are categorized into the following place types.

1. Under 40,000 jobs + workers.
2. 40,000 – 100,000 jobs + workers.
3. 100,000 – 200,000 jobs + workers.
4. 200,000 – 450,000 jobs + workers.
5. Over 450,000 jobs + workers.

"Work" Trips Made by Non-Workers

The CHTS collects both employment data for each participant and trip purpose data for all trips undertaken. However, the survey does not ensure these values are in agreement with one another. There are a small number of persons whose employment status is either not reported (or reported as "retired" or "unemployed") whose trips are categorized as work trips. Because this is not optimal for modeling purposes, any work trips made by a non-employed person is re-categorized; HBW trips are re-assigned as HBO trips, and WBO trips are re-assigned as OBO trips.

ESTIMATION DATASET

The estimation dataset for VMIP 2 consists of a portion of the statewide CHTS data. Only CHTS records which satisfy the following criteria were used.

- For household-level variables, only residents of the eight SJV counties and the six Sacramento Area Council of Governments (SACOG) counties are included. The six SACOG counties had to be included to ensure an adequate sample size.
- Only weekday trips are included.
- Trips are included from the full year of the CHTS, including winter and summer.
- Trips with both trip ends outside the 14-county SJV + SACOG region are excluded.

Table 1 shows the distribution of CHTS households in the estimation counties, the households reported in the ACS, and percentage of samples in the estimation set. Note the table shows the (unweighted) number of households in the estimation set and the full CHTS, while the value in the final column represents the percentage of the overall samples by county.

TABLE 1: GEOGRAPHIC SCALE FOR NEW TAZ VARIABLES

County	Households in Estimation Set	Total households in CHTS	Total households in County (2012 ACS)	Percentage of Estimation Set
Fresno	718	1,115	287,082	14%
Kern	961	1,544	253,178	12%
Kings	199	293	40,767	2%
Madera	205	311	42,063	2%
Merced	297	474	74,496	3%
San Joaquin	468	629	213,632	12%
Stanislaus	383	552	165,999	8%
Tulare	537	799	129,996	6%
Sacramento	567	825	512,496	25%
El Dorado	151	208	67,846	2%
Placer	290	385	131,775	7%
Sutter	130	168	31,635	2%
Yuba	137	205	24,133	1%
Yolo	186	246	70,090	4%
Total	**5,229**	**7,754**	**512,496**	**100%**

CHTS SUMMARIES

Several broad summaries of CHTS data were produced and are suitable both for model development and for general information. Separate summaries were produced for the 14-county estimation region, the eight-county SJV region, the three-county Three County Model region, and each of the eight SJV counties individually. The "simple" and "flat" summaries contain one record per geography, and is suitable for joining to GIS. The "simple" summary contains a smaller number of metrics, while the "flat" summary contains many more details. The "filterable" summary contains many records per geography, and is viewable in Excel. Details and data dictionaries for these summaries are in Appendix C: Simple Summaries of CHTS Data, Appendix D: Flat Summaries of CHTS Data, and Appendix E: Filterable Summaries of CHTS Data.

CHTS SIMPLIFIED DATA

In addition to being useful for model estimation, calibration, and validation, the CHTS data is useful for a wide range of other purposes. To that end, we have provided simplified versions of CHTS data together with instructions for processing that data in Excel. The format is designed to be flexible, easy to use, and able to produce a variety of commonly-requested summaries such as mode shares, trip lengths and origin/destination tables. More information about the simplified data and instructions for using it in Excel is in Appendix F: Simplified CHTS Data.

HOUSING AFFORDABILITY, EMPLOYMENT AND JOBS/HOUSING BALANCE

Demographic and employment data are critical components to any land use, transportation, or integrated land use-transportation modeling effort. An appropriately detailed description of the people who live and work in each geographic zone is essential to understanding their travel behavior and in predicting the region's evolution over time, especially the relationship between the locations of employers paying a given range of wages and the residence locations of workers with similar income levels. There are many sources for this data, necessitating a data merge and verifying its compatibility with other datasets. CoStar led this effort. They used surveyors to call and visit residential, office, and commercial buildings and combined multiple demographic and transportation databases into a single web-accessible dashboard. CoStar continuously updates the data and keeps the historic data so changes in rents, vacancies, and other relevant variables can be evaluated. This data were used to calibrate the bid/rent functions of the land use allocation/disaggregation model, and to assist in the estimation and calibration of trip generation and distribution, allowing additional functionality to better match jobs and household income. The income of households and job salaries are described later in the calibration step.

REFINE MODEL INPUT DATA

TRANSPORTATION ANALYSIS ZONES

The TAZ system for each model is largely unchanged from the original VMIP 1. New TAZ attributes were developed to refine the model's trip distribution, including the matching of jobs to workers by income level and the distribution of trips entering and leaving the model area. In addition, the VMIP 2 models include both accessibility pre-processors and in-model accessibility calculations at the TAZ level, described below.

TAZ ATTRIBUTES

New attributes in the TAZ-level input data are listed below.

- Total acreage of the TAZ (including undeveloped land).
- Percentage of trips produced by the TAZ which enter or leave the model area, by trip purpose.
- Percentage of trips attracted to the TAZ which enter or leave the model area, by trip purpose.
- Percentage of jobs in the TAZ which are high-, medium-, and low-income, by employment category.

Table 2 below describes the geographic scale at which the trips produced/attracted and employment income variables are implemented in the model. The model user can change variables to apply at a different scale if desired, as described in the table.

TABLE 2: GEOGRAPHIC SCALE FOR NEW TAZ VARIABLES

Variables	Description	Scale of current implementation	Scale of potential implementation
HBWH_ix, HBWH_xi, HBWM_ix, HBWM_xi, etc.	Percentages of trips produced & attracted to TAZ, by trip purpose	CDP	TAZ
EMP_EDUH, EMP_EDUM, EMP_EDUL, etc.	Percentages of employment that are high, medium, and low income, by job sector	County	TAZ

The full data dictionary for TAZ-level inputs is in Appendix G: Data dictionary for TAZ data inputs.

ACCESSIBILITY

The VMIP 2 models include two accessibility pre-processors. These are Python scripts, operating on the input TAZ and network shapefiles to produce accessibility metrics.

- Intersections.py produces a count of the number of intersections per TAZ.
- RoadwayMiles.py produces the sum of walkable network miles.

These script outputs, in data base format (DBF), are used during the model input preparation stage to calculate a variety of accessibility metrics at the TAZ level.

A third input file, VMTseed, contains an estimate of the average commuting VMT generated per worker in the TAZ. The starting estimates can be approximate because this estimate is updated throughout the model process.

During the input preparation phase of the model, TAZ-level accessibility metrics and built environment ("D variable") metrics are produced. These metrics are updated as the model runs through its feedback loops. Some of the accessibility metrics are implemented later in the model; others are provided as model outputs. **Table 3** below shows the accessibility metrics used later in the model.

TABLE 3: ACCESSIBILITY METRICS USED IN VMIP 2 MODELS

Metric	Description	Where used
EMP_30AUT	Jobs within 30 minutes by auto	Place Type calculation
WRK_30AUT	Working-age population within 30 minutes by auto	Place Type Calculation
ATYPE	Place Type categorization of job+worker to five categories. (See Table 4 below).	Trip Generation
LOG_EMPD	Log of employment density (jobs per developed acre)	Auto Ownership, Mode Choice
INTDEN	Intersection density (intersections per square mile)	Auto Ownership, Mode Choice
EMP_30TRN	Jobs within 30 minutes by transit	Auto Ownership, Mode Choice
COMMUTECOST	Average annual commute cost	Auto Ownership

Place type is calculated from the sum of jobs within 30 minutes by auto- and working-age population within 30 minutes by auto, and categorized into the five categories listed in **Table 4** below.

TABLE 4: PLACE TYPES

Place Type Category	Alternate Name	Description
1	POP1	Under 40,000 jobs + working-age population within 30 minutes by auto
2	POP2	Between 40,000 and 100,000 jobs + working-age population within 30 minutes by auto
3	POP3	Between 100,000 and 200,000 jobs + working-age population within 30 minutes by auto
4	POP4	Between 200,000 and 450,000 jobs + working-age population within 30 minutes by auto
5	POP5	Over 450,000 jobs + working-age population within 30 minutes by auto

A full data dictionary of the accessibility metrics calculated in the model is in Appendix H: Accessibility Variables.

LAND USE INPUTS

During the original VMIP 1, Census 2000 land use data were used in combination with the CHTS 2001/03 to estimate and calibrate the trip generation rates. After Census 2000, the Census Bureau not only developed continuous sampling and reporting via the American Community Survey, but they also changed the format, variables, and detail of reported data. In 2012 it was discovered all of the variables used in the MIP models are not available at the same cross-classification detailed level as was reported in 2000. As such, we have updated the residential demographic variables at the same time we re-estimated trip generation equations.

In addition to the availability of data provided by the ACS and Census, updating the land use inputs at the same time trip information is estimated and calibrated allowed the opportunity to expand the capabilities to take advantage of the job salary and household mortgage/expense data. While the Census and ACS provide the information for the base year recalibration, the VMIP 2 models can now also use Cube Land to disaggregate the base year land use to reflect the validation conditions, allowing future forecasts of residential demographics to vary based on land use and transportation system changes.

Although the land use data and Cube Land model were implemented for each model, the application of Cube Land is not required. It can be used to disaggregate land use while keeping the totals by zone nearly identical, test brand new scenarios by allocating the control total for each land use type, or a middle scenario where some areas do not change and others can be allocated based on Cube Land.

Table 5 below describes the land use variables used as model inputs:

TABLE 5: LAND USE INPUT VARIABLES

Type	Attribute	Description	Units
Geographic	TAZ	Transportation Analysis Zone ID	
	STATE	State	
	COUNTY	County	
	PUMA	Census Public Use Microdata Area	
	CITY	City	
	TRACT	Census tract ID	
	BLOCK	Census block ID	
	MODEL	Model ID	
	PLACETYPE [1]	Placetype category	
Residential	TOTHH	Total Households	Households
	RU1, RU2, … RU10 [2]	Households by Residential Unit Type	Households
	RUG1, RUG2, RUG3 [2]	Households by Residential Unit Type Groups	Households
	RUG1SPARE, … RUG7SPARE	Unused in current model but available for expanding grouping of residential unit types.	
Non-residential[3]	TOTEMP	Total employees	Employees
	EMPEDU	Educational Services (61-63)	Employees
	EMPFOO	Accommodations (721), Food Services (722), Arts, Entertainment and Recreation (71)	Employees
	EMPGOV	Public Administration (92)	Employees
	EMPIND	Utilities (22), Construction (23), Other Services Except Public Administration (81), Wholesale Trade (42), Transportation and Warehousing (48-49)	Employees
	EMPMED	Health Care and Social Assistance (62)	Employees
	EMPOFC	Information (51), Finance and Insurance (52), Real Estate, Rental and Leasing (53), Professional, Scientific, and Technical Services (54), Management of Companies and Enterprises (55), Administrative/Support, Waste Management & Remediation (56)	Employees
	EMPOTH	Mining, Quarrying, Oil and Gas Extraction (21), Manufacturing (31-33)	Employees

TABLE 5: LAND USE INPUT VARIABLES

Type	Attribute	Description	Units
	EMPRET	Retail Trade (44-45)	Employees
	EMPAGR	Agriculture, Forestry, Fishing and Hunting (11)	Employees
	EMPSPARE1, … EMPSPARE8	Unused in current model but available for expanding employment categories	
	POPDORM	Group Quarters population: School (Dormitory, Fraternity, Sorority)	People
	POPASSIST	Group Quarters Population: Medical (Assisted living, retirement home)	People
	POPMILITARY	Group Quarters Population: Military (Military base if not special generator)	People
	POPINST	Group Quarters Population: Institutionalized population (prison, mental health, etc.)	People
	ELEM	Elementary and middle school enrollment	Student Enrollment
	HS	High school enrollment	Student Enrollment
	COLLEGE	College enrollment	Student Enrollment
Scenario	YEAR	Scenario year	
	SCEN	Scenario name	
	MPO	MPO	
	Comments	Scenario comments	

Notes:

1. See Table 4 for place type categories.
2. See Table 8 for residential unit type categories.
3. Non-residential description contains NAICS sector number(s).

The land use inputs above are combined with the Census cross-classification rates to create the SE Detail file, described in **Table 6** below.

TABLE 6: SOCIO-ECONOMIC DETAIL

Type	Attribute	Description	Units
Geographic	TAZ	Transportation Analysis Zone ID	
	STATE	State	
	COUNTY	County	
	PUMA	Census Public Use Microdata Area	

TABLE 6: SOCIO-ECONOMIC DETAIL

Type	Attribute	Description	Units
Residential	CITY	City	
	TRACT	Census tract ID	
	BLOCK	Census block ID	
	MODEL	Model ID	
	PLACETYPE [1]	Placetype category	
	TOTHH	Total Households	Households
	RUG1, RUG2, RUG3 [2]	Households by Residential Unit Type Groups	Households
	RUG1SPARE, … RUG7SPARE	Unused in current model but available for expanding grouping of residential unit types.	
	RU1_HHPOP, RU3_HHPOP, RU6_HHPOP [2]	Population in households by residential unit type	People
	RUSPARE1, … RUSPARE7	Unused in current model but available for expanding grouping of residential unit types	
	RU1_HHSIZE1_INC1, RU9_HHSIZE5_INC5 [2,3,4]	Households cross-classified by Residential Unit Type, Household Size, and Household Income	Households
	RU1_AGE1524, … RU9AGE75 [2,5]	Households cross-classified by Residential Unit Type and Household Age category.	Households
	POP0005, … , POP75 [6]	Population by age range	People
Non-residential [7]	TOTEMP	Total employees	Employees
	EMPEDU	Educational Services (61-63)	Employees
	EMPFOO	Accommodations (721), Food Services (722), Arts, Entertainment and Recreation (71)	Employees
	EMPGOV	Public Administration (92)	Employees
	EMPIND	Utilities (22), Construction (23), Other Services Except Public Administration (81), Wholesale Trade (42), Transportation and Warehousing (48-49)	Employees
	EMPMED	Health Care and Social Assistance (62)	Employees

TABLE 6: SOCIO-ECONOMIC DETAIL

Type	Attribute	Description	Units
	EMPOFC	Information (51), Finance and Insurance (52), Real Estate, Rental and Leasing (53), Professional, Scientific, and Technical Services (54), Management of Companies and Enterprises (55), Administrative/Support, Waste Management & Remediation (56)	Employees
	EMPOTH	Mining, Quarrying, Oil and Gas Extraction (21), Manufacturing (31-33)	Employees
	EMPRET	Retail Trade (44-45)	Employees
	EMPAGR	Agriculture, Forestry, Fishing and Hunting (11)	Employees
	EMPSPARE1, ... EMPSPARE8	Unused in current model but available for expanding employment categories	
	POPDORM	Group Quarters population: School (Dormitory, Fraternity, Sorority)	People
	POPASSIST	Group Quarters Population: Medical (Assisted living, retirement home)	People
	POPMILITARY	Group Quarters Population: Military (Military base if not special generator)	People
	POPINST	Group Quarters Population: Institutionalized population (prison, mental health, etc.)	People
	ELEM	Elementary and middle school enrollment	Student Enrollment
	HS	High school enrollment	Student Enrollment
	COLLEGE	College enrollment	Student Enrollment
Scenario	YEAR	Scenario year	
	SCEN	Scenario name	
	MPO	MPO	
	Comments	Scenario comments	

Notes:
1. See Table 7 for place type categories.
2. See Table 8 for residential unit type categories.
3. See Table 9 for household size categories.
4. See Table 10 for household annual income categories.
5. See Table 11 for household age categories.
6. See Table 12 for population distribution by age range categories.
7. Non-residential description contains NAICS sector number(s).

If desired, preliminary place type descriptions may be included in the land use input. Within the VMIP 2 models, place type is re-calculated as part of the accessibility module described in Accessibility / D Variables.

TABLE 7: PLACE TYPES

Place Type Category	Alternate Name	Description
1	POP1	Under 40,000 jobs + working-age population within 30 minutes by auto
2	POP2	Between 40,000 and 100,000 jobs + working-age population within 30 minutes by auto
3	POP3	Between 100,000 and 200,000 jobs + working-age population within 30 minutes by auto
4	POP4	Between 200,000 and 450,000 jobs + working-age population within 30 minutes by auto
5	POP5	Over 450,000 jobs + working-age population within 30 minutes by auto

TABLE 8: RESIDENTIAL UNIT TYPE

<table>
<tr><th>Name</th><th>Grouping</th><th>Alternate Grouping Name</th><th>Description</th></tr>
<tr><td>RU1</td><td rowspan="2">RUG1 (SF)</td><td rowspan="2">RU1</td><td>1, detached</td></tr>
<tr><td>RU2</td><td>1, attached</td></tr>
<tr><td>RU3</td><td rowspan="6">RUG2 (MF)</td><td rowspan="6">RU3</td><td>2 units</td></tr>
<tr><td>RU4</td><td>3 to 4 units</td></tr>
<tr><td>RU5</td><td>5 to 9 units</td></tr>
<tr><td>RU6</td><td>10 to 19 units</td></tr>
<tr><td>RU7</td><td>20 to 49 units</td></tr>
<tr><td>RU8</td><td>50+ units</td></tr>
<tr><td>RU9</td><td rowspan="2">RUG3 (Other)</td><td rowspan="2">RU9</td><td>Mobile home</td></tr>
<tr><td>RU10</td><td>Boat, RV, van, etc.</td></tr>
</table>

Data sources:
Model input: MPO land use inputs
Estimation: CHTS
Calibration: Census

TABLE 9: HOUSEHOLD SIZE

Category	Description
HHSIZE1	1 person household
HHSIZE2	2 person household
HHSIZE3	3 person household
HHSIZE4	4 person household
HHSIZE5	5 or more person household

Source:
Model Input: MPO land use inputs + census cross-classification percentages
Estimation: CHTS
Calibration: Census

TABLE 10: HOUSEHOLD ANNUAL INCOME

High-med-low grouping	5-category grouping	10-category grouping	Description
LOWINC	INCG1	INC1	Less than $10,000
		INC2	$10,000 to $24,999
	INCG2	INC3	$25,000 to $34,999
		INC4	$35,000 to $49,999
MEDINC	INCG3	INC5	$50,000 to $74,999
	INCG4	INC6	$75,000 to $99,999
HIGHINC	INCG5	INC7	$100,000 to $149,999
		INC8	$150,000 to $199,999
		INC9	$200,00 or more
		INC10	SPARE -- unused

Data sources:
Model Input: MPO land use inputs + census cross-classification percentages
Estimation: CHTS
Calibration: Census

TABLE 11: HOUSEHOLD AGE

Category	Description
Age1524	No household member over age 25 but at least one household member age 15-24.
Age2564	Household has at least one member age 25-64
Age6574	Household has no member age 25-64 but at least one member age 65-74.
Age75	Household has no member age 25-74 but at least one member age 75 or older.

Data sources:
Model Input: MPO land use inputs + census cross-classification percentages
Estimation: CHTS
Calibration: Census

TABLE 12: POPULATION BY AGE RANGE

Category	Description
POP0005	People 0 to 5 years
POP0514	People 5 to 14 years
POP1517	People 15 to 17 years
POP1824	People 18 to 24 years
POP2554	People 25 to 54 years
POP5564	People 55 to 64 years
POP6574	People 65 to 74 years
POP75	People 75 years and over

Source:
Model Input: MPO land use inputs + census cross-classification percentages
Estimation: CHTS
Calibration: Census

Appendix I: Comparison of land use categories shows the residential land use data elements and how the VMIP 2 grouping compares to other data sources including the CHTS, ACS, and VMIP 1 categorization.

NETWORK UPDATE

As part of the VMIP 1, integration of GIS for each of the models took a substantial step forward by utilizing a geodatabase for background data and for storing model outputs. However, the highway and transit networks remained simplistic link and node representations of the actual networks. As part of VMIP 2, the highway network was based on a true shape centerline file in a geodatabase and updated variables to reflect the master network from the RTP/SCS. The transit lines were also updated to match the more detailed highway network and are contained in the geodatabase. The benefits of this are more accurate mapping and distances, easy linkage and comparisons to speed data, and inclusion of local streets for sub-TAZ level analysis. In addition, the GIS network contains many variables to complement those already part of the travel model network, including auto, HOV, transit, truck, bike, and walk accessibility designations. Advanced models such as Activity Based Models (ABMs) and Dynamic Traffic Assignment (DTA) also greatly benefit from the network accuracy and detail.

TABLE 13: STANDARD MASTER HIGHWAY NETWORK VARIABLES

Attribute	Description
Nodes	
X	X-coordinate of node in Nad 83
Y	Y-coordinate of node in Nad 83
N	Node number
TAZ	Traffic Analysis Zone Number
DISTRICT	Super district number used for aggregation
SOI	Sphere of influence used to number TAZs alphabetically
STDID	Study location number used to record turning movements when non-zero
COUNTY	County where node is located
JURISDICTION	Political jurisdiction where node is located
COMMUNITY	Community/district name
Links	
A	A node
B	B node
DISTANCE	Distance in miles
NAME	Local street name
ROUTE	Numerical state route number
TERRAIN	Terrain (F=Flat , R=Rolling, M=Mountain)
JURISDICTION	Political jurisdiction where link is located location
SCREENLINE	Screenline by direction (See Figures 3-1.1 through 3.1.10)
XXXX_PRJID [1]	RTP Project ID number
XXXX_PRJYR [1]	RTP Project Opening Year
XXXX_FACTYP [1]	Facility type by year [2]
XXXX_AREATYP [1]	Area type by year [2]
XXXX_LANES [1]	Number of directional through travel lanes by year [2]
XXXX_AUX [1]	Auxiliary lane (0=no, 1=yes)
XXXX_SPEED [1]	Free-flow speed in miles-per hour by year [3]

TABLE 13: STANDARD MASTER HIGHWAY NETWORK VARIABLES

Attribute	Description
XXXX_CAPCLASS [1]	Capacity class by year (derived from Terrain, Facility type, and Area Type) [2]
XXXX_CAPACITY [1]	Vehicle per hour (calculated based on Lanes and CapClass) [4]
XXXX_USE [1]	Identifies vehicle prohibitions by year [5]
XXXX_TOLL [1]	Code used for cost on toll facilities by year [3]

Notes:

1. XXXX represents BASE (calibration/validation year), IMP1 (status after first improvement), and IMP2 (status after second improvement). In addition to calibration/validation year which varies by MPO, the years required to be covered by improvement are 05, 20, 35, and 40.
2. See Table 14 for details on CapClass by Terrain, Facility Type, and Area Type.
3. See Table 15 for Speed ranges by Terrain, Facility Type, and Area Type.
4. See Table 16 for details on Capacity by Terrain, Facility Type, and Area Type.
5. 0 or 1=facility open to all ("general purpose") ; 2=Carpool 2; 3=Carpool 3+; 4=Combination trucks prohibited; 5=Walk or bike only

TABLE 14: CAPACITY CLASS BY TERRAIN, FACILITY TYPE, AND AREA TYPE

Facility Type	Area Type				
	Rural (R)	Suburban (SU)	Urban (U)	Fringe (F)	Central Business District (CBD)
Flat					
Freeway	1	11	21	31	41
Highway	2	12	22	32	42
Expressway	3	13	23	33	43
Arterial	4	14	24	34	44
Collector	5	15	25	35	45
Local	6	16	26	36	46
Ramp: Freeway-Freeway	7	17	27	37	47
Ramp: Slip	8	18	28	38	48
Ramp: Loop	9	19	29	39	49
Connector: Dist. ≤ 0.25	10	N/A	N/A	N/A	N/A
Connector: Dist. > 0.25	20	N/A	N/A	N/A	N/A

TABLE 14: CAPACITY CLASS BY TERRAIN, FACILITY TYPE, AND AREA TYPE

Facility Type	Area Type				
	Rural (R)	Suburban (SU)	Urban (U)	Fringe (F)	Central Business District (CBD)
Rolling					
Freeway	51	61	71	81	91
Highway	52	62	72	82	92
Expressway	53	63	73	83	93
Arterial	54	64	74	84	94
Collector	55	65	75	85	95
Local	56	66	76	86	96
Ramp: Freeway-Freeway	57	67	77	87	97
Ramp: Slip	58	68	78	88	98
Ramp: Loop	59	69	79	89	99
Connector: Dist. ≤ 0.25	60	N/A	N/A	N/A	N/A
Connector: Dist. > 0.25	70	N/A	N/A	N/A	N/A
Mountain					
Freeway	101	111	121	131	141
Highway	102	112	122	132	142
Expressway	103	113	123	133	143
Arterial	104	114	124	134	144
Collector	105	115	125	135	145
Local	106	116	126	136	146
Ramp: Freeway-Freeway	107	117	127	137	147
Ramp: Slip	108	118	128	138	148
Ramp: Loop	109	119	129	139	149
Connector: Dist. ≤ 0.25	110	N/A	N/A	N/A	N/A
Connector: Dist. > 0.25	120	N/A	N/A	N/A	N/A

TABLE 15: TYPICAL SPEEDS BY TERRAIN, FACILITY TYPE, AND AREA TYPE

Facility Type	Area Type				
	Rural (R)	Suburban (SU)	Urban (U)	Fringe (F)	Central Business District (CBD)
Flat					
Freeway	70	65-70	55-65	55-65	55-65
Highway	40-45	40-45	40-45	40-45	40-45
Expressway	55	45-55	45-55	45-55	40-45
Arterial	40-45	30-45	25-45	30-45	25-45
Collector	50	50	35-40	35-40	35-40
Local	25-40	25-40	25-40	25-40	25-40
Ramp: Freeway-Freeway	50	50	50	50	50
Ramp: Slip	50	50	50	50	50
Ramp: Loop	45	45	45	45	45
Connector: Dist. ≤ 0.25	35	35	35	35	35
Connector: Dist. > 0.25	15	15	15	15	15
Rolling					
Freeway	65-70	65-70	65-70	65-70	65-70
Highway	40-45	40-45	40-45	40-45	40-45
Expressway	50-65	50-65	50-65	50-65	50-65
Arterial	30-45	30-45	30-45	30-45	30-45
Collector	50	50	50	50	50
Local	50	50	50	50	50
Ramp: Freeway-Freeway	50	50	50	50	50
Ramp: Slip	50	50	50	50	50
Ramp: Loop	45	45	45	45	45
Connector: Dist. ≤ 0.25	35	35	35	35	35
Connector: Dist. > 0.25	15	15	15	15	15
Mountain					

TABLE 15: TYPICAL SPEEDS BY TERRAIN, FACILITY TYPE, AND AREA TYPE

Facility Type	Area Type				
	Rural (R)	Suburban (SU)	Urban (U)	Fringe (F)	Central Business District (CBD)
Freeway	65	65	65	65	65
Highway	40-45	40-45	40-45	40-45	40-45
Expressway	40-55	40-55	40-55	40-55	40-55
Arterial	30-45	30-45	30-45	30-45	30-45
Collector	25-40	25-40	25-40	25-40	25-40
Local	25-40	25-40	25-40	25-40	25-40
Ramp: Freeway-Freeway	50	50	50	50	50
Ramp: Slip	45	45	45	45	45
Ramp: Loop	35	35	35	35	35
Connector: Dist. ≤ 0.25	15	15	15	15	15
Connector: Dist. > 0.25	25	25	25	25	25

Note: Speed shown as miles per hour (MPH)

TABLE 16: DEFAULT CAPACITY BY TERRAIN, FACILITY TYPE, AND AREA TYPE

Facility Type	Area Type				
	Rural (R)	Suburban (SU)	Urban (U)	Fringe (F)	Central Business District (CBD)
Flat					
1. Freeway	2,000	2,000	1,800	1,750	1,750
2. Highway	1,800	1,800	1,600	1,500	1,300
3. Expressway	1,100	1,100	1,000	900	800
4. Arterial	900	900	900	800	750
5. Collector	700	700	800	800	700
6. Local	600	600	700	700	600

TABLE 16: DEFAULT CAPACITY BY TERRAIN, FACILITY TYPE, AND AREA TYPE

Facility Type	Area Type				
	Rural (R)	Suburban (SU)	Urban (U)	Fringe (F)	Central Business District (CBD)
7. Ramp: Freeway-Freeway	1,800	1,800	1,800	1,800	1,800
8. Ramp: Slip	1,500	1,500	1,500	1,500	1,500
9. Ramp: Loop	1,250	1,250	1,250	1,250	1,250
10. Connector: Internal	N/A	N/A	N/A	N/A	N/A
Rolling					
20. Connector: External (except major gateways)	N/A	N/A	N/A	N/A	N/A
21. Freeway	1,800	1,800	1,620	1,580	1,580
22. Highway	1,460	1,460	1,300	1,220	1,060
23. Expressway	890	890	810	730	650
24. Arterial	730	730	730	650	610
25. Collector	570	570	650	650	570
26. Local	550	550	640	640	550
27. Ramp: Freeway-Freeway	1,800	1,800	1,800	1,800	1,800
28. Ramp: Slip	1,500	1,500	1,500	1,500	1,500
29. Ramp: Loop	1,250	1,250	1,250	1,250	1,250
Mountain					
31. Freeway	1,500	1,500	1,350	1,310	1,310
32. Highway	790	790	700	660	570
33. Expressway	480	480	440	390	350
34. Arterial	390	390	390	350	330
35. Collector	310	310	350	350	310
36. Local	330	330	380	380	330

TABLE 16: DEFAULT CAPACITY BY TERRAIN, FACILITY TYPE, AND AREA TYPE

Facility Type	Area Type				
	Rural (R)	Suburban (SU)	Urban (U)	Fringe (F)	Central Business District (CBD)
37. Ramp: Freeway-Freeway	1,800	1,800	1,800	1,800	1,800
38. Ramp: Slip	1,500	1,500	1,500	1,500	1,500
39. Ramp: Loop	1,250	1,250	1,250	1,250	1,250

Note: Capacity shown as vehicles per hour per lane (VPHPL)

ESTIMATION, CALIBRATION, AND VALIDATION

This section covers the model estimation with the enhancements of integrating D variables within the sub-models and a revised inter-regional process to capture the interaction between household income and job salary. Values presented in this section are those estimated based on the entire survey data set, and **Appendix L** contains the resulting calibrated values.

ECONOMIC LAND USE FORECASTING

VMIP 1 developed and implemented an integrated transportation and standard socioeconomic land use forecasting model structure by expanding the pilot project for Kern COG. This system supports the travel demand models by allocating study area forecast control totals of households and jobs by type to zones within the study area based upon bid-rent economic principles. This approach to land use forecasting provides a way of recognizing the important effects that linkages between spatial distributions of housing costs, household incomes, and job industries have on intra- and inter-regional travel. It also provides a way to automate the otherwise tedious and error-prone process of disaggregating land use assumptions developed through scenario visioning exercises into more detailed household and job type stratifications for travel modeling.

TRAVEL MODEL ESTIMATION

VMIP 2 re-estimated the trip generation, auto availability, and mode choice model components using data from the 2012 CHTS. The fairly limited sample size, particularly for transit and non-motorized trips, precluded the estimation of county-specific mode choice model coefficients. Instead, models were estimated using data from all eight San Joaquin Valley counties, together with the six SACOG counties. Each model was then calibrated to fit local conditions using CHTS data for its county/counties alone. Calibration values are in Appendix L: Calibrated Parameters.

The table below shows the re-estimated model components for VMIP 2, including a description of the model structure and a list of variables used. Detailed descriptions of each model component and its estimation are in the following sections.

TABLE 17: RE-ESTIMATED MODEL COMPONENTS

	Vehicle Availability	Trip Generation	Mode Choice
Model Structure	Disaggregate: multinomial logit	Aggregate: 4-dimensional cross-class models or regression models. Stratified by productions vs attractions and trip purpose.	Disaggregate: multinomial logit. Stratified by trip purpose and vehicle availability + household size.
Household Size	HH1, HH2, HH3, HH4, HH5	HH1, HH2, HH3, HH4, HH5	
Household Income	INCG1, INCG2, INCG3, INCG4, INCG5	INCG1, INCG2, INCG3, INCG4, INCG5	
Housing Type	RUG1, RUG3, RUG6	RUG1, RUG3, RUG6	
Accessibility / D variables	Intersection density, transit accessibility to jobs, employment density	Place Types based on auto accessibility to jobs and workers: pop1, pop2, pop3, pop4, pop5	Intersection density, transit accessibility to jobs, employment density
Age of population		POP0005, POP0514, POP1517, POP1824, POP2554, POP5564, POP75	
Employment		EMPEDU, EMPFOO, EMPGOV, EMPIND, EMPMED, EMPOFC, EMPRET, EMPOTH, EMPAGR	
School Enrollment		ELEM, HS, COLLEGE	
In-vehicle travel time			Applies to all modes. Transit amenities, if any, can be discounted here.
Out of vehicle time			Access/egress/transfer walk and waiting time for transit, parking time for drive-to-transit, and passenger pickup for shared ride.
Cost	Commute cost proportion of household income		Transit fare, plus toll and parking costs as well as auto operating costs for drive modes.

ACCESSIBILITY / D VARIABLES

All three of the re-estimated model components make use of built environment ("D variables"), particularly the inclusion of accessibility. The table below describes the variables used.

TABLE 18: ACCESSIBILITY METRICS USED IN VMIP 2 MODELS

Metric	Description	Where used
EMP_30AUT	Jobs within 30 minutes by auto	Place Type calculation
WRK_30AUT	Working-age population within 30 minutes by auto	Place Type Calculation
ATYPE	Place Type categorization of job+worker to five categories. (See table 19 below).	Trip Generation
LOG_EMPD	Log of employment density (jobs per developed acre)	Auto Ownership, Mode Choice
INTDEN	Intersection density (intersections per square mile)	Auto Ownership, Mode Choice
EMP_30TRN	Jobs within 30 minutes by transit	Auto Ownership, Mode Choice
COMMUTECOST	Average annual commute cost	Auto Ownership

Place type is calculated from the sum of jobs within 30 minutes by auto and working-age population within 30 minutes by auto, and categorized into the five categories listed below.

TABLE 19: PLACE TYPES

Place Type Category	Alternate Name	Description
1	POP1	Under 40,000 jobs + working-age population within 30 minutes by auto
2	POP2	Between 40,000 and 100,000 jobs + working-age population within 30 minutes by auto
3	POP3	Between 100,000 and 200,000 jobs + working-age population within 30 minutes by auto
4	POP4	Between 200,000 and 450,000 jobs + working-age population within 30 minutes by auto
5	POP5	Over 450,000 jobs + working-age population within 30 minutes by auto

A full data dictionary of the accessibility metrics calculated in the model is in Appendix H: Accessibility Variables.

VEHICLE AVAILABILITY AND TRIP GENERATION

The original VMIP 1 resulted in all models generating person trips by vehicle availability from a very consistent set of land uses. Household trips were generated for eight different purposes, and truck trips were generated for light, medium, and heavy trucks. With the new CHTS data we have re-estimated the vehicle availability and trip generation rates. In addition to the cross-classifications currently used in the models we have added place classifications that relate jobs/housing, income and long distance commuting, and other factors that were not available in previous data sets. To better link jobs and housing, the HBW trip purpose was split into three purposes corresponding to high, medium, and low income households and jobs.

Auto Operating Cost

Auto operating costs were determined using the methodology outlined in the memo prepared by MTC, SCAG, SACOG, and SANDAG in October 2014 titled *Automobile Operating Cost for the Second Round of Sustainable Communities Strategies*. The method uses county specific base year fuel prices, fleet mix and fuel efficiency from EMFAC, and a consistent growth factor for fuel and non-fuel maintenance and operating costs. See Appendix K: Memo on Auto Operating Cost for the full memo and methodology. The resulting values for years ranging from 2005 to 20420 for each MPO is in Appendix L: Calibrated Parameters.

Vehicle Availability

The vehicle availability model is a disaggregate multinomial logit model which predicts the probability of a household owning 0, 1, 2, or 3, or 4+ vehicles based on the following variables:

TABLE 20: VARIABLES IN VMIP 2 VEHICLE AVAILABILITY MODEL

Category	Variable	Description
Cost Variable	Commute Cost Ratio	Average annual commute cost divided by household income
Accessibility Variables	Intersection Density	Intersections per square mile
	Transit Accessibility	Jobs within 30 minutes via transit
	Employment Density	Log of (jobs per developed acre)
Household Demographic Variables	Household Size	See size categories in Table 9
	Household Income	See income categories in Table 10
	Household Residential Unit Type	See residential unit type groups in Table 11

The commute cost ratio variable is an estimate of the proportion of a household's income required to own vehicles. It is derived from a county-level estimate of per-mile auto ownership costs, tract-level estimates of commuting VMT derived from the EPA's Smart Location Calculator, an annualization factor of 250 working days per year, and the household income. The variable is applied on a per-vehicle basis, so that owning no vehicles incurs no cost, owning two vehicles incurs twice the cost of owning one vehicle, and so on.

The table below provides the coefficients of the auto ownership model. In its draft form the model was estimated without alternative-specific constants. These constants were set for each model individually during model calibration.

TABLE 21: VMIP 2 AUTO OWNERSHIP MODEL COEFFICIENTS

	0 Vehicles	1 Vehicle	2 Vehicles	3 Vehicles	4+ Vehicles
Alternative-Specific Constant					
CommuteCostRatio	7.51	3.95	0.00	0.00	0.00
PedOrIntDens	0.009	0	0	-0.004	-0.004
TransitAccessibility (x1000)	0.009	0.010	0	-0.051	-0.112
LogEmpDensity	0.39	0.24	0	0.00	-0.19
RUGroup=RU1	0	0	0	0	0
RUGroup=RU3	1.27	0.53	0	-1.53	-1.53
RUGroup=RU6	0.27	-.27	0	0	0
HH_size=1	-1.16	1.5	0	-3.15	-4.94
HH_size=2	-3.03	-0.42	0	-2.26	-4.19
HH_size=3	-3.37	-0.24	0	-1.34	-3.40
HH_size=4	-4.02	-0.66	0	-1.61	-3.13
HH_size=5+	-3.50	-0.89	0	-1.32	-2.44
HH_inc=IncG1	0	0	0	0	0
HH_inc=IncG2	-1.33	-0.28	0	0.86	0.98
HH_inc=IncG3	-3.87	-0.93	0	1.2	2.35
HH_inc=IncG4	-2.98	-1.55	0	1.55	2.35
HH_inc=IncG5	-4.23	-1.96	0	1.44	2.87

Note the model uses owning two vehicles as its base, and calculates the relative probability of owning fewer or greater vehicles; thus the model coefficients describe relative probabilities as in the example below:

$$\ln\left(\frac{Prob(0\ vehicles)}{Prob(2\ vehicles)}\right) = 7.51(CommuteCostRatio) + 0.0093(PedOrIntDensity) + \ \ldots$$

The coefficients for this model are generally intuitive in direction and scale.

- Higher commuting cost increases the probability of owning 0 or 1 vehicles, and decreases the probability of owning 3 or 4 vehicles, as compared to the baseline of 2 vehicles.
- Higher scores for the three accessibility variables, indicating generally better accessibility by non-auto modes, increase the probability of owning 0 vehicles (and sometimes also 1 vehicle) relative to owning 2; and decrease the probability of owning 3 or 4.
- Household income is the demographic variable which has the largest influence in auto ownership. Generally as incomes go up, probabilities of owning 0 or 1 vehicles go down, and probabilities of owning 3 or 4 vehicles go up.
- Household size behaves in the expected way, with probability of owning 0 or 1 vehicles going down as household size increases and probability of owning 3 or 4 vehicles going up.
- Multi-family unit types are more likely to own 0 or 1 vehicles, and less likely to own 3 or 4 vehicles, than single family. There weren't enough records in the RUG6 "other" category (RV, mobile home, etc.) to distinguish them from single family, and they were generally more similar to single family than multi-family uses, so they share the same coefficients as single family.

An important consideration for future model development is that car sharing and transportation network companies (i.e., UBER, LYFT, etc.) are changing auto availability dynamics and potentially long-term auto ownership. As more data becomes available it may be appropriate to modify the auto ownership model to recognize these changes and focus more on auto availability across multiple sub modes and costs per mile.

Trip Generation

The VMIP 2 models generate person-trips from a consistent set of land uses, using cross-classified residential data, for a number of purposes including non-home-based purposes, K-12 and college trip purposes, and generate small, medium, and heavy truck trips. We have re-estimated trip generation rates, excluding truck rates, with the new CHTS data. The most significant changes in trip generation as compared to original VMIP 1 are listed below.

- Trip generation considers accessibility using the place type variable described in
- Accessibility / D Variables.

- Non-home based trip generation is based on the new categorization of employment.
- HBW trips are expanded into three new categories: HBW-High, HBW-Medium, and HBW-Low. These categories are based on household income on the production side and proportions of worker incomes for each employment category on the attraction side.
- Trips are classified as internal to internal (II), internal to external (IX), or external to internal (XI) based on percentages calculated from CHTS data. These percentages are calculated by trip purpose and by CDP.

Home-Based Productions: Cross-Classification Models

Three of the home-based trip productions (HBW, HBS, and HBO) were estimated using cross-classification models. These models are applied to socio-economic-demographic (SED) data which has been cross-classified by four variables: household size, household income, residential unit type, and place type (as described in section Accessibility / D Variables.

Estimation of trip rates using cross-classification models must ensure all cross-classification groups have large enough sample sizes to produce sufficient variability to obtain a stable average trip rate. Because not all cross-classifications of the variables above do in fact have a large enough sample size, some cross-classifications were estimated in aggregate, resulting in identical trip rates being estimated for some cross-classification combinations.

Variables were added to the cross-classification model sequentially, and with each added variable existing groups were only subdivided if there was sufficient sample size (generally at least 40 households) to support a split. The order in which variables were added to the cross-classification models was as follows.

- Household size
- Household income
- Place Type
- Residential unit type

Although the model is coded to allow for five income categories and five place types, the data available did not allow for distinctions to be determined this finely either because of a lack of sufficient amount of data, or differences which weren't statistically significant, or both. In effect, this means the estimated trip rates differ only among three income categories: low (under $50,000), medium ($50,000 - $100,000), and high (over $100,000); and only between two groups of place types: types 1 and 2 (with fewer than 100,000 workers+jobs within a 30-minute auto trip); and types 3, 4, and 5 (with more than 100,000 workers+jobs within a 30-minute auto trip). In addition, only a few combinations of household size, household income, and place type yielded different trip rates by residential unit type.

The tables below provide the resulting person-trip production rates:

TABLE 22: HBW HOUSEHOLD PERSON TRIP PRODUCTION RATES (DAILY TRIPS PER HOUSEHOLD)

	1-person HH	2-person HH	3-person HH	4-person HH	5+-person HH
Low Income; Place Types 1 and 2	0.42 (SF) 0.24 (MF)	0.62 (SF) 0.45 (MF)	0.87	1.28	1.50
Low Income; Place Types 3, 4, 5	0.55 (SF) 0.43 (MF)	0.80 (SF) 0.92 (MF)	1.35	1.27	1.49
Medium Income; Place Types 1 and 2	0.79	1.13	1.57	1.72	2.40
Medium Income; Place Types 3, 4, 5	0.68	1.17	1.62	1.47	2.25
High Income; Place Types 1 and 2	0.61	1.42	1.63	1.75	1.84
High Income; Place Types 3, 4, 5	0.61	1.26	2.04	1.62	1.84

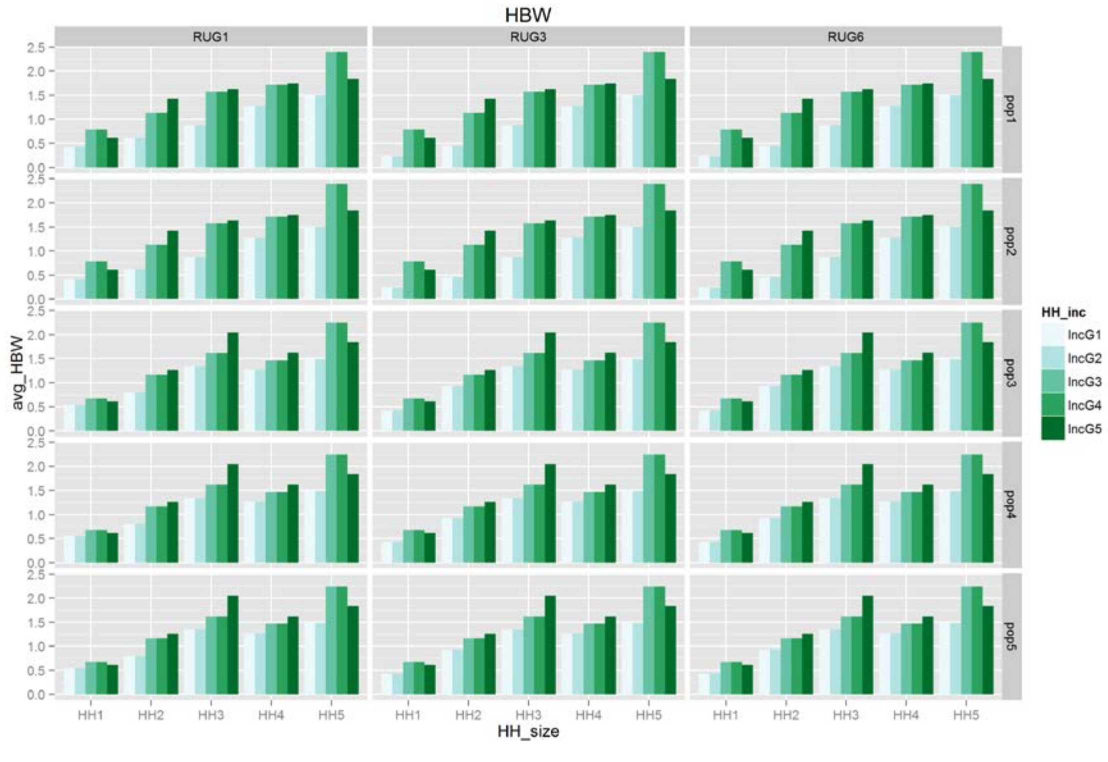
TABLE 23: HBS HOUSEHOLD PERSON TRIP PRODUCTION RATES (DAILY TRIPS PER HOUSEHOLD)

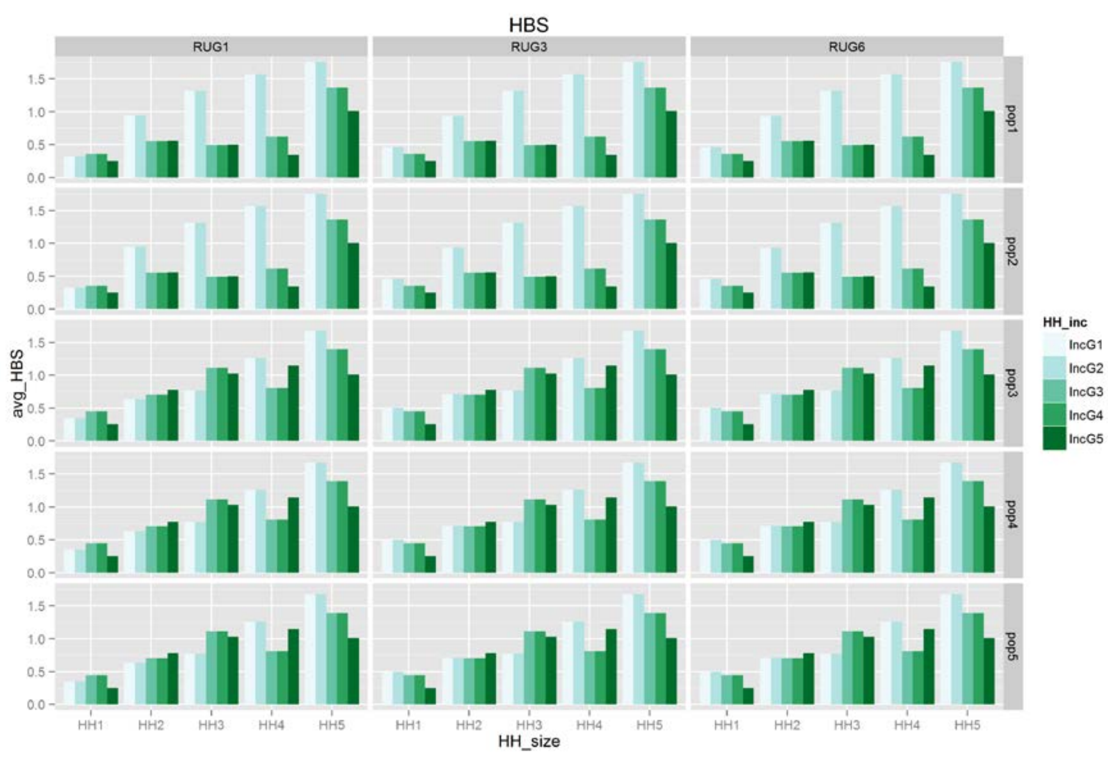
	1-person HH	2-person HH	3-person HH	4-person HH	5+-person HH
Low Income; Place Types 1 and 2	0.32 (SF) 0.46 (MF)	0.95 (SF) 0.93 (MF)	1.32	1.57	1.75
Low Income; Place Types 3, 4, 5	0.34 (SF) 0.50 (MF)	0.63 (SF) 0.71 (MF)	0.77	1.26	1.67
Medium Income; Place Types 1 and 2	0.36	0.55	0.49	0.62	1.37
Medium Income; Place Types 3, 4, 5	0.45	0.70	1.11	0.81	1.39
High Income; Place Types 1 and 2	0.25	0.56	0.50	0.34	1.01
High Income; Place Types 3, 4, 5	0.25	0.78	1.03	1.14	1.01

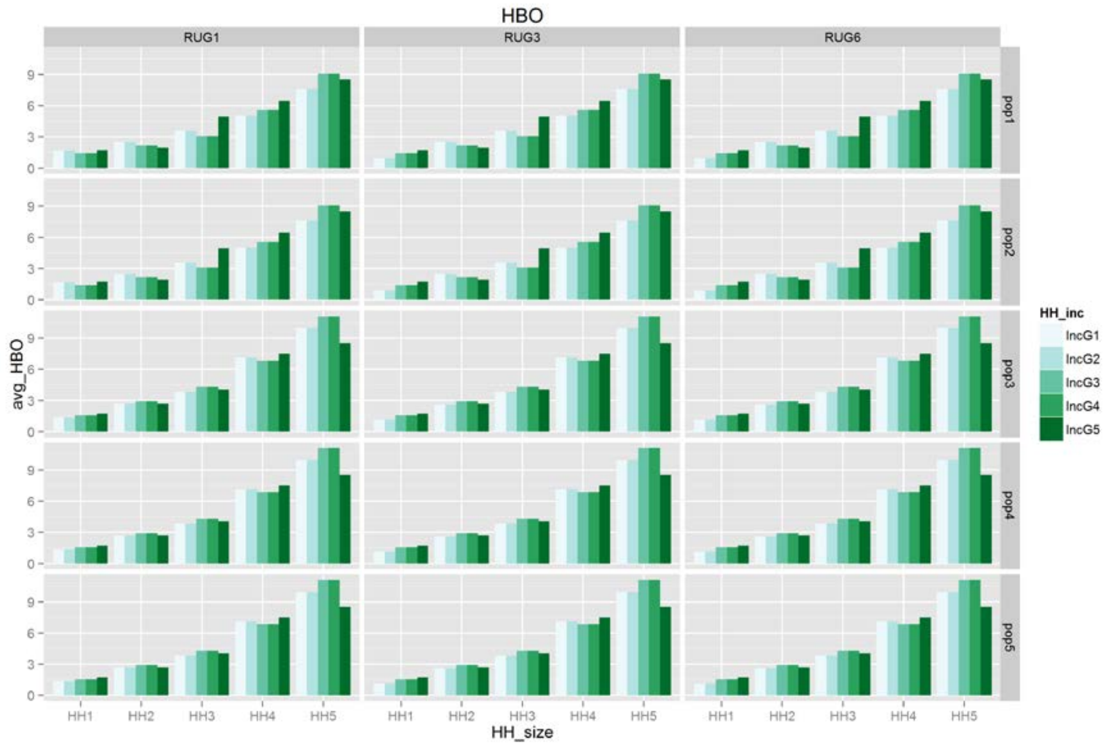
TABLE 24: HBO HOUSEHOLD PERSON TRIP PRODUCTION RATES (DAILY TRIPS PER HOUSEHOLD)

	1-person HH	2-person HH	3-person HH	4-person HH	5+-person HH
Low Income; Place Types 1 and 2	1.68 (SF) 0.92 (MF)	2.50	3.57	5.02	7.61
Low Income; Place Types 3, 4, 5	1.35 (SF) 1.14 (MF)	2.69 (SF) 2.59 (MF)	3.83	7.13	9.94
Medium Income; Place Types 1 and 2	1.44	2.17	3.09	5.59	9.06
Medium Income; Place Types 3, 4, 5	1.57	2.92	4.30	6.84	11.10
High Income; Place Types 1 and 2	1.73	1.94	4.94	6.45	8.51
High Income; Place Types 3, 4, 5	1.73	2.69	4.04	7.50	8.51

The graphs below show the cross-classified trip production rates.







Home-Based Productions: School Purposes

The remaining home-based trip productions, HBK and HBC, were estimated using regression models. The units of analysis for these models were households, and the explanatory variables were the numbers of household members in various age categories: Age 0-4, Age 5-14, Age 15-17, Age 18-24, and Age 25-54.

Two separate models were estimated for each trip purpose, one for households in place types 1 and 2 (with fewer than 100,000 workers+jobs within a 30-minute auto trip); and one for households in place types 3, 4, and 5 (with more than 100,000 workers+jobs within a 30-minute auto trip).

The table below lists the resulting trip production rates per person in the age ranges specified. Note that while one might reasonably expect each child to make two school trips per day (to and from), the actual trip rates are somewhat lower: the survey includes days when individual children don't go to school due to school holidays or illness. Furthermore, if children make intermediate stops between school and home, the resulting trips will not appear as HBK trips in the household survey but rather as multiple trips (e.g., OBO and HBO).

TABLE 25: HBK AND HBC TRIP RATES (PER PERSON)

	HBK (Place Types 1 and 2)	HBK (Place Types 3 and 4)	HBC (Place Types 1 and 2)	HBC (Place Types 3 and 4)
Age 0-4	0.15	0.24		
Age 5-14	1.18	1.07		
Age 15-17	0.93	1.06		0.06
Age 18-24	0.07	0.11	0.23	0.24
Age 25-54			0.02	0.02

Attractions and Non-Home-Based Productions

Trip attractions, along with trip productions for non-home-based trips, were estimated using either ordinary linear regression models or partial linear regression models. Unlike ordinary linear regression, partial linear regression can be used even when explanatory variables are strongly correlated with one another. Because the VMIP 2 models include a large number of employment categories highly correlated with one another this model form resulted in more reasonable models than ordinary linear regression for some trip purposes.

Units of analysis for both kinds of regression models were groups of census tracts; the techniques used to group census tracts are described below. The explanatory variables for these models were the total number of jobs in each of the nine employment categories, school enrollment totals at the K-12 and university levels, and the total number of households. The table below lists the nine employment categories used:

TABLE 26: EMPLOYMENT CATEGORIES FOR VMIP 2 MODELS

Category	Description and NAICS code(s)
EMPEDU	Educational Services (61)
EMPFOO	Accommodation and Food Service (72), Art, Entertainment, and Recreation (71),
EMPAGR	Agriculture, Forestry, Fishing and Hunting (11)
EMPOTH	Mining (21), and Manufacturing (31-33)
EMPMED	Health Care and Social Assistance (62)
EMPIND	Utilities (22), Construction (23), Wholesale Trade (42), Transportation and Warehousing (48-49), Other Services (81)
EMPRET	Retail Trade (44-45)

TABLE 26: EMPLOYMENT CATEGORIES FOR VMIP 2 MODELS

Category	Description and NAICS code(s)
EMPOFC	Information (51), Finance and Insurance (52), Real Estate Rental and Leasing (53), Professional, Scientific, and Technical Services (54), Management of Companies and Enterprises (55), and Administrative and Support and Waste Management and Remediation Services (56)
EMPGOV	Public Administration (92)

The units of analysis for these regression models were defined using a combination of geography (census tracts, census designated places, or counties) and place type (as measured by jobs+workers within a 30-minute auto trip). A "rolling up" process was used where the smallest possible analytic units with sufficient sample size were used. Where census tracts attracted at least 50 trips of a given purpose, they were used as analytic units; otherwise census places or full counties, grouped by place type, were used instead.

Data for school enrollments was only available at the full county level. For the home-based school and home-based college trip purposes, this data was used with analytic units equal to counties, despite the fact that this resulted in models with very few analytic units. However, for other trip purposes which used school enrollments as explanatory variables, school enrollments were distributed among those census tracts which had HBK or HBC trip attractions. The countywide total of school enrollments was kept constant, with each tract receiving a portion commensurate with its HBK or HBC trip attractions. The result, while not as accurate as using enrollment data at the tract level, allows trip purposes such as HBO and WBO to have a larger number of analytic units and nevertheless use the school enrollment data.

The table below summarizes the number of analytic units used for each regression model, by trip purpose and attraction (A) versus production (P). For example, the 61 analytic units used for the HBW attractions model includes 6 individual census tracts (with sufficiently many work trips attracted to each), 34 subsets of census places with the same Place Type (e.g., Fresno, type 4; Stockton, type 3; Hanford type 2; Unincorporated Tulare County type 2), and 21 subsets of counties grouped by Place Type (e.g., Sacramento County, types 2 and 3 or San Joaquin County, type 2).

TABLE 27: GEOGRAPHIC UNITS USED IN MODEL ESTIMATION

Trip Purpose	Census Tracts	Census Places by Place Type	Counties by Place Type	Total
HBW (A)	6	34	21	61
HBK (A)	0	0	14	14
HBC (A)	0	0	0	14
HBS (A)	0	24	18	42
HBO (A)	32	78	14	124
WBO (P)	2	21	19	42
WBO (A)	1	20	18	39
OBO (P)	9	43	21	73
OBO (A)	10	47	18	75

Employment data used for model estimation was obtained from the EPA's Smart Location Database (SLD). The employment categories in the SLD do not fully match those in the model, so the model's Construction, Agricultural, and Industrial categories are combined; the resulting trip rate for the combined category is then applied to each of the three model categories. Additional explanatory variables tested include the number of households per tract, and the school enrollment per tract. School enrollment data was obtained from the California Department of Education (K12, public school enrollments only) and from the California Postsecondary Education Commission (college, public and private 2- and 4-year institutions).

All of the regression models estimated were either simple linear regressions with no intercept, or partial linear regressions with no intercept. In the case of non-home-based trips (WBO and OBO), the same variables were used for the production and the attraction models. **Table 28** lists the person trip rates estimated for each model. As an example of interpreting these models, the home-based other attraction model states that each retail, service, and public sector job will attract roughly 2 HBO trips, each K-12 school enrollment will attract roughly 1.5 HBO trips, and each household will attract roughly 1.1 HBO trips.

TABLE 28: ESTIMATED ATTRACTION AND NON-HOME BASED PRODUCTION MODELS

	HBW-A	HBS-A	HBK-A	HBC-A	HBO-A	WBO-P	WBO-A	OBO-P	OBO-A
AGR employment	1.17				0.34				
EDU employment	1.17								
FOO employment	1.17	2.15			1.25	0.12	0.12	8.19	7.66
GOV employment	1.17					0.07	0.09	0.16	0.22
IND employment	1.17				0.34				
MED employment	1.17				3.45	0.18	0.18	0.16	0.22
OFC employment	1.17				5.16	0.33	0.41	0.16	0.22
OTH employment	1.17				0.34				
RET employment	1.17	5.76			1.2	0.15	0.16	8.19	7.66
ELEM enrollment			1.1		0.66	0.8	0.76	0.14	0.05
HS enrollment			1.1		0.66	0.8	0.76	0.14	0.05
COLLEGE enrollment				0.35					
Total households					0.95				

HBW Segmentation by Household Income

Following trip generation, HBW trips were further segmented by household income. On the production side, this segmentation was already achieved by virtue of the fact that household income was one of the variables present in cross-classification. On the attraction side, HBW trip attractions for each employment category were separated into high, medium, and low income based on the percentages in the table below.

Proportion of II, IX, and XI Trips

Once the base trip production and attraction rates were established, trip productions for each TAZ were further segmented into II and IX trips, while trip attractions were further segmented into II and XI trips. This segmentation was calculated separately for each trip purpose and each CDP as described below. Note this segmentation simply describes the proportion of trips which enter or leave the county from each listed CDP; it does not govern the location of those trips, which is still determined by the trip distribution model.

First, all CHTS trip ends and households were associated with a CDP or were determined to fall in unincorporated areas. This process was made more complicated by the fact that the publicly-available version of the CHTS has all locations geocoded by census tract; however, census tract boundaries may not align with CDP boundaries, and each census tract may have multiple CDPs associated with it. In cases where multiple CDPs are associated with a single census tract, the CDP with the largest population in the tract (identified at the census block level) is used. If the largest population in the tract is outside all named CDPs, the tract is identified as an unincorporated portion of the relevant county. Note that some named CDPs are not the largest population center in any census tract, and thus do not appear in the summaries of CHTS data, having been aggregated into either neighboring CDPs or the unincorporated portion of the county.

Next, trip productions for each CDP and trip purpose were segmented into II and IX trips; while trip attractions were segmented into II and XI trips. In cases where the CHTS contains fewer than 30 trips for the place/purpose combination, the county-wide average II versus IX or II versus XI percentage was substituted.

TRIP DISTRIBUTION

The current gravity model trip distribution process and factors for each existing MPO model was mostly maintained for consistency. The required revisions are:

- Add friction factors for additional trip purposes resulting in the jobs housing relationship – segmenting by income level as well as by IX and XI parameters.
- Ensure friction factors for non-work trips do not screen out short trips which are likely candidates for non-motorized travel, particularly in models which have only used vehicle trip generation.

For models without mode choice components, the composite travel time will be estimated using walk time based on distance and an average of walk and drive time for origin-destination pairs where walk is competitive with auto. In addition, the sub-TAZ level of detail available in the GIS network will be used in combination with TAZ size.

The required revisions are listed below.

- Add friction factors for additional trip purposes and income group for home-work.
- Revise friction factors to be continuous and better match survey data.
- Adjust impedance inputs to be based on a composite of person travel times by all modes as well as travel costs, instead of just travel time by auto.

MODE CHOICE

In general, the mode choice functionality is the same as the VMIP 1 model. The primary changes to the mode choice model are listed below.

- The number of transit sub-modes in the model has been expanded from two to four. The prior Transit-Walk and Transit-Drive submodes have been replace with the following modes,
    - Transit-Walk-Bus
    - Transit-Walk-Rail (including the possibility of rail access via bus)
    - Transit-Drive-Bus
    - Transit-Drive-Rail (including the possibility of rail access via bus)
- In the current implementation, Transit-Walk-Bus and Transit-Walk-Rail are combined into a single mode prior to assignment; as are Transit-Drive-Bus and Transit-Drive Rail. This report recommends future model updates assign these modes separately, with the Rail submodes requiring the presence of at least one rail leg.
- Accessibility and built environment variables have been incorporated into the mode choice model.

The VMIP 2 mode choice model is segmented by trip purpose and vehicle availability, using three vehicle availability categories as described in the table below:

TABLE 29: VEHICLE AVAILABILITY SEGMENTS IN VMIP 2 MODE CHOICE MODELS

Name	Description
0veh	Households which own no vehicles
1veh	Households which have one vehicle but more than one person
Others	Households with either one vehicle and one person, or more than one vehicle

The table below lists the modes available in the VMIP 2 models.

TABLE 30: MODES AVAILABLE IN VMIP 2 MODE CHOICE MODELS

Category	Name	Segments Available	Trip Purposes	Description
Auto	da	1Veh, Other	All	Drive alone
	s2	All	All	Shared ride, 2 persons
	s3	All	All	Shared ride, 3+ persons
Transit	twb	All	All	Transit, walk-access, bus
	tdb	All	All	Transit, drive-access, bus
	twr	All	All but HBK, HBC	Transit, walk-access, rail
	tdr	All	All but HBK, HBC	Transit, drive-access, rail
	sb	All	HBK only	School bus
Active	walk	All	All	Walk
	bike	All	All	Bike

The variables used in each of the mode choice model segments are listed in the table below. Not all variables are used in all trip purposes models. For the accessibility and built environment variables, the table notes whether the variable is measured at the trip production (P) or trip attraction (A). Note that value of time is a direct consequence of the relationship between in-vehicle time and cost. As such, it is not estimated directly but is instead a consequence of the in-vehicle time (IVT) and cost coefficients. For model implementation purposes, only value of time (VOT) is used in the mode choice utility equation; for clarity, both are reported in the tables below.

TABLE 31: VARIABLES IN VMIP 2 MODE CHOICE MODELS

Variable	Purposes	Description
(Constants)	All	Alternative-specific constants
IVT	All	In-vehicle time
OVT	All	Out-of-vehicle time (access, transfer, egress, and waiting times)
Cost	All	Total cost, including auto operating cost, parking cost and tolls, and transit fares.
VOT	All	Value of time (conversion between cost variables and time variables)
TransitAccess	HBW, WBO, OBO	Jobs available within 30 minutes via transit, decay-weighted (P)
LogEmpDensity	HBW, HBS, HBO	Log (employment density of block group) (A)
IntDensity	HBK, HBC	Pedestrian-oriented intersection density (A)

The form of the VMIP 2 mode choice models is multinomial logit. A nested logit form might have been preferred for theoretical reasons, given the strong relationships among drive, transit, and active modes. However, no satisfactory nested logit models were estimated, likely because of severe constraints on the amount of transit data available. Multinomial logit models produced generally more sensible results and were used instead. Even the multinomial logit models produced some un-intuitive results. Rather than use un-intuitive coefficients, these were replaced by results from VMIP 1 mode choice models, pooled models involving multiple segments or multiple trip purposes, or were omitted altogether.

Home-Based Work

The table below lists model coefficients for HBW segments. Drive-alone was used as a reference mode for all segments, including the 0-vehicle segment where this mode is not permitted. In this segment, utility calculations were carried out without the drive alone mode.

TABLE 32: HBW MODE CHOICE MODEL COEFFICIENTS

Variable	Mode	0-Vehicle	1-Vehicle, 2+ person HH	All Others
Constant	da	x	0	0
	s2	0.710	-1.839	-2.340
	s3	-0.229	-2.587	-2.936

TABLE 32: HBW MODE CHOICE MODEL COEFFICIENTS

Variable	Mode	0-Vehicle	1-Vehicle, 2+ person HH	All Others
	twb	-1.900	-1.602	-2.754
	tdb	-1.900	-1.602	0.000
	twr	-1.900	-4.173	-5.937
	tdr	-1.900	-0.444	-5.432
	bike	-2.438	-2.898	-3.763
	walk	1.477	0.030	-1.075
IVT	All	-0.035	-0.040	-0.040
OVT	All	-0.070	-0.080	-0.080
OVT/IVT	All	2	2	2
Cost	All	-0.003	-0.002	-0.001
VOT	All	6	10.055	18
LogEmpDensity	da	x	0	0
	s2	0.828	0.329	0.506
	s3	0.458	0.408	0.506
	twb	1.873	0.586	1.066
	tdb	1.873	0.586	1.066
	twr	1.202	0.850	1.202
	tdr	1.066	0.189	1.202
	bike	2.147	0.765	0.506
	walk	1.025	0.178	0.005
TransitAccess	da	0	0	0
	s2	0.013	0.013	0.005
	s3	0.013	0.013	0.005
	twb	0.158	0.027	0.032
	tdb	0.158	0.027	0.032
	twr	0.158	0.027	0.032

TABLE 32: HBW MODE CHOICE MODEL COEFFICIENTS

Variable	Mode	0-Vehicle	1-Vehicle, 2+ person HH	All Others
	tdr	0.158	0.027	0.032
	bike	0.136	0.031	0.062
	walk	0.136	0.031	0.062

Home-Based Shop

The table below lists model coefficients for HBS segments. Drive-alone was used as a reference mode for the 1-vehicle and 2-vehicle segments, while walk was used as a reference mode for the 0-vehicle segment.

TABLE 33: HBS MODE CHOICE MODEL COEFFICIENTS

Variable	Mode	0-Vehicle	1-Vehicle, 2+ person HH	All Others
Constant	da	x	0	0
	s2	-3.420	-0.495	-0.889
	s3	-4.269	-0.380	-1.009
	twb	-2.439	-3.542	-5.834
	tdb	-2.439	-3.542	-5.834
	twr	-2.439	-3.542	-5.834
	tdr	-2.439	-3.542	-6.961
	bike	-5.341	-3.756	-2.972
	walk	0	2.191	-0.684
IVT	All	-0.025	-0.025	-0.025
OVT	All	-0.050	-0.050	-0.050
OVT/IVT	All	2	2	2
Cost	All	-0.005	-0.003	-0.002
VOT	All	3	6	6.319
LogEmpDensity	da	x	0	0

TABLE 33: HBS MODE CHOICE MODEL COEFFICIENTS

Variable	Mode	0-Vehicle	1-Vehicle, 2+ person HH	All Others
	s2	-0.040	0.297	0.161
	s3	0.957	0.026	0.161
	twb	0.732	0.916	1.141
	tdb	0.732	0.916	1.141
	twr	0.866	0.866	0.750
	tdr	0.866	0.866	0.750
	bike	1.274	1.171	0.594
	walk	0	0.190	0.458

Home-Based School (K-12)

The table below lists model coefficients for HBK segments. The reference mode for the 0- and 1-vehicle segments is walk; the reference mode for the 2-vehicle segment is shared-ride 3.

TABLE 34: HBK MODE CHOICE MODEL COEFFICIENTS

Variable	Mode	0-Vehicle	1-Vehicle, 2+ person HH	All Others
Constant	da	x	-4.874	-2.110
	s2	-3.560	-1.710	-0.703
	s3	-3.115	-1.540	0
	twb	-0.887	-7.657	0.316
	tdb	-0.887	-7.657	0.316
	bike	-4.456	-4.456	-2.876
	walk	0	0	0.273
	sb	-1.198	-1.346	0.449
IVT	All	-0.025	-0.025	-0.025
OVT	All	-0.050	-0.050	-0.050

TABLE 34: HBK MODE CHOICE MODEL COEFFICIENTS

Variable	Mode	0-Vehicle	1-Vehicle, 2+ person HH	All Others
OVT/IVT	All	2	2	2
Cost	All	-0.005	-0.003	-0.002
VOT	All	3	6	9
IntDensity	da	x	-0.004	0
	s2	0	-0.004	0.004
	s3	0	-0.004	-0.019
	twb	-0.019	0.003	0.004
	tdb	0	0	0
	bike	0.003	0.009	0.005
	walk	-0.008	0.000	0.005
	sb	-0.012	-0.004	-0.003

Home-Based College

The table below lists model coefficients for HBC segments. Because of the very small number of HBC trips in the household survey data, all vehicle ownership segments were pooled for model estimation purposes, with distinctions between segments left for adjustment during model calibration. Drive-alone was used as a reference mode. In the 0-vehicle segment, utility calculations were carried out without the drive alone mode.

TABLE 35: HBC MODE CHOICE MODEL COEFFICIENTS

Variable	Mode	0-Vehicle	1-Vehicle, 2+ person HH	All Others
Constant	da	x	0	0
	s2	-2.230	-2.230	-2.230
	s3	-2.396	-2.396	-2.396
	twb	-0.521	-0.521	-0.521
	tdb	-0.521	-0.521	-0.521

TABLE 35: HBC MODE CHOICE MODEL COEFFICIENTS

Variable	Mode	0-Vehicle	1-Vehicle, 2+ person HH	All Others
	bike	-3.848	-3.848	-3.848
	walk	-1.126	-1.126	-1.126
IVT	All	-0.025	-0.025	-0.025
OVT	All	-0.050	-0.050	-0.050
OVT/IVT	All	2	2	2
Cost	All	-0.005	-0.003	-0.002
VOT	All	3	6	9
IntDensity	da	x	0	0
	s2	-0.004	0.004	0.004
	s3	-0.004	-0.019	-0.019
	twb	0.003	0.004	0.004
	tdb	0	0	0
	bike	0.009	0.005	0.005
	walk	0	0.005	0.005

Home-Based Other

The table below lists model coefficients for HBO segments. Drive-alone was used as a reference mode for the 2-vehicle segment, while walk was used as a reference mode for the 0- and 1-vehicle segments.

TABLE 36: HBO MODE CHOICE MODEL COEFFICIENTS

Variable	Mode	0-Vehicle	1-Vehicle, 2+ person HH	All Others
Constant	da	x	-1.538	0
	s2	-3.032	-1.086	-0.151
	s3	-3.354	-1.250	0.014
	twb	-4.518	-3.406	-3.174

TABLE 36: HBO MODE CHOICE MODEL COEFFICIENTS

Variable	Mode	0-Vehicle	1-Vehicle, 2+ person HH	All Others
	tdb	-8.953	-5.947	-3.341
	twr	-6.684	-6.405	-7.221
	tdr	-6.684	-6.405	-7.221
	bike	-3.368	-3.596	-1.963
	walk	0	0	0.561
IVT	All	-0.025	-0.025	-0.025
OVT	All	-0.050	-0.050	-0.050
OVT/IVT	All	2	2	2
Cost	All	-0.005	-0.003	-0.002
VOT	All	3	6	9
	da	x	-0.455	0
	s2	-0.455	-0.455	0
	s3	-0.614	-0.614	0
	twb	0.387	0.277	0.315
LogEmpDensity	tdb	0.924	0.277	0.315
	twr	-0.407	0.277	0.363
	tdr	-0.407	0.277	0.363
	bike	-0.143	0.559	0.455
	walk	0	0	0.455

Work-Based Other

The table below lists model coefficients for WBO segments. Because of the small number of WBO, 0-vehicle household trips in the household survey data, the 0-vehicle and 1-vehicle segments were pooled for model estimation purposes, with distinctions between them left for adjustment during model calibration. Drive-alone was used as a reference mode. In the 0-vehicle segment, utility calculations were carried out without the drive alone mode.

TABLE 37: WBO MODE CHOICE MODEL COEFFICIENTS

Variable	Mode	0-Vehicle	1-Vehicle, 2+ person HH	All Others
Constant	da	x	0	0
	s2	-1.226	-1.226	-1.308
	s3	-1.857	-1.857	-1.969
	twb	0.000	0.000	-2.453
	tdb	-4.305	-4.305	-2.453
	twr	-3.518	-3.518	-3.285
	tdr	-3.518	-3.518	-2.497
	bike	-3.424	-3.424	-5.431
	walk	-2.108	-2.108	-2.153
IVT	All	-0.035	-0.035	-0.030
OVT	All	-0.089	-0.089	-0.076
OVT/IVT	All	2.515	2.515	2.515
Cost	All	-0.004	-0.001	-0.001
VOT	All	6.076	16.618	18
TransitAccess	da	0	0	0
	s2	0	0	0
	s3	0	0	0
	twb	0.084	0.084	0.023
	tdb	0.084	0.084	0.023
	twr	0.144	0.144	0.062
	tdr	0.144	0.144	0.078
	bike	0.063	0.063	0.045
	walk	0.063	0.063	0.072

Other-Based Other

The table below lists model coefficients for OBO segments. Walk was used as a reference mode for the 0- and 1-vehicle segments; drive-alone was used as a reference mode for the 2-vehicle segment.

TABLE 38: OBO MODE CHOICE MODEL COEFFICIENTS

Variable	Mode	0-Vehicle	1-Vehicle, 2+ person HH	All Others
Constant	da	x	-0.732	0
	s2	-1.975	-0.223	-0.228
	s3	-2.353	-0.732	-0.388
	twb	-2.764	-3.899	-4.442
	tdb	-2.764	-3.899	-4.442
	twr	-4.017	-3.899	-5.409
	tdr	-4.017	-3.899	-5.409
	bike	-3.036	-4.219	-3.627
	walk	0	0	-0.444
IVT	All	-0.030	-0.030	-0.074
OVT	All	-0.061	-0.061	-0.147
OVT/IVT	All	2	2	2
Cost	All	-0.004	-0.003	-0.005
VOT	All	5.191	6	9
TransitAccess	da	x	-0.200	0
	s2	-0.200	-0.200	0
	s3	-0.369	-0.369	0
	twb	0.027	0.097	0.025
	tdb	0.027	0.097	0.025
	twr	0.027	0.097	0.025
	tdr	0.027	0.097	0.025
	bike	0.043	0.150	0.039
	walk	0	0	0.039

PRICING

The auto operating cost was updated based on the Big 4 MPO methodology. The change includes the non-fuel pricing, fuel cost and vehicle fleet determined for each individual county, and a constant price increase for fuel and non-fuel costs applied to forecast the future. More details are found in the memo from the Big 4 in Appendix K: Memo on Auto Operating Cost.

The household income and commute cost was also included in the model for the auto ownership. More details on this are included in the estimation section.

TRIP ASSIGNMENT

Trip assignment includes traffic and transit assignments.

Traffic Assignment

The traffic assignment process in each model was reviewed. During implementation of VMIP 1 it was noticed the addition of distance to the path assignment resulted in routes that did not reflect traffic counts or local knowledge. For VMIP 2, the traffic assignment method was modified to include congested travel time and link or node costs, removing distance.

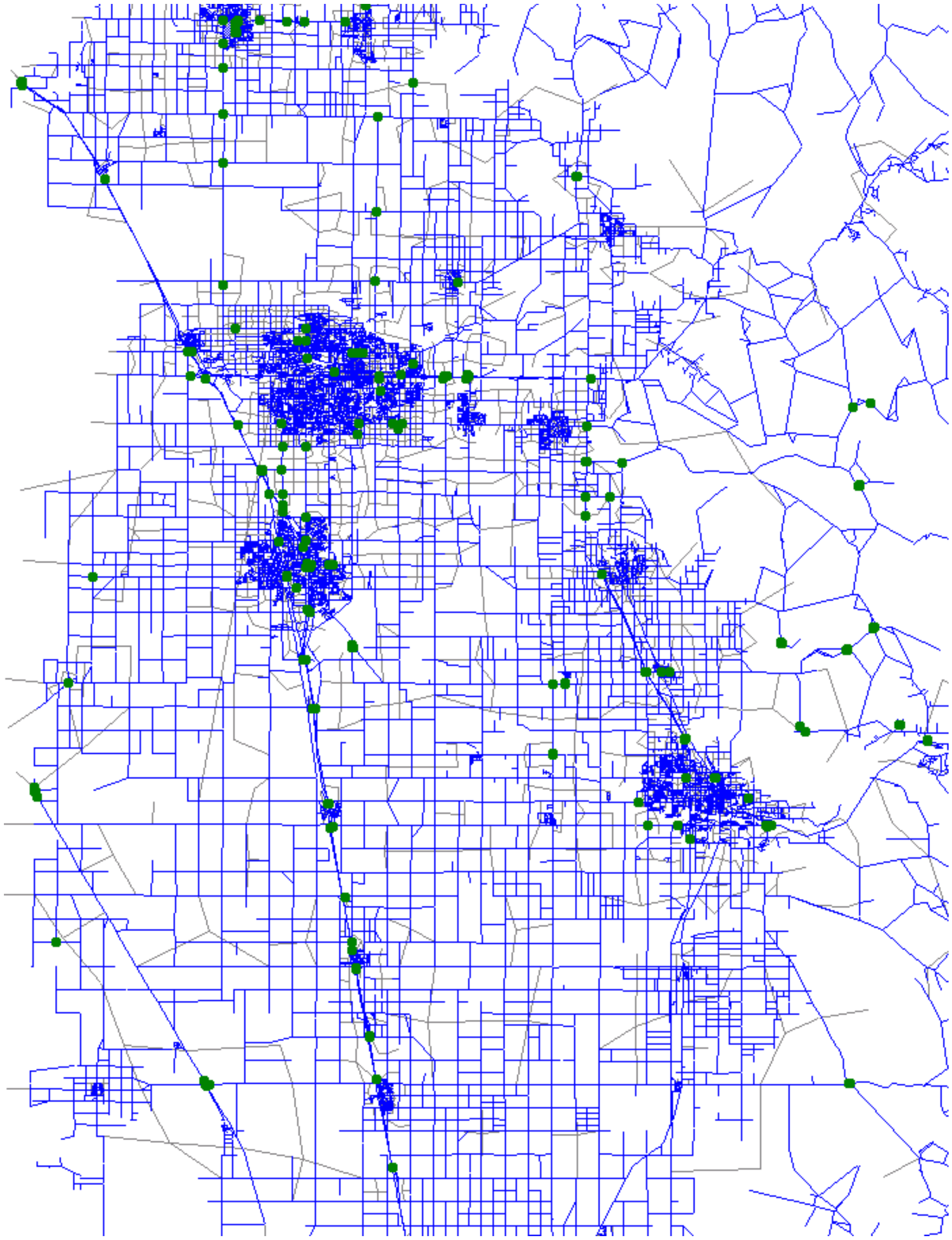
To allow for a different value of time, traffic assignments by vehicle availability was implemented for a multi-class assignment which separately evaluates and reports the following five vehicle types:

- Drive Alone
- Drive Alone Toll
- Shared Ride 2
- Shared Ride 3+
- Truck

Traffic assignment was modified to remove distance from the path cost function, leaving time and pricing (converted to time using the value of time).

Turn Penalties

Turn penalties were added for rural routes connecting between cities to reflect delay of all-way or side-street stop intersections. The green nodes in the figure below denote turn penalties on rural routes and turn prohibitions for one-way or ramp junctions.



Transit Assignment

The transit assignment has not changed from VMIP 1 and includes the following variables:

- Transit networks, real or synthetic
- Transit attributes (mode, operator, vehicle type)
- Transit access links (coded into network? How does this work)
- Fares

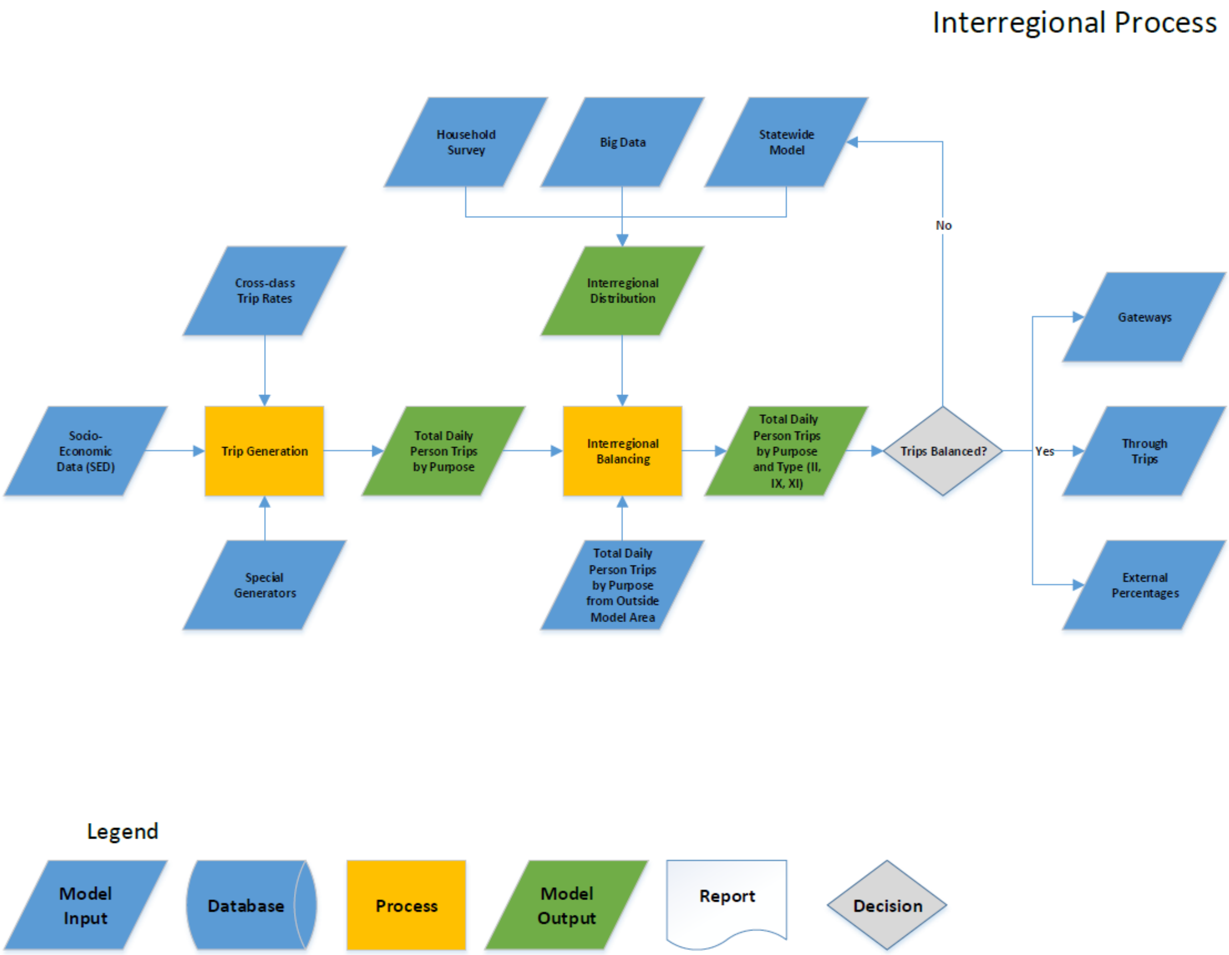
- User classes (this needs to reflect types of MPO questions, such as sensitivity to fares or value of time)
- Transfer and wait rules

FEEDBACK LOOP

The feedback loop ensures the travel times used as input to trip distribution are consistent with the travel times on the final reported congested road network, as required for air quality conformity analysis. No changes were made during VMIP 2.

INTER-REGIONAL COORDINATION

In VMIP 1, each of the eight SJV counties used its own estimates of travel growth at the county boundaries and the proportions of through traffic. These forecasts of growth and through trips may be very different, even for adjacent counties, making it difficult to consistently identify inter-regional travel and possibly consolidate travel forecasts from multiple MPOs. The basis of the inter-regional coordination in VMIP 2 is the California Statewide Travel Demand Model (CSTDM), which provides a baseline distribution of passenger vehicle trips entering, leaving, or passing through each model area. The statewide model may not need to be re-run for every scenario run in a VMIP 2 model; the process illustrated and described below shows the decision process for whether the statewide model needs to be re-run.



- First, trips internal to the model (ii trips) should be balanced to one another.
- Next, inter-regional trips produced and attracted to the model are compared to the number of IX and XI trips passing through model gateways. If balance can be achieved by re-distributing IX and XI trips among gateways, then there is no need to re-run the statewide model.
- However, if the number of IX trips produced by the model varies significantly from the number of IX trips attracted to gateways, or the number of XI trips attracted by the model is too different from the number of XI trips produced from gateways, then the statewide model must be re-run to account for land use changes which have changed inter-regional travel patterns.

The process outlined above was only partly implemented during VMIP 2 since the CSTDM has not been updated recently and does not include the land use developed for the RTP/SCS for any of the MPOs in the SJV. This report recommends that once the CSTDM (passenger) and California Statewide Freight Forecasting Model (CSFFM) are updated, new through trip tables are implemented in the model.

MODEL CALIBRATION

Calibration is an iterative process where model settings are adjusted so the output of the model matches observed travel patterns. Model calibration helps overcome issues of data quality, sample size, or aggregation bias and results in model outcomes tailored to local travel characteristics.

CALIBRATION TARGETS

The first calibration step is to verify the model is producing reasonable travel behavior across household dimensions:

- Household size
- Household income

A cross-classification comparison of the model outcomes and validation behavior for each of the household dimensions is prepared. The model is calibrated in an iterative method by reducing or increasing the 2012 ACS values until the household cross-classification totals from the model match the validation data source totals.

Model-Specific Calibration Targets

To verify that acceptable levels of calibration have been achieved, the model output for each step or submodel is compared to observed data. This comparison is referred to as validation.

- Vehicle availability was validated using census vehicle ownership cross-classified by household size and income.
- Trip generation was validated for trip productions, attractions, and trip balancing.
    - Trip production: A comparison of model total trips by purpose and observed totals from the expanded 2012 CHTS data. A secondary comparison, if needed, can be HBW trips from more aggregate sources such as the CTPP or NHTS. These sources are used with caution since they report "usual" workplace locations and are not directly comparable to model generated workplace locations. Convert person trip rates to ITE rates using Ave Veh Occ by purpose.
    - Trip attraction: Compare HBW attractions to total jobs in zone, range of 1.2-1.5 HBW attractions per employee in zone (source TFResource.org).
    - Trip balancing: PA totals, within +-10% of totals and totals by purpose.

- The trip distribution gravity model and any associated friction factors (k-factors) were calibrated iteratively to match average trip lengths by purpose and trip length frequencies by purpose are compared with the CHTS.
- The mode choice model was validated against CHTS mode shares.

The calibrated parameters used in the model are reported in Appendix L: Calibrated Parameters and summarized in the 1_Inputs\Support\ VMIP2_TCAG_Parameters.xlsx.

MODEL STATIC VALIDATION

In the static validation tests, we ran the model to ensure the model output matches available traffic counts and ridership counts, and assessed the model's ability to replicate roadway speeds. This process starts with measuring the model traffic volume flows across screenlines composed of several roadways to ensure overall traffic flows in specific directions are accurately captured. Then, model volumes on individual links are compared to traffic counts. As part of the static validation procedure, elements of the trip generation, trip distribution, and traffic assignment modules were adjusted. Validation results are in the 0_Documents\Validation directory included with the model.

TRIP GENERATION

Trip generation validation consisted of the total production to attraction ratio (P/A) by purpose and the total trips generated per household. As we can see from the table, the P/A ratios are quite close to 1 for all the trip purposes and well within the 10% guideline. When applying the model for future years or land use scenarios, the P/A ratio should be reviewed along with the trips per household to ensure the model results reasonably reflect the scenario. The User Guide contains additional detail on checking the land use, trip balancing, and adjusting the inter-regional factors if needed.

TABLE 39: TRIP GENERATION – PRODUCTION (P)/ATTRACTION (A) BALANCE

Trip Purpose	Evaluation Criterion	Productions	Attractions	P/A Ratio	Difference	Percent Difference
HBW	+/- 10%	238,381	232,299	1.03	-6,082	-2.6%
HBS	+/- 10%	272,561	270,959	1.01	-1,602	-0.6%
HBO	+/- 10%	590,281	603,873	0.98	13,593	2.3%
NHB	+/- 10%	413,757	430,197	0.96	16,440	4.0%

TABLE 40: WEEKDAY PERSON TRIPS PER HOUSEHOLD

CHTS	Model
11.6	11.1

Notes: 2012 California Household Travel Survey, Weekday Trips, re-weighted by F&P

VEHICLE AVAILABILITY

Next, we checked weekday person trips per household as shown in the table below. Again, the model output matches very closely with the data from the 2012 CHTS. Similarly, vehicle availability from the model as shown in the table below matches with the CHTS data.

TABLE 41: VEHICLE AVAILABILITY

0		1		2		3+	
CHTS	Model	CHTS	Model	CHTS	Model	CHTS	Model
6%	7%	32%	33%	40%	40%	22%	19%

Notes: 2012 California Household Travel Survey, Weekday Trips, re-weighted by F&P

MODE SPLIT

When it comes to mode split by purpose, including modes such as drive alone, shared ride 2, transit and walking as well as purposes such as home based work (HBW) and non-home based work (NHB), outputs from the model are once again very close to the CHTS data.

TABLE 42: MODE SPLIT BY PURPOSE

Purpose	Total		Drove Alone		Shared Ride 2		Shared Ride 3+		Transit		Walk		Bike		Other	
	CHTS	Model	CHTS	Model	CHTS	Model	CHTS	Model	CHTS	Model	CHTS	Model	CHTS	Model	CHTS	Model
HBW	16%	14%	80%	81%	9%	8%	5%	7%	0.3%	0.7%	5%	3%	1%	1%	0%	0%
HBO	59%	61%	24%	25%	28%	30%	31%	30%	0.5%	1.5%	13%	8%	1%	1%	3%	4%
NHB	26%	24%	42%	40%	27%	26%	18%	17%	0.3%	0.9%	12%	13%	0%	3%	1%	0%
Total	100%	100%	37%	37%	25%	26%	24%	23%	0.4%	1.2%	11%	9%	1%	2%	2%	2%

Notes: 2012 California Household Travel Survey, Weekday Trips, re-weighted by F&P. Includes only internal-to-internal, weekday person trips for all modes. School bus trips are categorized as Other.

Model output for trip purposes by mode also falls close to the survey results as clearly shown in the table below. The transit data in the survey were 100% HBO which was not realistic, so the other modes were calibrated and the resulting transit mode in the model was retained rather than forcing 0% transit for other purposes. Additional on-board or similar surveys could be used to verify the results for transit. Similar, the walk and bike overall mode shares are low and the non-home trips are often underreported. Although somewhat costly given the mode share, surveys of pedestrian or bike trips could refine the purpose split. Knowing the underreporting of non-home trips, the model was calibrated to have a higher percentage of these types of trips while retaining the overall mode share.

TABLE 43: PURPOSE BY MODE

Purpose	Total		Drove Alone		Shared Ride 2		Shared Ride 3+		Transit		Walk		Bike	
	CHTS	Model	CHTS	Model	CHTS	Model	CHTS	Model	CHTS	Model	CHTS	Model	CHTS	Model
HBW	16%	14%	34%	32%	6%	4%	3%	4%	11%	8%	7%	4%	14%	5%
HBO	59%	61%	38%	42%	67%	71%	77%	77%	70%	74%	67%	59%	69%	56%
NHB	26%	24%	29%	27%	28%	25%	20%	18%	19%	18%	26%	36%	16%	39%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Notes: 2012 California Household Travel Survey, Weekday Trips, re-weighted by F&P. Includes only internal-to-internal, weekday person trips for all modes. School bus trips are categorized as Other.

DISTRIBUTION – TRAVEL TIME

During the model estimation process the individual household survey records were evaluated. In many cases the reported travel time, level of congestion in the area, and travel distance were inconsistent for a given trip. Rather than using trip distance, the model uses travel time for distribution so future congestion or changes in travel time between modes influences overall travel. The results of the average travel time from the model are close to those observed, with the model being lower than CHTS average times. For key rural routes between cities the model was overestimating assigned trips. Based on discussion with TCAG staff, turn penalties were added to retain the overall speed for air quality and emissions purposes while reflecting the all-way or side-street stop delay along the routes.

TABLE 44: TRIP ASSIGNMENT – AVERAGE TRAVEL TIME (IN MINUTES) BY TRIP PURPOSE

Trip Purpose					
HBW		HBO		NHB	
CHTS	Model	CHTS	Model	CHTS	Model
16.1	14.3	12.4	9.9	10.4	9.1

Notes: 2012 California Household Travel Survey, Weekday Trips, re-weighted by F&P. Includes only internal-to-internal, weekday person trips for all modes.

VEHICLE MILES TRAVELED

Data from Highway Performance Management System (HPMS) were used as a benchmark for comparison of Vehicle Miles Traveled (VMT) within the model area. Although HPMS is an estimate of VMT based on sampled count data throughout the county, it is a standard method and a point of comparison often referenced especially for air quality analysis. The model is within rounding error (0% difference) compared to HPMS and is within the allowed deviation. Based upon VMT being within the estimate from HPMS combined with the travel time distribution and the lack of significant congestion within the region, the distribution portion of the model seems reasonable.

TABLE 45: TRIP ASSIGNMENT – VMT

Evaluation Criterion	HPMS	Model	% Deviation
+-3%	10,062,200	10,307,185	+ 2.4%

Notes: Daily Vehicle Miles Traveled. Highway Performance Management System – 2014 California Public Road Data, Table 6.

DISTRIBUTION – INTER-REGIONAL TRAVEL

We also looked at model trip distribution and compared it with CHTS survey data. As shown in the table below, the model is close to the survey data for each trip type.

TABLE 46: TRIP DISTRIBUTION – BY PURPOSE (ALL MODES)

Trip Type	Trip Purpose							
	Total		HBW		HBO		NHB	
	CHTS	Model	CHTS	Model	CHTS	Model	CHTS	Model
II	92%	90%	85%	85%	94%	91%	92%	90%
IX	4%	7%	9%	11%	3%	7%	4%	6%
XI	4%	3%	5%	4%	3%	3%	5%	4%

Notes: 2012 California Household Travel Survey, Weekday Trips, re-weighted by F&P. Includes only internal-to-internal, weekday person trips for all modes.

ROADWAY ASSIGNMENT – TRAFFIC VOLUMES

For the TCAG model, weekday traffic counts were compared to the model assigned volume for total vehicle trips. TCAG collects a large number of counts on county roads and city streets, and these counts were supplemented by count data collected by Caltrans as part of the Highway Performance Management System (HPMS) reporting. Count data ranged from 2014 to 2016, with the model land use reflecting 2015. **Table 47** summarizes the static validation tests for both sets of counts. In general, screening out counts influenced by construction activity improves the link level validation. The Assignment Validation Dashboard on the following page.

TABLE 47: SUMMARY OF TRAFFIC ASSIGNMENT VALIDATION – DAILY CONDITIONS

Evaluation Criterion	Guidelines(1)	Model
Number of count locations	N/A	232
Model/Count Ratio	+/- 10%	1.06
Percent within Caltrans Deviation	>75%	67%
Percent Root Mean Square Error	< 40%	60%
Correlation Coefficient	> 0.88	0.95
Screenlines within Caltrans Deviation	100%	91%

Notes: (1) *2017 Regional Transportation Plan Guidelines for Metropolitan Planning Organizations*, California Transportation Commission, January 18, 2017 and *Travel Forecasting Guidelines*, State of California Department of Transportation, 1992.

The VMIP 2 model does not pass all of the static validation tests even after filtering the counts for construction activity. The model/count ratio shows the model tends to under-predict observed counts despite matching CHTS trip generation rates almost identically. This may suggest increases in trip rates could be justified since surveys may not fully capture existing travel behavior from busier households that are difficult to recruit, plus the potential to under-report short distance trips. The percent of links (and screenlines) within acceptable Caltrans deviations is also lower than the recommended guideline. The percentage root mean square error of 60% is higher than the recommended value of 40%, but this same statistic is reasonable for higher volume roadways above 25,000 as shown in the supplemental dashboards below. The time of day validation results are also shown for informational purposes, with the model meeting most of the criteria but local area model validation and calibration is recommended for project application.

The model validation results demonstrate the model performs acceptably at a regional scale especially for key metrics such as VMT and higher volume roadways. At a local scale, sub-area refinements and validation should be performed before using the model for project applications. Refinements may include adding zonal or network detail to the model along with modifications to centroid loadings, network inputs (i.e., speeds), land use inputs, and demographic inputs. To help identify or target sub-regional areas requiring more refinements, users should review the map of daily validation locations. Any applications forecasts should also use an appropriate forecasting approach as described by National Cooperative Highway Research Program (NCHRP) Report 255 or 716 rather than using model forecast volumes directly.

San Joaquin Valley Model Improvement Project (San Joaquin Valley MIP)
All Two-Way Volume Model Validation Results
Tulare County Model (07/11/2017)

7/12/17 2:57 PM

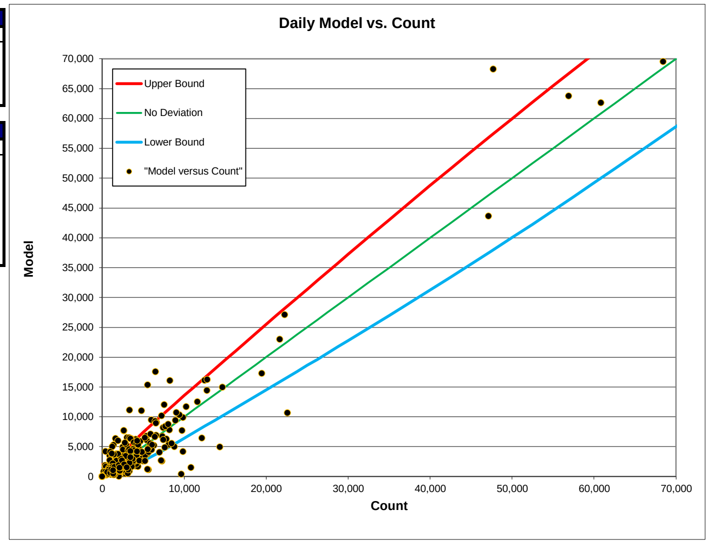
Recommended in RTP Guidelines *			For Informational Purposes Only. **					
All Links Assignment	**Guidelines**	**Daily**	**AM Peak Period**	**Mid-Day**	**PM Peak Period**	**Off-Peak**	**AM Peak Hour**	**PM Peak Hour**
Model/Count Ratio =	**+-10%**	1.06	1.11	1.01	1.08	1.09	0.75	1.06
Percent Within Maximum Deviation =	**> 75%**	67%	65%	62%	68%	67%	54%	64%
Percent Root Mean Square Error =	**< 40%**	60%	76%	61%	66%	57%	122%	69%
Correlation Coefficient =	**> 0.88**	0.95	0.93	0.95	0.94	0.96	0.79	0.93
%of Screenlines Within Standard Dev. =	**100%**	91%	82%	91%	82%	73%	55%	82%
	Total Count	232	232	232	232	232	232	232
	Link Within Deviation	156	150	144	157	156	126	148
	Link Outside Deviation	76	82	88	75	76	106	84

Daily Model/Count by Functional Class

Functional Class	M/C	# Locations
Freeway	1.02	4
Highway\Expressway	1.04	3
Arterial	0.84	225
Collector	NA	0

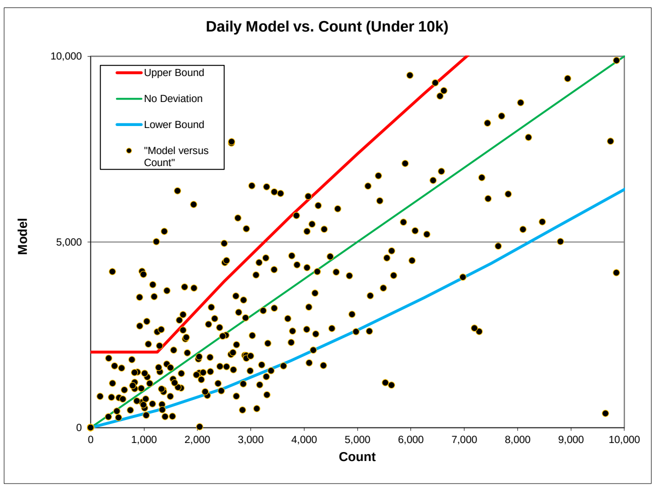
RMSE by Daily Volume Groups

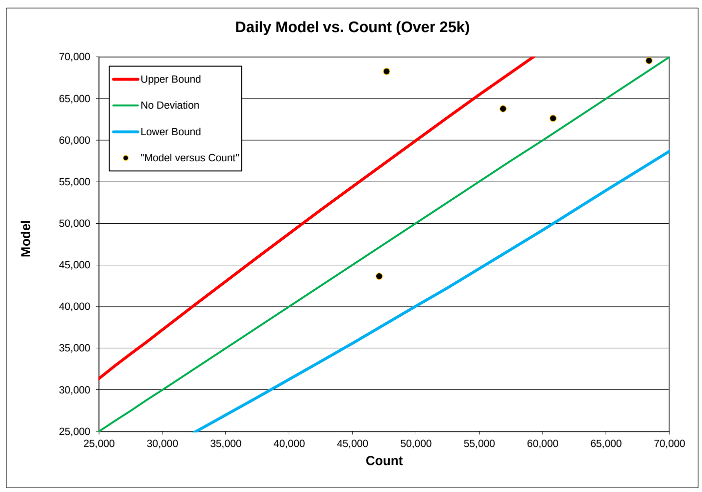
Count Volume	Guideline	Model
> 50,000	**< 21%**	17%
25,000 - 49,999	**< 22%**	31%
10,000 - 24,999	**< 25%**	37%
5,000 - 9,999	**< 29%**	51%
2,500 - 4,999	**< 36%**	62%
1,000 - 2,499	**< 47%**	86%
< 1,000	**< 60%**	203%



Notes:

Land Use Checks	
Highway Network Checks	
Transit Network Checks	
Total Trip Generation	
Trip Balancing	
Trip per Household	
Average Travel Time	
Mode Share	
VMT	
VMT per Capita	
HPMS Error	
Gravity Model Iterations =	20
Number of Interations per Off-Peak Assignment =	20
Number of Interations per Peak Assignment =	50
Time to Run =	





TRANSIT ASSIGNMENT – SYSTEM RIDERSHIP

As shown in the table below, the total transit system ridership is slightly high compared to the observed ridership. With transit mode share for transit less than 3%, minor differences in mode result in a noticeable difference in transit riders. The person trips per household match survey data, although surveys often don't fully represent all households, especially larger households with demanding schedules.

TABLE 48: DAILY TRANSIT ASSIGNMENT

Validation Statistic	Evaluation Criterion	Observed Ridership	Model Ridership	Percentage
Difference between actual ridership to model results for entire system	+/- 20%	10,123	11,718	+ 16%

Notes: Observed Ridership includes VT, TIME, DART, TCAT and PT average weekday unlinked trips for 2015

THROUGH TRIPS

Although the through trips have not been updated, enhancements to travel behavior within the model include more reasonable internal trip rates and estimates consistent with the 2012 CHTS. As discussed in the inter-regional coordination section, the CSTDM has not been updated to reflect the SJV MPO current RTPs. As such, the XX trips, derived from the CSTDM, were not adjusted upward. Further, XX truck trips in VMIP 2 were converted from passenger car equivalents (PCEs) to vehicles since the assignment accounts for PCEs and the counts (passenger vehicles plus trucks) are also in terms of vehicles. The volumes at the gateway are a combination of IXXI and XX and increasing either\both will increase VMT. It is recommended that the through trips for the base year and future scenarios be updated when the CSTDM is updated to reflect the SJV MPO RTP/SCS.

APPENDIX A:

PREPARATION OF CALIFORNIA HOUSEHOLD TRAVEL SURVEY DATA

MEMORANDUM

Date: June 23, 2015

To: Users of CHTS data prepared by Fehr & Peers

From: Jennifer Ziebarth

Subject: Cleaning and Weighting of California Household Travel Survey Data

WC14-3115

The purpose of this memo is to document the steps undertaken to prepare the 2012 California Household Travel Survey (CHTS) for use in the Valley Model Improvement Program, Phase 2 (VMIP 2) project.

The 2012 CHTS is a statewide dataset of multi-modal travel behavior and household demographics. The survey includes data from a total of 42,431 households, collected using telephone surveys and GPS devices from all counties in California. The dataset includes travel patterns, including activity purpose, duration, travel distance, travel time, and mode choice. Demographics include household size, income, vehicle availability, and the additional characteristics of the individuals within the household.

Data preparation included the following steps:

1. Identify and repair unreasonable or missing trip distances.
2. Identify and consolidate transit trip chains.
3. Identify trip purposes.
4. Impute missing household income data.
5. Calculate a set of household-level weights to replace those provided with the CHTS.
6. Recode certain variables
7. Attach MPO and Census Designated Place information to trip and household records
8. Aggregate information about persons in the household to the household record
9. Attach person-level data to the trip records

TRIP DISTANCE CLEANING

The California Household Travel Survey provides trip distances in two formats: an "as-traveled" distance intended to be the actual distance traveled, and an "air distance" reflecting the straight-line distance between the trip's origin and destination. However, the as-traveled distance was missing from some trip records and was unreasonable in others. The graph below shows the relationship between air distance and as-traveled distance for all non-airplane trips in the CHTS. Trips whose as-traveled distance deviate too much from their air distance are candidates for providing a "cleaned" distance.

To provide "cleaned" trip distances, a simple linear regression was performed separately for each travel mode based only on the data where the as-traveled distance is deemed reasonable.

IDENTIFY TRIP PURPOSES

To identify trip purposes, both the activity purpose from the CHTS activities file and the place name from the CHTS places file were used. The activity codes provided in the CHTS data are as follows:

1. PERSONAL ACTIVITIES (SLEEPING, PERSONAL CARE, LEISURE, CHORES)
2. PREPARING MEALS/EATING
3. HOSTING VISITORS/ENTERTAINING GUESTS
4. EXERCISE (WITH OR WITHOUT EQUIPMENT)/PLAYING SPORTS
5. STUDY / SCHOOLWORK
6. WORK FOR PAY AT HOME USING TELECOMMUNICATIONS EQUIPMENT
7. USING COMPUTER/TELEPHONE/CELL OR SMART PHONE OR OTHER COMMUNICATIONS DEVICE FOR PERSONAL ACTIVITIES
8. ALL OTHER ACTIVITIES AT MY HOME
9. WORK/JOB DUTIES
10. TRAINING
11. MEALS AT WORK
12. WORK-SPONSORED SOCIAL ACTIVITIES (HOLIDAY OR BIRTHDAY CELEBRATIONS, ETC)
13. NON-WORK RELATED ACTIVITIES (SOCIAL CLUBS, ETC)
14. EXERCISE/SPORTS
15. VOLUNTEER WORK/ACTIVITIES
16. ALL OTHER WORK-RELATED ACTIVITIES AT MY WORK
17. IN SCHOOL/CLASSROOM/LABORATORY
18. MEALS AT SCHOOL/COLLEGE
19. AFTER SCHOOL OR NON-CLASS-RELATED SPORTS/PHYSICAL ACTIVITY
20. ALL OTHER AFTER SCHOOL OR NON-CLASS RELATED ACTIVITIES (LIBRARY, BAND REHEARSAL, CLUBS, ETC)
21. CHANGE TYPE OF TRANSPORTATION/TRANSFER (WALK TO BUS, WALK TO/FROM PARKED CAR)
22. PICKUP/DROP OFF PASSENGER(S)

23. DRIVE THROUGH MEALS (SNACKS, COFFEE, ETC.) [SHOW IF PTYPE <> 1 (HOME)]
24. DRIVE THROUGH OTHER (ATM, BANK) [SHOW IF PTYPE <> 1]
25. WORK-RELATED (MEETING, SALES CALL, DELIVERY)
26. SERVICE PRIVATE VEHICLE (GAS, OIL, LUBE, REPAIRS)
27. ROUTINE SHOPPING (GROCERIES, CLOTHING, CONVENIENCE STORE, HH MAINTENANCE)
28. SHOPPING FOR MAJOR PURCHASES OR SPECIALTY ITEMS (APPLIANCE, ELECTRONICS, NEW VEHICLE, MAJOR HH REPAIRS)
29. HOUSEHOLD ERRANDS (BANK, DRY CLEANING, ETC.)
30. PERSONAL BUSINESS (VISIT GOVERNMENT OFFICE, ATTORNEY, ACCOUNTANT)
31. EAT MEAL AT RESTAURANT/DINER
32. HEALTH CARE (DOCTOR, DENTIST, EYE CARE, HIROPRACTOR, VETERINARIAN)
33. CIVIC/RELIGIOUS ACTIVITIES
34. OUTDOOR EXERCISE (PLAYING SPORTS/JOGGING, BICYCLING, WALKING, WALKING THE DOG, ETC.)
35. INDOOR EXERCISE (GYM, YOGA, ETC.)
36. ENTERTAINMENT (MOVIES, WATCH SPORTS, ETC)
37. SOCIAL/VISIT FRIENDS/RELATIVES
38. OTHER (SPECIFY) [NOTE: LISTED ON DIARY] (O_APURP)
39. LOOP TRIP (FOR INTERVIEWER ONLY-NOT LISTED ON DIARY)
99. DONT KNOW/REFUSED

Each place visited was assigned a place based on the following criteria:

- If the place name is “HOME,” then the place is “HOME,” regardless of the activity purposes.
- If the place includes an activity with purpose code between 9 and 16, the place is “WORK.”
- If the place includes an activity with purpose code between 17 and 20, then:
    - If the place name includes identifying strings such as “COLLEGE,” “UNIV,” “UCLA,” or “USC,” the place is “COLLEGE.”
    - If the place name includes “PRESCHOOL” or “DAYCARE,” the place is “OTHER”.

  - o Otherwise the place is "K12."

- If the place includes an activity with purpose code 27 or 28, then the place is "SHOP."
- Otherwise, the place is "OTHER."

Once the purpose for each place has been determined, assigning a purpose to each trip is straightforward. For non-transit trips, the purpose at the trip origin is the purpose of the immediately preceding place record, and the purpose at the trip destination is the purpose of the place record itself. Then:

- If one end of the trip is "HOME" and the other is "WORK," the trip is home-based work ("HBW").
- If one end of the trip is "HOME" and the other is "K12," the trip is home-based K-12 ("HBK").
- If one end of the trip is "HOME" and the other is "COLLEGE," the trip is home-based college ("HBC").
- If one end of the trip is "HOME" and the other is "SHOP," the trip is home-based shop ("HBS").
- If one end of the trip is "HOME" and the other is either "OTHER" or "HOME," the trip is home-based other ("HBO").
- If one end of the trip is "WORK" and the other end is anything but "HOME," the trip is work-based other ("WBO").
- In all other cases, the trip is non-home-based ("NHB").

In some cases it is useful to consolidate these trips into a simpler scheme:

- Home-based work ("HBW") is the same as above.
- Home-based other ("HBO") includes "HBO," "HBK," "HBC," and "HBS" above.
- Non-home-based ("NHB") includes "WBO" and "NHB" above.

For transit trips, the purpose identification is slightly more complex and first requires identification of chains of transit trips (see below).

JOINT TRAVEL AMONG HOUSEHOLD MEMBERS

When multiple household members travel together in a single vehicle, the trip is considered a joint trip. Such trips are identified using arrival and departure times as well as person codes for household members on the trip. If the only purpose of the trip is to drop off or pick up household members, the trip is flagged as an escort trip.

This coding allows flexibility in how escort trips are counted when CHTS records are summarized. To avoid losing potentially important information, no trip purposes are changed.

IDENTIFY AND CONSOLIDATE TRANSIT TRIP CHAINS

In recording transit trips, the California Household Travel Survey treats each portion of the transit trip chain as a separate trip. For example, a trip in which the traveler drives to a rail station, takes the train to a second rail station, and then walks to a workplace is listed in the survey as three separate, consecutive trips, with three separate modes. This method of record-keeping makes it possible to track the mode of access and egress for a transit trip, but for most travel behavior analyses it is preferable to consider these three trips as a single unit. . Thus, a necessary step of data preparation is identification and consolidation of chains which make up a single linked transit trip.

To identify chains of transit trips, trips are flagged as transit access, transit egress, or transit transfer using the following criteria. A transit access trip is one which:

- Immediately precedes a trip whose mode is a transit mode,
- Does not itself use a transit mode, and either
  - Has an activity of "change to type of transportation / transfer" coded, or
  - Has an activity duration less than 30 minutes and a location whose name contains a keyword suggesting a transit stop, such as "station," "bus," "subway," etc.
- Does not end at the traveler's home.

A transit egress trip is one which:

- Immediately follows a trip whose mode is a transit mode,
- Does not itself use a transit mode, and either
  - Has an activity of "change to type of transportation / transfer" coded, or
  - Has an activity duration less than 30 minutes and a location whose name contains a keyword suggesting a transit stop, such as "station," "bus," "subway," etc.
- Does not depart from the traveler's home.

A trip which fits both sets of criteria, appearing to be both transit access and transit egress, is considered a transit transfer.

Once potential access, transfer, and egress trips have been identified, the first and last legs of transit trip chains are identified according to the following criteria. The first leg of a transit trip chain is one which:

- Is flagged as a transit access trip, or
- Is a transit trip whose preceding trip is not transit and does not have an activity of "change to type of transportation" coded, and whose previous activity duration is greater than 30 minutes.

The last leg of a transit trip chain is one which:

- Is flagged as a transit egress trip, or
- Is a transit trip which does not have an activity of "change to type of transportation" coded, whose following trip is not transit and whose activity duration is greater than 30 minutes.

Note the actual criteria are slightly more involved; for details see the R code. For validation of this process, it was confirmed no person has a different number of trips flagged as the first in a transit chain than flagged as the last in a transit chain.

Once transit trip chains have been identified, a trip purpose can be assigned to the chain as a whole. The chain origin is the origin for the first trip in the chain, that is, the purpose of the immediately preceding place. The chain destination is the destination for the final trip in the chain. The same categorization of trip purposes is used as described in the previous section.

COMPARISON OF TRIP MODES

The modes reported in the cleaned CHTS data are slightly simplified from those reported in the original CHTS data. In addition, mode categories in the cleaned CHTS data reflect vehicle occupancy of drive modes and mode of access for transit modes. The comparison between the original mode reported in the CHTS and the simplified mode in the cleaned data is as follows:

Simplified mode	Original modes
Walk	Walk; Wheelchair / Mobility Scooter Other Non-Motorized
Bike	Bike

Simplified mode	Original modes
Drive Alone	Auto / Van / Truck Driver Auto / Van / Truck Passenger Carpool / Vanpool Motorcycle / Scooter / Moped Rental Car / Vehicle
Drive Shared 2	Auto / Van / Truck Driver Auto / Van / Truck Passenger Carpool / Vanpool Motorcycle / Scooter / Moped Rental Car / Vehicle
Drive Shared 3	Auto / Van / Truck Driver Auto / Van / Truck Passenger Carpool / Vanpool Motorcycle / Scooter / Moped Rental Car / Vehicle
Drive Shared 4+	Auto / Van / Truck Driver Auto / Van / Truck Passenger Carpool / Vanpool Motorcycle / Scooter / Moped Rental Car / Vehicle
Taxi	Taxi / Hired Car / Limo
Shuttle	Private shuttle (SuperShuttle, employer, hotel, etc.) Other Private Transit
Walk to Bus	Greyhound Bus Local Bus, Rapid Bus Express Bus / Commuter Bus (AC Transbay, Golden Gate Transit, etc.) Premium Bus (Metro Orange / Silver Line) Public Transit Shuttle (DASH, Emery Go Round, etc.) AirBART / LAX FlyAway Amtrak Bus Other Bus
Drive to Bus	Greyhound Bus Local Bus, Rapid Bus Express Bus / Commuter Bus (AC Transbay, Golden Gate Transit, etc.) Premium Bus (Metro Orange / Silver Line) Public Transit Shuttle (DASH, Emery Go Round, etc.) AirBART / LAX FlyAway Amtrak Bus Other Bus

Simplified mode	Original modes
Walk to Rail	BART, Metro Red / Purple Line ACE, Amtrak, Caltrain, Coaster, Metrolink Metro Blue / Green / Gold Line, Muni Metro, Sacramento Light Rail, San Diego Sprinter / Trolley / Orange/Blue/Green, VTA Light Rail Street Car / Cable Car Other Rail
Drive to Rail	BART, Metro Red / Purple Line ACE, Amtrak, Caltrain, Coaster, Metrolink Metro Blue / Green / Gold Line, Muni Metro, Sacramento Light Rail, San Diego Sprinter / Trolley / Orange/Blue/Green, VTA Light Rail Street Car / Cable Car Other Rail
Walk to Ferry	Ferry / Boat
Drive to Ferry	Ferry / Boat
School Bus	School Bus
Paratransit	Dial-a-Ride / Paratransit (Access Services, etc.)
(removed from cleaned data)	Plane
NA	RF

IMPUTATION OF MISSING DATA

Although the household records are largely complete, certain key variables are missing for a small number of records. Variables used to estimate household weights (see next section) are imputed if they are missing. Additional variables were created to flag households whose data is imputed rather than reported in the original survey. The imputation process for these variables is described below.

HOUSEHOLD INCOME

Household income was not reported for 3,642 (8.6%) of households. For these households, the most likely income was calculated by comparing households of the same size, number of vehicles owned, and tenure type (own versus rent). The imputed household income is the average income category of the comparable households. For cases where fewer than ten households were considered comparable, households were grouped to provide a larger sample.

HOUSEHOLD RESIDENTIAL TYPE

The residential unit type was not available for 69 households (0.2% of the full CHTS). Residential unit type was imputed for these households by examining the residential unit types of households with the same size, number of vehicles owned, and household income category. The imputed residential unit type (single family, multi-family, or other) is set to be the most common residential unit type for matching households.

AGE OF HEAD OF HOUSEHOLD

Age of the head of household could not be determined for one household. This household was assumed to have a head in the age 25-64 category.

ESTIMATION OF SURVEY WEIGHTS

Surveys are meant to capture the characteristics of an entire population by randomly sampling a small proportion of the population. Often, a perfectly random sample is hard to achieve — some groups are difficult to survey and are under-represented, other groups are over-represented. To balance this bias, sample weights are estimated to "reshape" the sample. Fehr & Peers estimated household sample weights for the CHTS to balance the survey sample to match county-level percentages for several variables as reported in the 2012 American Community Survey 5-year estimates. Variables used as controls for the re-weighting are:

- Household size (one to seven or more)
- Household income (nine income categories)
- Number of workers per household (zero to three or more)
- Number of vehicles owned per household (zero to four or more)
- Household residential unit type (three categories)
- Household size (one to five or more) cross-classified by household income (five categories)
- Household size (one to five or more) cross-classified by number of vehicles per household (zero to four or more)
- Household size (one to five or more) cross-classified by number of workers per household (zero to three or more)

Counties were weighted either individually or, in the case of counties with fewer CHTS households, in groups of at most four adjacent counties weighted as a single unit. The multi-county groups used for weighting where single-county sample sizes were insufficient were:

- Lake and Mendocino Counties
- Del Norte, Siskiyou, Lassen, Modoc, Plumas, Sierra, and Nevada Counties
- Shasta, Tehama, Trinity, Glenn, and Colusa Counties
- Yolo, Yuba, and Sutter Counties
- Alpine, Amador, Calaveras, Mariposa, Tuolomne, Inyo, and Mono Counties
- Monterey and San Benito Counties

Expansion weights, suitable for expanding CHTS data to represent the full population of a county, were calculated for each county individually. Separate expansion weights exist for all households, and for households whose travel day is a weekday.

Weighting reports for each of the eight San Joaquin Valley counties is in the appendix to this memo.

ATTACH MPO AND CENSUS DESIGNATED PLACE INFORMATION

Fields are added to the household record listing the MPO and the Census Designated Place (CDP) of the household location; fields are added to the trip record listing the MPO and CDP of the trip origin and destination. Many MPOs in California are a single county; in this case, the MPO code is identical to the county FIP code. Multi-county MPOs are coded as follows:

1. AMBAG: Santa Cruz, Monterey, and San Benito Counties
2. MTC: Alameda, Contra Costa, Solano, Napa, Sonoma, Marin, San Francisco, San Mateo, and Santa Clara Counties
3. SACOG: Sacramento, Yolo, Yuba, Sutter, and portions of El Dorado and Placer counties
4. SCAG: Los Angeles, Ventura, Orange, Riverside, Imperial, and San Bernardino counties
5. TMPO: Portions of El Dorado and Placer counties

El Dorado and Placer counties are divided between two MPOs: the Tahoe Basin area lies in TMPO while the remainder of the counties are part of SACOG. Records are coded into the proper MPO using their census tract.

ATTACH PERSON DATA

A limited amount of data from the raw CHTS person file is attached to the final household and trip records. Demographic information such as the traveler's age, racial identity, worker, and student status is attached to the trip record. Fields indicating the number of household members in various age categories are added to the household record, along with a field indicating the age category of the head of household. The age categories used are:

- Age 0-2
- Age 3-4
- Age 5-14
- Age 15-17
- Age 18-24
- Age 25-34
- Age 35-44
- Age 45-54
- Age 55-64
- Age 65-74
- Age 75 and up

APPENDIX B:

CALIFORNIA HOUSEHOLD TRAVEL SURVEY DATA DICTIONARY

MEMORANDUM

Date:	April 21, 2015
To:	File
From:	Jennifer Ziebarth
Subject:	**Instructions for using CHTS cleaned data**

WC14-3115

The purpose of this memo is to provide instructions for using the cleaned and re-weighted California Household Travel Survey data. It includes data dictionaries for both the household and trip files, and important instructions regarding the use of household and trip weights.

JOINING THE HOUSEHOLD AND TRIP FILES

The "sampno" variable is a household ID code which can be used to join the household and trip files.

USING THE WEIGHTS

Please note that the CHTS data comes with survey weights which must be correctly applied to yield accurate summaries.

There are three types of weights included with the cleaned CHTS data:

- Household-level weights (hhweight and hhexpweight)
- Trip-level weights (tripweight and tripexpweight)
- Trip correction factor (tcf)

In order to use CHTS data accurately, one or more of these weights must be applied. The following instructions describe when to use each type of weight, and explain and give examples of using the weights.

DETERMINING WHICH WEIGHTS TO USE

To determine which weights to use, consider the following criteria:

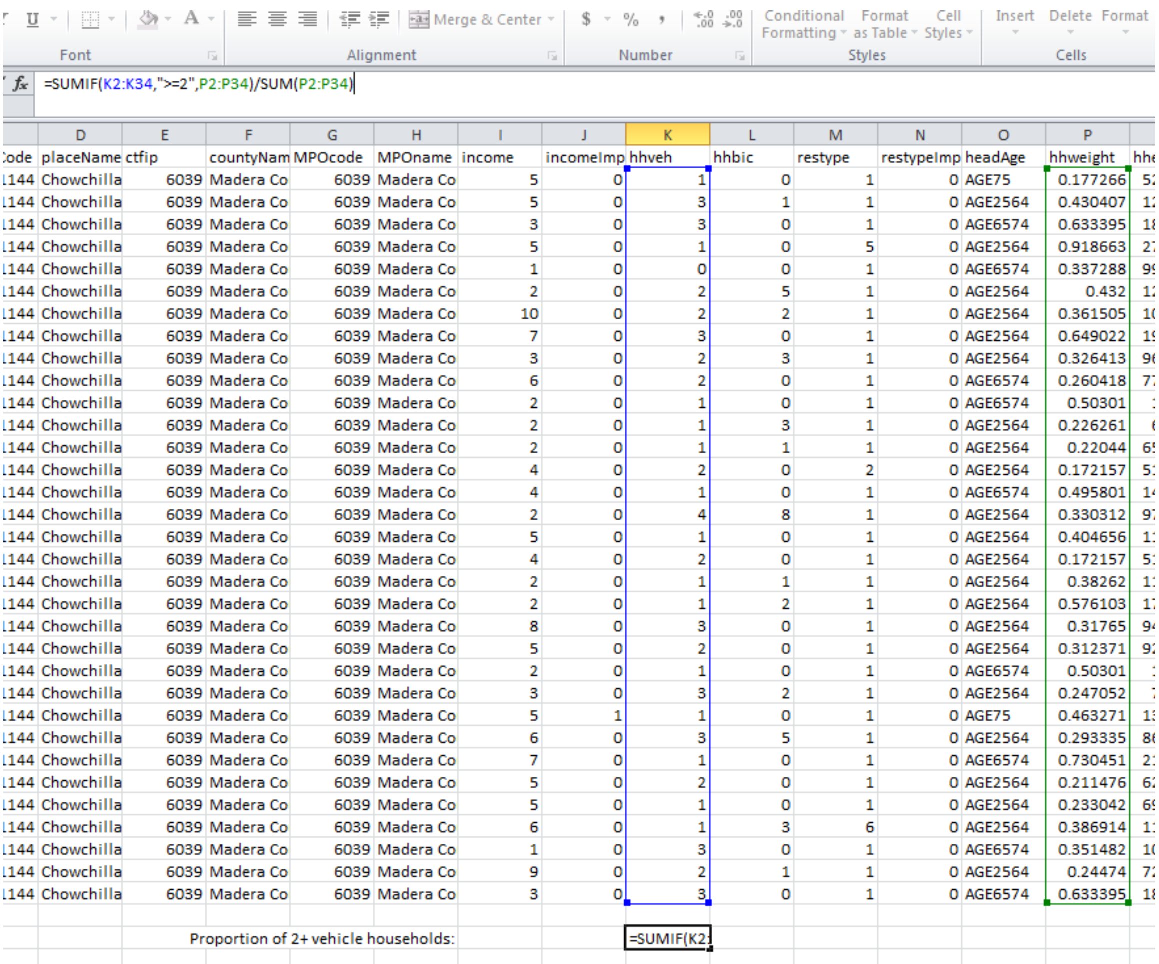
- When summing or averaging values that pertain to households, use the household weights *hhweight* or *hhexpweight*. Examples include calculating the percentage of 0-vehicle households in a region, calculating the average number of licensed drivers per household, or calculating the number of households in a region with school-aged children. The *hhweight* weighting factor will weight households relative to one another and is useful for computing percentages, while the *hhexpweight* factor will also provide estimates of the total number of households.
- When summing or averaging values that pertain to trips from different households, use the trip weights *tripweight* or *tripexpweight*. Examples include calculating the average distance per vehicle trip, calculating mode shares, or calculating the distribution of travel times. As with the household weights, *tripweight* will weight trips relative to one another and is useful for computing percentages, while the *tripexpweight* factor will also provide estimates of the total number of trips.
- When summing or averaging values that pertain to trips within a single household, use the trip correction factor *tcf*. Often this is not done on its own but as the first of a two-step process; an example is calculating average VMT per household: first sum the VMT per household using the *tcf* weight, then average each household's VMT using either the *hhweight* or the *hhexpweight* weight. Similar two-step processes should be used to calculate the number of person-trips per household and the number of vehicle-trips per household.
- **When in doubt about which weight to use, please contact Jennifer Ziebarth.** I'm more than happy to help or to double-check that you've chosen the right weighting factor for your situation.

EXAMPLE 1: PROPORTION OF 2-OR-MORE VEHICLE HOUSEHOLDS

To calculate the proportion of households with two or more vehicles, sum the weights of households with two or more vehicles, then divide by the sum of all household weights. In equation form:

$$Proportion\ of\ 2 - vehicle\ households = \frac{\sum_{2\ or\ more\ vehicle\ households}(household\ weight)}{\sum_{all\ households}(household\ weight)}$$

To do this in Excel, use the SUMIF and SUM functions:



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=SUMIF(K2:K34,">=2",P2:P34)/SUM(P2:P34)

code	placeName	ctfip	countyNam	MPOcode	MPOname	income	incomeImp	hhveh	hhbic	restype	restypeImp	headAge	hhweight	hhe
1144	Chowchilla	6039	Madera Co	6039	Madera Co	5	0	1	0	1	0	AGE75	0.177266	52
1144	Chowchilla	6039	Madera Co	6039	Madera Co	5	0	3	1	1	0	AGE2564	0.430407	12
1144	Chowchilla	6039	Madera Co	6039	Madera Co	3	0	3	0	1	0	AGE6574	0.633395	18
1144	Chowchilla	6039	Madera Co	6039	Madera Co	5	0	1	0	5	0	AGE2564	0.918663	27
1144	Chowchilla	6039	Madera Co	6039	Madera Co	1	0	0	0	1	0	AGE6574	0.337288	99
1144	Chowchilla	6039	Madera Co	6039	Madera Co	2	0	2	5	1	0	AGE2564	0.432	12
1144	Chowchilla	6039	Madera Co	6039	Madera Co	10	0	2	2	1	0	AGE2564	0.361505	10
1144	Chowchilla	6039	Madera Co	6039	Madera Co	7	0	3	0	1	0	AGE2564	0.649022	19
1144	Chowchilla	6039	Madera Co	6039	Madera Co	3	0	2	3	1	0	AGE2564	0.326413	96
1144	Chowchilla	6039	Madera Co	6039	Madera Co	6	0	2	0	1	0	AGE6574	0.260418	77
1144	Chowchilla	6039	Madera Co	6039	Madera Co	2	0	1	0	1	0	AGE6574	0.50301	1
1144	Chowchilla	6039	Madera Co	6039	Madera Co	2	0	1	3	1	0	AGE2564	0.226261	6
1144	Chowchilla	6039	Madera Co	6039	Madera Co	2	0	1	1	1	0	AGE2564	0.22044	65
1144	Chowchilla	6039	Madera Co	6039	Madera Co	4	0	2	0	2	0	AGE2564	0.172157	51
1144	Chowchilla	6039	Madera Co	6039	Madera Co	4	0	1	0	1	0	AGE6574	0.495801	14
1144	Chowchilla	6039	Madera Co	6039	Madera Co	2	0	4	8	1	0	AGE2564	0.330312	97
1144	Chowchilla	6039	Madera Co	6039	Madera Co	5	0	1	0	1	0	AGE2564	0.404656	11
1144	Chowchilla	6039	Madera Co	6039	Madera Co	4	0	2	0	1	0	AGE2564	0.172157	51
1144	Chowchilla	6039	Madera Co	6039	Madera Co	2	0	1	1	1	0	AGE2564	0.38262	11
1144	Chowchilla	6039	Madera Co	6039	Madera Co	2	0	1	2	1	0	AGE2564	0.576103	17
1144	Chowchilla	6039	Madera Co	6039	Madera Co	8	0	3	0	1	0	AGE2564	0.31765	94
1144	Chowchilla	6039	Madera Co	6039	Madera Co	5	0	2	0	1	0	AGE2564	0.312371	92
1144	Chowchilla	6039	Madera Co	6039	Madera Co	2	0	1	0	1	0	AGE6574	0.50301	1
1144	Chowchilla	6039	Madera Co	6039	Madera Co	3	0	3	2	1	0	AGE2564	0.247052	7
1144	Chowchilla	6039	Madera Co	6039	Madera Co	5	1	1	0	1	0	AGE75	0.463271	13
1144	Chowchilla	6039	Madera Co	6039	Madera Co	6	0	3	5	1	0	AGE2564	0.293335	86
1144	Chowchilla	6039	Madera Co	6039	Madera Co	7	0	1	0	1	0	AGE6574	0.730451	21
1144	Chowchilla	6039	Madera Co	6039	Madera Co	5	0	2	0	1	0	AGE2564	0.211476	62
1144	Chowchilla	6039	Madera Co	6039	Madera Co	5	0	1	0	1	0	AGE2564	0.233042	69
1144	Chowchilla	6039	Madera Co	6039	Madera Co	6	0	1	3	6	0	AGE2564	0.386914	11
1144	Chowchilla	6039	Madera Co	6039	Madera Co	1	0	3	0	1	0	AGE6574	0.351482	10
1144	Chowchilla	6039	Madera Co	6039	Madera Co	9	0	2	1	1	0	AGE2564	0.24474	72
1144	Chowchilla	6039	Madera Co	6039	Madera Co	3	0	3	0	1	0	AGE6574	0.633395	18
		Proportion of 2+ vehicle households:						=SUMIF(K2:						

To do this in R, use the sum function, identifying the subset of households with at least two vehicles in the numerator and all households in the denominator.

```
> prop_2plus <- sum(chowchilla$hhweight[chowchilla$hhveh>=2]) / sum(chowchilla$hhweight)
> prop_2plus
[1] 0.4930628
> |
```

EXAMPLE 2: AVERAGE TRIP DISTANCE

To calculate average trip distance for a collection of trips, sum the products of each trip distance multiplied by the trip weight, then divide by the sum of all trip weights. In equation form:

$$Average\ trip\ distance = \frac{\sum_{trips}(trip\ distance) * (trip\ weight)}{\sum_{trips}(trip\ weight)}$$

To do this in Excel, use the SUMPRODUCT and SUM functions:

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=sumproduct(R2:R94,BA2:BA94)/sum(BA2:BA94)

	D	E	F	G	H	Q	R	AB	AO	AZ	BA	BB	BC
	dTract	oPlace	oPlaceNam	dPlace	dPlaceNam	tripPurp	totalDist	modeString	age	tcf	tripweight	tripexpweight	
01	300	1144	Chowchilla	1144	Chowchilla	NHB	5.664943	Drive Alone	62	1.085538	0.186883	67.43078	
00	300	1144	Chowchilla	1144	Chowchilla	HBO	0.664659	Drive Alone	62	1.331198	0.229175	82.69053	
00	300	1144	Chowchilla	1144	Chowchilla	HBO	0.926246	Drive Shared 2	62	1.331198	0.229175	82.69053	
00	300	1144	Chowchilla	1144	Chowchilla	HBO	0.872687	Drive Alone	63	1.08895	0.187471	67.64272	
00	300	1144	Chowchilla	1144	Chowchilla	HBO	0.872687	Drive Alone	63	1.08895	0.187471	67.64272	
00	300	1144	Chowchilla	1144	Chowchilla	HBO	0.926246	Drive Shared 2	63	1.331198	0.229175	82.69053	
00	300	1144	Chowchilla	1144	Chowchilla	HBS	0.64899	Drive Shared 2	60	2.174432	0.83198	300.1934	
00	300	1144	Chowchilla	1144	Chowchilla	HBS	0.644164	Drive Shared 2	60	2.174432	0.83198	300.1934	
00	300	1144	Chowchilla	1144	Chowchilla	HBS	0.64899	Drive Shared 2	58	2.174432	0.83198	300.1934	
00	300	1144	Chowchilla	1144	Chowchilla	HBS	0.64899	Drive Shared 2	58	2.174432	0.83198	300.1934	
00	202	1144	Chowchilla	1144	Chowchilla	HBO	2.994741	Walk	18	0.696995	0.401541	144.8832	
02	300	1144	Chowchilla	1144	Chowchilla	HBO	2.994741	Drive Shared 2	18	0.988271	0.569346	205.4302	
02	300	1144	Chowchilla	1144	Chowchilla	HBO	5.840582	Drive Alone	77	1.188906	0.377656	136.265	
00	300	1144	Chowchilla	1144	Chowchilla	NHB	0.913314	Drive Shared 3	27	1.331198	0.328875	118.6639	
00	300	1144	Chowchilla	1144	Chowchilla	HBO	1.999179	Drive Alone	27	1.331198	0.328875	118.6639	
02	300	1144	Chowchilla	1144	Chowchilla	HBO	0.644646	Drive Alone	37	1.08895	0.319427	115.255	
00	202	1144	Chowchilla	1144	Chowchilla	HBO	0.642672	Drive Shared 3	37	1.08895	0.319427	115.255	
02	300	1144	Chowchilla	1144	Chowchilla	HBO	1.388131	Drive Shared 2	37	1.331198	0.390487	140.8946	
00	202	1144	Chowchilla	1144	Chowchilla	HBO	1.388131	Drive Alone	37	1.331198	0.390487	140.8946	
02	300	1144	Chowchilla	1144	Chowchilla	HBO	0.644646	Drive Shared 3	31	1.331198	0.390487	140.8946	
00	300	1144	Chowchilla	1144	Chowchilla	NHB	2.387291	Drive Alone	31	1.331198	0.390487	140.8946	
00	300	1144	Chowchilla	1144	Chowchilla	NHB	1.514051	Drive Alone	31	1.331198	0.390487	140.8946	
00	202	1144	Chowchilla	1144	Chowchilla	HBO	1.388131	Drive Shared 2	31	1.331198	0.390487	140.8946	
02	201	1144	Chowchilla	1144	Chowchilla	HBK	6.436982	School Bus	10	1.365993	0.400693	144.5773	
01	300	1144	Chowchilla	1144	Chowchilla	NHB	5.901662	School Bus	10	0.988271	0.289894	104.5991	
00	202	1144	Chowchilla	1144	Chowchilla	HBO	0.642672	Drive Shared 3	10	1.188906	0.348748	125.8344	
02	202	1144	Chowchilla	1144	Chowchilla	HBK	2.771092	School Bus	8	1.208368	0.354457	127.8942	
02	202	1144	Chowchilla	1144	Chowchilla	HBK	2.773391	School Bus	8	1.173979	0.344369	124.2544	
02	300	1144	Chowchilla	1144	Chowchilla	HBO	1.388131	Drive Shared 2	8	1.08895	0.319427	115.255	
00	202	1144	Chowchilla	1144	Chowchilla	HBO	1.388131	Drive Shared 2	8	1.08895	0.319427	115.255	
02	300	1144	Chowchilla	1144	Chowchilla	HBW	2.674768	Drive Alone	65	1.079488	0.228286	82.3697	
00	300	1144	Chowchilla	1144	Chowchilla	WBO	0.242534	Drive Alone	65	1.273109	0.269232	97.14383	
00	202	1144	Chowchilla	1144	Chowchilla	HBS	2.490271	Drive Alone	65	1.273109	0.269232	97.14383	
02	300	1144	Chowchilla	1144	Chowchilla	HBW	2.674768	Drive Alone	65	1.079488	0.228286	82.3697	
00	202	1144	Chowchilla	1144	Chowchilla	HBW	3.015911	Drive Alone	65	1.079488	0.228286	82.3697	
02	201	1144	Chowchilla	1144	Chowchilla	HBW	6.905395	Drive Alone	59	0.988271	0.208996	75.40944	
01	202	1144	Chowchilla	1144	Chowchilla	HBW	6.905395	Drive Alone	59	1.188906	0.251425	90.71877	
				Average trip distance			=sumproduct(R2:R94,BA2:BA94)/sum(BA2:BA94)						

To do this in R, use the weighted.mean function:

```
> weighted.mean(chowchilla_ii_trips$totalDist,chowchilla_ii_trips$tripweight)
[1] 2.282369
>
```

EXAMPLE 3: VMT PER HOUSEHOLD

To calculate the average VMT per household requires working with both the trips and households data, and using two different weights at different steps of the process. Note the "sampno" variable is a household ID which can be used to join the household and trip data to each other.

The first step in calculating VMT per household is to find the sum of all vehicle trip distances for each household, using the trip correction factor as a weight. Note that to select vehicle trips you can select trips for which autoDriver=1; this will select each vehicle trip exactly once. The total VMT per household is the sum $VMT = \sum_{vehicle\ trips}(trip\ distance) * (tcf)$.

The second step in calculating VMT per household is to find the weighted average of all of the household VMTs just calculated. Because we're working per household, we need to use the household weights:

$$Average\ VMT\ per\ household = \frac{\sum_{households}(household\ VMT) * (household\ weight)}{\sum_{households}(household\ weight)}$$

DATA DICTIONARY: HOUSEHOLDS

The following table documents the variables in the cleaned household data file.

HOUSEHOLDS FILE DATA DICTIONARY

Variable	Description
sampno	Household ID
hctract	Census tract of household residence. A 10-digit ID which includes the county FIP as well as the census tract.
placeCode, placeName	Census Designated Place of household residence
ctfip,countyName	County of household residence
MPOcode, MPOname	MPO of household residence. Same as county for 1-county MPOs.
servicepop	Service population: Jobs + workers within 45 minutes by auto (time-decay-weighted)
income, incomeImputed	Household income category, flag for imputed data 1 = Less than $10,000 2 = $10,000 - $24,999 3 = $25,000 - $34,999 4 = $35,000 - $49,999 5 = $50,000 - $74,999 6 = $75,000 - $99,999 7 = $100,000 - $149,999 8 = $150,000 - $199,999 9 = $200,000 or more
hhsize	Number of household residents
hhemp, hhstu, hhlic	Number of household workers, students, driver's license holders
hhveh, hhbic	Number of vehicles and number of bicycles owned by household
restype, restypeImputed	Residential unit type, flag for imputed data

HOUSEHOLDS FILE DATA DICTIONARY

Variable	Description
headAge, headAgeImputed	Age category of HH head, flag for imputed data
tripMonth	Month of travel day
tripDay	Day of week for travel day
householdTrips	Total number of person-trips taken by household members on the travel day
Age0002, Age0304, Age0514, Age1517, Age1824, Age2534, Age3544, Age4554, Age5564, Age6574, Age75	The number of household residents in each age category
hhweight	Household weight
hhexpweight, hhexpweight_weekday	Household expansion weight for all households and for weekday subset of households

Data sources: 2012 CHTS household and person files, as cleaned and prepared by F&P; for details see the CHTS data preparation memo.

DATA DICTIONARY: TRIPS

The following table documents the variables in the cleaned trips data file.

TRIPS FILE DATA DICTIONARY

Variable	Description
sampno, perno	Household ID, person ID
chainno, numLegs	Trip chain ID, number of legs in trip chain
dep_hr, dep_min, arr_hr, arr_min	Time of trip departure & arrival (hour, minute)
tripPurp	Trip purpose (7 categories)
modeString	Trip mode (16 categories)
totalDist, totalTime	Total trip distance (miles) and time (minutes)
oTract, dTract	Census tract of trip origin and destination. (10-digit number, includes county FIP code)
pTract, aTract	Census tract of trip production and attraction
oPlace, oPlaceName, dPlace, dPlaceName	Census Designated Place of trip origin and destination
pPlace, pPlaceName, aPlace, aPlaceName	Census Designated Place of trip production and attraction

TRIPS FILE DATA DICTIONARY

Variable	Description
oFIP, oCountyName, dFIP, dCountyName	County of trip origin and destination
pFIP, pCountyName, aFIP, aCountyName	County of trip production and attraction
oMPO, oMPOname, dMPO, dMPOname	MPO of trip origin & destination (same as county for one-county MPOs)
pMPO, pMPOname, aMPO, aMPOname	MPO of trip production and attraction
oServicePop, dServicePop	Service population (jobs + workers within 45 minutes by auto, time-decay-weighted) at trip origin and destination
opurp, dpurp	Purpose recorded at trip origin and destination
opurp1,opurp2,opurp3,dpurp1,dpurp2,dpurp3	Detailed activity purpose codes at trip origin and destination
totalDist	Total trip distance (including transit access/egress)
accessDist, xferDist, egressDist	Transit access, transfer , egress distances
IVT, accessTime, xferTime, egressTime, waitTime	In-vehicle time, transit access, transfer, egress, and wait times
dwellTime	Time spent at trip destination
autoDriver	Flag for driver of auto trips
nonHHDriver	Flag for trips where the respondent is a passenger on a trip where a non-HH member is the driver
hhmem, nonhhmem	Count of HH and non-HH passengers on trip (not including the driver)
escortFlag	Flag for trip whose only discernable purpose is to escort another person
accMode, egrMode	Transit access and egress modes
accOcc, egrOcc	Vehicle occupancy of access and egress modes
age	Age of trip-maker
gender,ntvty, hisp,race,disab	Gender, nativity, Hispanic & racial identity, disability status of trip-maker
worker,student, schoolType	Worker & student status, and school type of trip-maker
license, transPass	Driver's license, transit pass status of trip-maker
tcf, tripweight	Trip correction factor , trip weight

Data sources: Data sources: 2012 CHTS person, place, and activity files, as cleaned and prepared by F&P; for details see the CHTS data preparation memo.

APPENDIX C:

SIMPLE SUMMARIES OF CHTS DATA

MEMORANDUM

Date: December 29, 2015

To: File

From: Jennifer Ziebarth

Subject: Data dictionary for CHTS simple summaries

WC14-3115

The purpose of this memo is to provide a data dictionary for the “simple” summaries of CHTS data. These summaries come in both Excel (.xlsx) and csv (.csv) formats. The summaries have one record for each geographic unit and are suitable for joining to a shapefile for visualization in GIS. The data summarized here includes the most commonly requested data from the CHTS including mode shares, trip purposes, trip distance, and trip time.

DATA DICTIONARY: CHTS SIMPLE SUMMARIES

Grouping	Variable	Description
Geography	geogCode, geogName, geogType, lookup	Code, name, and type of geography (e.g., state, county, MPO, or "place" (city or named place recognized by census). The lookup field is useful for creating VLOOKUPs in Excel, and helps to distinguish between cities and counties with the same name (e.g., Alameda_place is the city of Alameda; Alameda_county is the county.)
Households, Trips, and Sample Sizes	HHsampleSize, PTsampleSize,VTsampleSize	Number of household, person-trip, and vehicle-trip records in the CHTS for this geography. CAUTION: If there are fewer than 100 households or trips for a geography, then the corresponding summaries should be used with caution. If there are fewer than 30 households for a given geography, it is excluded from this summary. Consult Jennifer Ziebarth for advice on how to proceed.

DATA DICTIONARY: CHTS SIMPLE SUMMARIES

Grouping	Variable	Description
Households, Trips, and Sample Sizes	numHH, numPersonTrips, numVehTrips	The total number of households, person-trips, and vehicle trips represented by the CHTS for this geography.
Person-Trips per Household	PersonTrips_per_HH, PersonTrips_per_HH_HBW, PersonTrips_per_HH_HBO, PersonTrips_per_HH_NHB	The average number of person-trips per household, total and by trip purpose. Includes all travel modes, and all trips regardless of o/d.
Person-Trips per Household	PMT_per_HH, PMT_per_HH_HBW, PMT_per_HH_HBO, PMT_per_HH_NHB	The average number of person-miles traveled per household, total and by trip purpose. Includes all travel modes, and all trips regardless of o/d.
Person-Trips per Household	PHT_per_HH, PHT_per_HH_HBW, PHT_per_HH_HBO, PHT_per_HH_NHB	The average number of person-hours traveled per household, total and by trip purpose. Includes all travel modes, and all trips regardless of o/d.
Vehicle-Trips per Household	VehicleTrips_per_HH, VehicleTrips_per_HH_HBW, VehicleTrips_per_HH_HBO, VehicleTrips_per_HH_NHB	The average number of vehicle-trips per household, total and by trip purpose. Includes all trips regardless of o/d.
Vehicle-Trips per Household	VMT_per_HH, VMT_per_HH_HBW, VMT_per_HH_HBO, VMT_per_HH_NHB	The average number of vehicle-miles traveled per household, total and by trip purpose. Includes all trips regardless of o/d.
Vehicle-Trips per Household	VHT_per_HH, VHT_per_HH_HBW, VHT_per_HH_HBO, VHT_per_HH_NHB	The average number of vehicle-hours traveled per household, total and by trip purpose. Includes all trips regardless of o/d.
Person-Trips per Household (ii only)	PersonTrips_per_HH_ii, PersonTrips_per_HH_HBW_ii, PersonTrips_per_HH_HBO_ii, PersonTrips_per_HH_NHB_ii	The average number of person-trips per household, total and by trip purpose. Includes all travel modes, but only trips *within the named geography*.
Person-Trips per Household (ii only)	PMT_per_HH_ii, PMT_per_HH_HBW_ii, PMT_per_HH_HBO_ii, PMT_per_HH_NHB_ii	The average number of person-miles traveled per household, total and by trip purpose. Includes all travel modes, but only trips *within the named geography*.
Person-Trips per Household (ii only)	PHT_per_HH_ii, PHT_per_HH_HBW_ii, PHT_per_HH_HBO_ii, PHT_per_HH_NHB_ii	The average number of person-hours traveled per household, total and by trip purpose. Includes all travel modes, but only trips *within the named geography*.

DATA DICTIONARY: CHTS SIMPLE SUMMARIES

Grouping	Variable	Description
Vehicle-Trips per Household (ii only)	VehicleTrips_per_HH_ii, VehicleTrips_per_HH_HBW_ii, VehicleTrips_per_HH_HBO_ii, VehicleTrips_per_HH_NHB_ii	The average number of vehicle-trips per household, total and by trip purpose. Includes only trips *within the named geography*.
Vehicle-Trips per Household (ii only)	VMT_per_HH_ii, VMT_per_HH_HBW_ii, VMT_per_HH_HBO_ii, VMT_per_HH_NHB_ii	The average number of vehicle-miles traveled per household, total and by trip purpose. Includes only trips *within the named geography*.
Vehicle-Trips per Household (ii only)	VHT_per_HH_ii, VHT_per_HH_HBW_ii, VHT_per_HH_HBO_ii, VHT_per_HH_NHB_ii	The average number of vehicle-hours traveled per household, total and by trip purpose**.** Includes only trips *within the named geography*.
Person-Trip Distance by mode & purpose	PersonTrip_Avg_Distance_*mode-_purpose*	Average person-trip distance (miles) for each combination of mode and purpose. Includes ii trips (trips internal to the named geography) only.
Person-Trip Time by mode & purpose	PersonTrip_Avg_Time_*mode_purpose*	Average person-trip time (minutes) for each combination of mode and purpose. Includes ii trips (trips internal to the named geography) only.
Daily mode shares	modeShare_*mode_purpose*	Average daily mode share for the listed mode within all trips of the listed purpose. If no purpose is listed, mode share is for trips of all purposes. Includes ii trips (trips internal to the named geography) only.
Peak period mode shares	modeShare_*mode_purpose*_peak	Average peak period mode share for the listed mode within all trips of the listed purpose. For purposes of this summary, peak period is defined as 6-9 AM and 4-7 PM. If no purpose is listed, mode share is for trips of all purposes. Includes ii trips (trips internal to the named geography) only.
Daily purpose shares	purpShare_*mode_purpose*	Average daily purpose share for the listed purpose within all trips of the listed mode. Includes ii trips (trips internal to the named geography) only.
Peak period purpose shares	purpShare_*mode_purpose*_peak	Average peak period purpose share for the listed purpose within all trips of the listed mode. For purposes of this summary, peak period is defined as 6-9 AM and 4-7 PM. Includes ii trips (trips internal to the named geography) only.
Direction Share	dirShare_*direction_purpose*	Average daily share of trips by direction: internal (ii), outgoing (ix), and incoming (xi), within all trips of the given purpose. If no purpose is listed, then share of trips by direction for all purposes combined.

Data sources: 2012 CHTS household, person, place, and activity files, with F&P modifications
Summarized using script MasterCHTSSummaries.R

APPENDIX D:
FLAT SUMMARIES OF CHTS DATA

MEMORANDUM

Date: April 22, 2015

To: File

From: Jennifer Ziebarth

Subject: Data dictionary for CHTS flat summaries

WC14-3115

The purpose of this memo is to provide a data dictionary for the "flat" summaries of CHTS data. These summaries come in both Excel (.xlsx) and csv (.csv) formats. The summaries have one record for each geographic unit and are suitable for joining to a shapefile for visualization in GIS.

DATA DICTIONARY: CHTS FLAT SUMMARIES

Grouping	Variable	Description
Geography	geogCode, geogName, geogType	Code, name, and type of geography (e.g., state, county, MPO, or "place" (city or named place recognized by census)
Number of Households and Trips	numHH, HHsampleSize, HH_Warning	Number of households represented by the CHTS for this geography, CHTS household sample size for this geography, and warning indicating whether data should be used with caution (*, 100 households or fewer) or used only when aggregated to include more households (**, 30 households or fewer).
Number of Households and Trips	numVehTrips, VTsampleSize, vehTripWarning	Number of vehicle trips represented by the CHTS for this geography, CHTS vehicle trip sample size for this geography, and warning indicating whether data should be used with caution (*, 100 vehicle trips or fewer) or used only when aggregated to include more vehicle trips (**, 30 vehicle trips or fewer).

DATA DICTIONARY: CHTS FLAT SUMMARIES

Grouping	Variable	Description
Number of Households and Trips	numPersonTrips, PTsampleSize, personTripWarning	Number of person trips represented by the CHTS for this geography, CHTS person trip sample size for this geography, and warning indicating whether data should be used with caution (*, 100 person trips or fewer) or used only when aggregated to include more person trips (**, 30 person trips or fewer).
Demographics	HH1, HH2, HH3, HH4, HH5, hhsize	Percentage of households with 1, 2, 3, 4, or 5+ members; average number of persons per household
Demographics	Veh0,Veh1,Veh2,Veh3,Veh4; hhveh	Percentage of households with 0,1,2,3, or 4+ autos; average number of vehicles per household
Demographics	Inc1, Inc2, Inc3, Inc4, Inc5, Inc6, Inc7, Inc8, Inc9	Percentage of households in each income category: 1. Less than $10,000 2. $10,000 to $24,999 3. $25,000 to $34,999 4. $35,000 to $49,999 5. $50,000 to $74,999 6. $75,000 to $99,999 7. $100,000 to $149,999 8. $150,000 to $199,999 9. $200,000 or more
Demographics	RUG1, RUG3, RUG6	Percentage of households by residential type. RUG1 = Single family; RUG3=Multi-family; RUG6 = Other (e.g., Mobile home, RV, boat)
Demographics	Age1824,Age2564,Age6574, Age75	Percentage of households by age category of household head
Demographics	Pop0005, Pop0514, Pop1517, Pop1824, Pop2554, Pop5564, Pop6574, Pop75	Average number of residents per HH in each category
Household Summaries	VMT_per_HH_*purpose_mode*	Average VMT per Household by purpose and mode.
Household Summaries	VehicleTrips_per_HH_*purpose_mode*	Average Vehicle Trips per Household by purpose and mode
Household Summaries	PersonTrips_per_HH_*purpose_mode*	Average Person Trips per Household by purpose and Mode
Vehicle Trip Summaries	numVehTrips_*purpose_mode_distribution*	Total number of vehicle trips represented for each combination of purpose, mode, distribution

DATA DICTIONARY: CHTS FLAT SUMMARIES

Grouping	Variable	Description
Vehicle Trip Summaries	vehDist_*purpose_mode_distribution*	Average vehicle trip distance for each combination of purpose, mode, distribution
Vehicle Trip Summaries	vehTime_*purpose_mode_distribution*	Average vehicle trip time for each combination of purpose, mode, distribution
Vehicle Trip Summaries	vehOcc_*purpose_mode_distribution*	Average vehicle occupancy for each combination of purpose, mode, distribution
Person Trip Summaries	numPersonTrips_*purpose_mode_distribution*	Total number of person trips represented for each combination of purpose, mode, distribution
Person Trip Summaries	PersDist_*purpose_mode_distribution*	Average person trip distance for each combination of purpose, mode, distribution
Person Trip Summaries	PersTime_*purpose_mode_distribution*	Average person trip time for each combination of purpose, mode, distribution

Data sources: 2012 CHTS household and person files, with F&P modifications
Summarized using script MasterCHTSSummaries.R

APPENDIX E:

FILTERABLE SUMMARIES OF CHTS DATA

MEMORANDUM

Date: December 29, 2015

To: File

From: Jennifer Ziebarth

Subject: Data dictionary for CHTS filterable summaries

WC14-3115

The purpose of this memo is to provide instructions for using the "filterable" summaries of CHTS data. Unlike the "flat" summaries, which are comparatively small in size, the "filterable" summaries allow for filtering based on multiple criteria, and as such they are quite large files. To simplify the summaries and allow for somewhat smaller file sizes, the filterable summaries are separated into two files, household summaries and trip summaries, which are described below.

INSTRUCTIONS AND HINTS

The filterable summaries allow CHTS data to be viewed by geography as well as selecting households or trips with certain demographic or travel profiles, such as households with two or more vehicles owned, or trips internal to the geography.

In most cases it is possible to select any combination of filter variables and see a summary of the relevant CHTS data. However, note that for some combinations the sample size of CHTS households, vehicle trips, or person trips may be quite small. Warning fields indicate whether the data can be used on its own, should be viewed with caution, or used only when aggregated with other data.

	Large enough sample size for confident reporting.
*	Use with caution: sample size may be not be large enough for statistical confidence.
**	Do not use in isolation. Sample size is too small for this result to stand on its own.

OTHER TIPS

- Non-vehicle modes such as bike, walk, or transit always have 0 vehicle trips per household in the household summaries, and 0 vehicle trips in the trip summaries, because these modes do not generate vehicle trips.
- Mode shares (and other "share" variables) are measured relative to mode= "All," with all other filters identical.
- Note that in some cases cities and counties share a name, so you may need to filter on both geogName and geogType to get the result you're looking for.

EXAMPLES

The examples below shows some of the tips above:

	Geography			Filter variables						Summaries per Household								
	geogCode	geogName	geogType	HH size	HH vehicles	HH income	Trip purpose	Mode	Peak	HH total	HH sample size	HH Warning	Vehicle Trips per HH Mea	VMT per HH Mean	VHT per HH Mean	Person Trips per HH Mea	PMT per HH Mean	PHT per HH Mean
345	1797	Tulare	place	All	All	All	All	Bike	All	10,739	57	*	0.0	0.0	0.0	0.0	0.0	0.0
346	6107	Tulare	county	All	All	All	All	Bike	All	113,379	464		0.0	0.0	0.0	0.1	0.1	0.0
347	1797	Tulare	place	All	All	All	All	DriveAlon	All	10,739	57	*	4.4	25.5	1.1	4.4	25.5	1.1
40726	6107	Tulare	county	All	All	All	All	DriveAlon	All	113,379	464		4.9	35.4	1.2	4.9	35.5	1.2
40727	1797	Tulare	place	All	All	All	All	DriveShar	All	10,739	57	*	2.0	6.3	0.4	3.6	12.6	0.6
40728	6107	Tulare	county	All	All	All	All	DriveShar	All	113,379	464		1.8	11.2	0.4	3.3	20.9	0.8
86763	1797	Tulare	place	All	All	All	All	DriveShar	All	10,739	57	*	0.5	0.9	0.1	2.4	3.4	0.2
86764	6107	Tulare	county	All	All	All	All	DriveShar	All	113,379	464		0.9	5.1	0.2	3.0	14.5	0.7
86765	1797	Tulare	place	All	All	All	All	Other	All	10,739	57	*	0.0	0.0	0.0	0.3	0.7	0.1
86766	6107	Tulare	county	All	All	All	All	Other	All	113,379	464		0.0	0.0	0.0	0.3	1.7	0.1
127407	1797	Tulare	place	All	All	All	All	Transit	All	10,739	57	*	0.0	0.0	0.0	0.0	0.3	0.0
127408	6107	Tulare	county	All	All	All	All	Transit	All	113,379	464		0.0	0.0	0.0	0.1	1.8	0.1
127409	1797	Tulare	place	All	All	All	All	Walk	All	10,739	57	*	0.0	0.0	0.0	0.9	0.5	0.1
127410	6107	Tulare	county	All	All	All	All	Walk	All	113,379	464		0.0	0.0	0.0	1.5	0.8	0.3

- The summary shows both the city of Tulare and the county of Tulare; the CHTS has 464 households in the county, but only 57 households in the city. Thus, summaries for the city should be used with caution.
- Vehicle trips, VMT, and VHT per household are 0 for all modes except the drive modes.

Geography			Filter variables								Summaries per person-trip								
geogCode	geogName	geogType	HH size	HH vehicles	HH income	Trip purpose	Mode	Resident	Direction	Peak	Total Number of Person Trips	Person-trip Sample Size	Person Trip Warning	Person-trip Mode Share	Person-trip Purpose Share	Person-trip Resident Share	Person-trip Direction Share	Person-trip Distance Mean	Person-trip Time Mean
1797	Tulare	place	All	All	All	All	All	Res	ii	All	101,614	312		100%	100%	94%	83%	1.4	8.1
1797	Tulare	place	All	All	All	All	Bike	Res	ii	All	98	1	**	0%	100%	100%	100%	2.4	24.0
1797	Tulare	place	All	All	All	All	DriveAlon	Res	ii	All	34,581	132		34%	100%	90%	74%	1.7	9.0
1797	Tulare	place	All	All	All	All	DriveShar	Res	ii	All	31,815	80	*	31%	100%	100%	86%	1.4	8.0
1797	Tulare	place	All	All	All	All	DriveShar	Res	ii	All	21,865	56	*	22%	100%	93%	89%	1.2	5.4
1797	Tulare	place	All	All	All	All	Other	Res	ii	All	3,537	10	**	3%	100%	100%	100%	2.0	14.9
1797	Tulare	place	All	All	All	All	Walk	Res	ii	All	9,718	33	*	10%	100%	100%	99%	0.6	9.0
6107	Tulare	county	All	All	All	All	All	Res	ii	All	1,378,601	3,986		100%	100%	99%	96%	3.8	12.5
6107	Tulare	county	All	All	All	All	Bike	Res	ii	All	7,461	38	*	1%	100%	100%	100%	1.1	17.7
6107	Tulare	county	All	All	All	All	DriveAlon	Res	ii	All	513,362	1,729		37%	100%	99%	94%	4.8	12.8
6107	Tulare	county	All	All	All	All	DriveShar	Res	ii	All	337,192	1,042		24%	100%	99%	95%	4.2	11.5
6107	Tulare	county	All	All	All	All	DriveShar	Res	ii	All	325,740	734		24%	100%	100%	97%	3.3	11.3
6107	Tulare	county	All	All	All	All	Other	Res	ii	All	30,612	79	*	2%	100%	100%	95%	4.5	24.8
6107	Tulare	county	All	All	All	All	Transit	Res	ii	All	6,100	29	**	0%	100%	100%	86%	4.4	37.4
6107	Tulare	county	All	All	All	All	Walk	Res	ii	All	158,133	335		11%	100%	100%	100%	0.5	12.4

- All visible entries for “purpose share” are 100%, because trip purpose has been filtered to show all trip purposes combined (“All”).
- Mode shares for rows where mode= “All” are 100%, while mode shares in other rows are smaller than 100%. The 34% mode share in the third row indicates that that row’s mode (“Drive Alone”) represents 34% of all person trips with the selected characteristics: In the city of Tulare, all household sizes, vehicles, and incomes, trips by residents only (“Res”), and only trips within Tulare (“ii”).
- In many cases shown the number of households or trips is too small to draw any conclusions with the visible data. For example, the second row indicates the CHTS has only one weekday person trip, made by a resident of the city of Tulare, within that city, by bike. The red highlight serves as a warning that this single trip is not enough to draw wider conclusions.

DATA DICTIONARIES

DATA DICTIONARY: CHTS HOUSEHOLD FILTERABLE SUMMARIES

Type	Variable	Description
Geography	geogCode, geogName, geogType	Code, name, and type of geography (e.g., state, county, region/MPO, or "place" (city or named place recognized by census)
Filter	HH size	Household size : HH1=1, HH2=2, HH3=3, HH4=4, HH5=5 or more, HH4+ = 4 or more,
	HH vehicles	Number of vehicles owned by household: Veh0=0, Veh1=1, Veh2=2, Veh3=3, Veh4=4 or more, Veh2+ = 2 or more

DATA DICTIONARY: CHTS HOUSEHOLD FILTERABLE SUMMARIES

Type	Variable	Description
	HH income	Household income by category: Low = $0 - $49,999; Med = $50,000 - $99,999; High = $100,000 or more
	Trip purpose	Trip purpose, 3 categories (HBW, HBO, NHB). "HB" includes both HBW and NHB.
	Mode	Mode (Active, Drive Alone, Drive Shared 2, Drive Shared 3+, Transit, Other)
	Peak	All = All trips; Peak = 6-9am or 4-7pm; Offpeak = all other times
Summaries Per Household	HH total	Total number of households
	HH sample size	Number of CHTS household records
	HH Warning	Warning indicating whether data should be used with caution (*, 100 households or fewer) or used only when aggregated to include more households (**, 30 households or fewer).
	Person Trips per HH Mean	Average number of person trips per household
	PMT per HH Mean	Average Person Miles Traveled per household
	PHT per HH Mean	Average Person Hours Traveled per household
	Vehicle Trips per HH Mean	Average number of vehicle trips per household
	VMT per HH Mean	Average Vehicle Miles Traveled per household
	VHT per HH Mean	Average Vehicle Hours Traveled per household

Data sources: 2012 CHTS, as cleaned and summarized by Fehr & Peers

DATA DICTIONARY: CHTS TRIP FILTERABLE SUMMARIES

Type	Variable	Description
Geography	geogCode, geogName, geogType	Code, name, and type of geography (e.g., state, county, MPO, or "place" (city or named place recognized by census)
Filter	HH size	Household size : HH1=1, HH2=2, HH3=3, HH4=4, HH5=5 or more, HH4+ = 4 or more,

DATA DICTIONARY: CHTS TRIP FILTERABLE SUMMARIES

Type	Variable	Description
	HH vehicles	Number of vehicles owned by household: Veh0=0, Veh1=1, Veh2=2, Veh3=3, Veh4=4 or more, Veh2+ = 2 or more
	HH income	Household income by category: Low = $0 - $49,999; Med = $50,000 - $99,999; High = $100,000 or more
	Trip purpose	Trip purpose, 3 categories (HBW, HBO, NHB). "HB" includes both HBW and NHB.
	Mode	Mode (Active, Drive Alone, Drive Shared 2, Drive Shared 3+, Transit, Other)
	Resident	Restrict to residents of the listed geography? Res= Only residents; Non= Only non-residents; All = Both residents and non-residents
	Direction	Direction of trip, relative to the listed geography. ii =internal trip within the geography. ix = outgoing trip which starts inside and ends outside the geography. xi = incoming trip which begins outside and ends inside the geography.
	Peak	All = All trips; Peak = 6-9am or 4-7pm; Offpeak = all other times
Summaries per Vehicle Trip	Total Number of Vehicle Trips	Total number of vehicle trips
	Vehicle trip sample size	Number of CHTS vehicle trip records
	Vehicle Trip Warning	Warning indicating whether data should be used with caution (*, 100 vehicle trips or fewer) or used only when aggregated to include more vehicle trips (**, 30 vehicle trips or fewer).
	Vehicle Trip Mode Share, Vehicle Trip Purpose Share, Vehicle Trip Resident Share, Vehicle Trip Direction Share	Percent of vehicle trips with the current mode , purpose, residence status, or direction
	Vehicle Trip Distance Mean	Average vehicle trip distance
	Vehicle Trip Time Mean	Average vehicle trip time
	Vehicle Occupancy Mean	Average vehicle occupancy per vehicle trip
	Total Number of Person Trips	Total number of person trips
	Person Trip Sample Size	Number of CHTS person trip records

DATA DICTIONARY: CHTS TRIP FILTERABLE SUMMARIES

Type	Variable	Description
Summaries per Person Trip	Person Trip Warning	Warning indicating whether data should be used with caution (*, 100 person trips or fewer) or used only when aggregated to include more vehicle trips (**, 30 person trips or fewer).
	Person Trip Mode Share, Person Trip Purpose Share, Person Trip Resident Share, Person Trip Direction Share	Percent of person trips with the current mode , purpose, residence status, or direction
	Person Trip Distance Mean	Average person trip distance
	Person Trip Time Mean	Average person trip time

Data sources: 2012 CHTS, as cleaned and summarized by Fehr & Peers

APPENDIX F:

SIMPLIFIED CHTS DATA

MEMORANDUM

Date: October 7, 2015

To: File

From: Jennifer Ziebarth

Subject: How to use simplified CHTS data

WC14-3115

The purpose of this memo is to provide a data dictionary and instructions for using the simplified CHTS data (also known as "pivot summaries"). This data comes in .csv format and is intended to be further processed in Excel.

DATA DICTIONARY

The table below lists the variables present in the simplified CHTS data.

DATA DICTIONARY: SIMPLIFIED CHTS DATA

Grouping	Variables	Description
Location	oTract, dTract, homeTract, workTract	Census tract for trip origin, destination, home location, and (for respondents with a work trip on survey date) work location. Census tracts are listed as 10-digit state+county+tract FIPS code.
Location	oPlace, dPlace, homePlace, workPlace	Census Designated Place (e.g., city or other named place) for trip origin, destination, home location, and (for respondents with a work trip on survey date) work location.
Location	oFIP, dFIP, homeFIP, workFIP; oCounty, dCounty, homeCounty, workCounty	County (both FIPS code and name) for trip origin, destination, home location, and (for respondents with a work trip on survey date) work location.

DATA DICTIONARY: SIMPLIFIED CHTS DATA

Grouping	Variables	Description
Location	oRegion, dRegion, homeRegion, workRegion	Region for trip origin, destination, home location, and (for respondents with a work trip on survey date) work location. Regions are multi-county MPOs or other multi-county regions as listed below: • AMBAG: Monterey, San Benito, and Santa Cruz Counties • MTC: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties • SACOG: El Dorado*, Placer*, Sacramento, Sutter, Yolo, and Yuba Counties, excluding Tahoe Basin area of El Dorado and Placer counties • SCAG: Imperial, Los Angeles, Orange, Riverside, San Bernardino, Ventura Counties • TMPO: Tahoe Basin area of El Dorado and Placer Counties • SJV: Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare Counties • North: Butte, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Nevada, Plumas, Shasta, Sierra, Siskiyou, Tehama, and Trinity Counties • Central Mountains: Alpine, Amador, Calaveras, Inyo, Mariposa, Mono, and Tuolumne Counties • S Central Coast: San Luis Obispo and Santa Barbara Counties • SANDAG: San Diego County
Mode	Mode	One of the following travel modes: • DriveAlone, DriveShared • Bus, Rail, Ferry • Walk, Bike • Other (e.g., taxi, school bus, paratransit, …)
Purpose	Purpose	One of the following trip purposes: • HBW (home-based work) • HBO (home-based other) • NHB (non-home-based)
Distance	Distance	Total trip distance, rounded to the nearest mile. (Trips under half a mile are reported as distance 0). Note that trip distances in the survey are calculated from respondent's origin and destination, and the route used may not match the respondent's actual route.

DATA DICTIONARY: SIMPLIFIED CHTS DATA

Grouping	Variables	Description
Time	Time	Total trip time (including transit access/egress and waiting), rounded to the nearest 5 minutes. (Trips under 2.5 minutes are reported as time 0.) Note that trip times are self-reported by survey respondents.
Person-Trips	numPersTrips	Weighted and expanded number of person-trips for the given origin, destination, home, work, purpose, mode, distance, and time.
Person-Trips	rawPersTrips	Survey sample size for person-trips with the given origin, destination, home, work, purpose, mode, distance, and time.
Vehicle-Trips	numVehTrips	Weighted and expanded number of vehicle-trips for the given origin, destination, home, work, purpose, mode, distance, and time.
Vehicle-Trips	rawVehTrips	Survey sample size for vehicle-trips with the given origin, destination, home, work, purpose, mode, distance, and time.

Data sources: 2012 CHTS household and person files, with F&P modifications
Summarized using script ModeDistTime_PurposeDistrib.R

ON SURVEY WEIGHTING AND EXPANSION

The variables representing the number of person-trips and vehicle-trips are weighted and expanded to represent the total number of household-related trips of the listed type. While the survey is weighted to match household demographics (such as household size, household income, etc.) on a per-county basis, some limitations of the survey should be kept in mind when using the expanded number of trips.

- Because the CHTS is a **household** travel survey, it only measures travel related to (California) households. It does not measure commercial trips, trips made by visitors, or trips made by California residents who are not classified by the census as belonging to households – e.g., residents of group living quarters such as college dormitories, military bases, medical facilities, or correctional facilities.
- The survey weights supplied with the CHTS were judged to be insufficient for Fehr & Peers' purposes and we have therefore re-calculated weights in-house. For more information, see the CHTS data preparation memo or contact Jennifer Ziebarth.

USING THE SIMPLIFIED DATA

The simplified CHTS data is designed to be a flexible format which can produce the most commonly-requested summaries of CHTS data. Within Excel, this data can be filtered, summed, averaged, or brought into pivot tables and pivot charts to create a variety of summaries. Several common examples are detailed below. Two general comments may help you get started:

1. Because the CHTS is a weighted survey, you'll want to use the weighted variables numPersTrips and numVehTrips to count person-trips or vehicle-trips for almost any summary.
2. It's important to always confirm your summary is based on a large enough sample to provide reasonable representation of the population. For this reason, the sample sizes rawPersTrips and rawVehTrips are also provided. In general, caution should be used when summaries are based on less than 100 total (person- or vehicle-) trips; summaries based on a sample of less than 30 total trips should not be used alone, but should rather be pooled with additional data.

EXAMPLES OF COMMONLY REQUESTED SUMMARIES

MODE SHARE BY TRIP PURPOSE

To create a table of mode shares by trip purpose, start by confirming the CHTS has enough records to summarize the characteristics of interest. Create a pivot table with modes as rows, trip purposes as columns, and raw person-trips as values. In the Value Field Settings dialog, summarize values by Sum. Add filters to the pivot table to select other characteristics of interest such as residence or work location, origin, destination, etc. In the example below, we've selected records for respondents who live in Oakland and work in Walnut Creek.

homePlace	Oakland			
workPlace	Walnut Creek			
Sum of rawPersTrips	**Column Labels**			
Row Labels	**HBO**	**HBW**	**NHB**	**Grand Total**
DriveAlone	8	12	7	27
Rail		1	1	2
Walk	3		1	4
Grand Total	**11**	**13**	**9**	**33**

Unsurprisingly, there aren't very many trips in the CHTS with these characteristics, so we should expand our criteria. A good guideline for mode share summaries is at least 100 trips total, and at least 30 trips for each trip purpose.

Once we've confirmed the CHTS has enough responses with the characteristics of interest, create a second pivot table with the same rows, columns, and filters, and with number of person-trips as values. In the Value Field Settings dialog, summarize values by Sum, and show the values as percentage of column total.

homePlace	Oakland			
workCounty	Contra Costa			
Sum of numPersTrips	**Column Labels**			
Row Labels	**HBO**	**HBW**	**NHB**	**Grand Total**
DriveAlone	59%	84%	68%	70%
DriveShared	29%	0%	15%	14%
Rail	0%	16%	1%	5%
Walk	12%	0%	16%	11%
Grand Total	**100%**	**100%**	**100%**	**100%**

AVERAGE VEHICLE TRIP LENGTH

To estimate average vehicle-trip length, again start by confirming the CHTS has enough trips with the desired characteristics. Create a pivot table with raw vehicle trips (summarized by sum) in the value field, and any other desired characteristics in filters, rows and columns. Here, we see there are sufficient records for residents of all three AMBAG counties to allow summarizing vehicle trip length.

homeRegion	AMBAG			
Sum of rawVehTrips	**Column Labels**			
Row Labels	**HBO**	**HBW**	**NHB**	**Grand Total**
Monterey	1,597	827	997	3,421
San Benito	429	225	279	933
Santa Cruz	1,170	521	849	2,540
Grand Total	**3,196**	**1,573**	**2,125**	**6,894**

To determine average vehicle trip length by trip purpose, it's easier not to use a pivot table but to work with the relevant portion of the data directly. Set filters for the desired characteristics, and create a new column multiplying trip distance by the number of vehicle trips.

L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
homeRegic	workTr	workPl	workCc	workRe	mode	purpos	distanc	time	numPe	rawPer	numVe	rawVeh	numVT*distance	
AMBAG	NA	NA	NA	NA	DriveAlon	HBO	109	150	0.09	1	0.09	1	=W817*S817	
AMBAG	6E+09	San Leand	Alameda	MTC	DriveShar	HBW	92	170	1.07	1	1.07	1		
AMBAG	6E+09	Fremont	Alameda	MTC	DriveAlon	HBW	90	115	0.1	1	0.1	1		
AMBAG	NA	NA	NA	NA	DriveShar	NHB	111	270	0.19	2	0.09	1		
AMBAG	NA	NA	NA	NA	DriveAlon	HBO	333	340	0.06	1	0.06	1		
AMBAG	NA	NA	NA	NA	DriveShar	NHB	84	110	0.18	1	0.18	1		
AMBAG	NA	NA	NA	NA	DriveAlon	HBO	55	55	0.11	1	0.11	1		
AMBAG	6.05E+09	Los Banos	Merced	SJV	DriveShar	NHB	2	5	1.36	2	0.67	1		
AMBAG	6.05E+09	Los Banos	Merced	SJV	DriveShar	HBO	71	70	1.06	2	0.53	1		

Then, create sums for both the number of vehicle trips and vehicle trips * distance. Because we want to calculate average vehicle trip length for residents of the three AMBAG counties separately, SUMIF statements will help to sum only the values we're interested in.

=SUMIF($K1:$K195510,K$195618,$W1:$W195510)

J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
homeP	homeC	homeRegic	workTr	workPl	workCc	workRe	mode	purpos	distanc	time	numPe	rawPer	numVe	rawVel	numVT*dist
Unincorpc	Santa Cru:	AMBAG	NA	NA	NA	NA	DriveShar	NHB	87	170	1.01	2	0.52	1	45.24
Santa Cru:	Santa Cru:	AMBAG	NA	NA	NA	NA	DriveAlon	NHB	90	120	0.05	1	0.05	1	4.5
Soquel	Santa Cru:	AMBAG	NA	NA	NA	NA	DriveShar	NHB	41	70	0.66	2	0.33	1	13.53
Santa Cru:	Santa Cru:	AMBAG	NA	NA	NA	NA	DriveShar	NHB	168	360	0.02	2	0.01	1	1.68
Felton	Santa Cru:	AMBAG	NA	NA	NA	NA	DriveShar	NHB	88	30	0.91	1	0.91	1	80.08
Felton	Santa Cru:	AMBAG	6.8E+09	Other US	Other US	Other US	DriveShar	NHB	1	15	0.86	1	0.86	1	0.86
Felton	Santa Cru:	AMBAG	6.8E+09	Other US	Other US	Other US	DriveShar	NHB	1	30	0.69	1	0.69	1	0.69
Rio del M:	Santa Cru:	AMBAG	NA	NA	NA	NA	DriveShar	NHB	163	240	0.91	4	0.25	1	40.75
Total	Monterey												=SUMIF($		
Total	San Benito														
Total	Santa Cruz														
Total	AMBAG														

Finally, divide the sum of vehicle trips * distance by the sum of vehicle trips, and you have the average vehicle trip distance. Note that this process is creating a weighted average of the trip distance, using the number of vehicle trips as a weight.

	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
	homeP	homeC												numVe	rawVel	numVT*distance	
7	Felton	Santa Cru:	A	N	N	N	N	D	N	#	#	1	1	0.91	1	80.08	
8	Felton	Santa Cru:	A	#	O	O	O	D	N	1	#	1	1	0.86	1	0.86	
9	Felton	Santa Cru:	A	#	O	O	O	D	N	1	#	1	1	0.69	1	0.69	
0	Rio del M:	Santa Cru:	A	N	N	N	N	D	N	#	#	1	4	0.25	1	40.75	
7																	Average Vehicle Trip Distance
8	Total	Monterey												1685.18		13083.81	7.76
9	Total	San Benito												250.92		2686.28	10.71
0	Total	Santa Cruz												1287.31		9913.47	7.70
1	Total	AMBAG												3223.41		25683.56	7.97
2																	

O/D TABLE

To create an O/D table for a set of geographies, again start by setting up a pivot table with the desired filters, with origins as rows, destinations as columns, and raw trips (either person- or vehicle-trips) as value; this will help you to confirm whether sample sizes are sufficient.

oRegion	SJV
dRegion	SJV

Sum of rawVehTrips	Column Labels							
Row Labels	**Fresno**	**Kern**	**Kings**	**Madera**	**Merced**	**San Joaquin**	**Stanislaus**	**Tulare**	**Grand Total**
Fresno	3,576	8	51	107	20	1	3	100	3,866
Kern	11	4,024	1		1	1	1	38	4,077
Kings	55	2	798	1				43	899
Madera	110	1	1	633	18	-	6		769
Merced	17	1		19	1,354	6	85	1	1,483
San Joaquin	2			2	7	2,076	104		2,191
Stanislaus	2	1		4	84	104	1,602	2	1,799
Tulare	99	33	46	4		1	1	2,519	2,703
Grand Total	**3,872**	**4,070**	**897**	**770**	**1,484**	**2,189**	**1,802**	**2,703**	**17,787**

In this example, overall we have plenty of vehicle trips to summarize, but for the pairs with a small number of survey records we shouldn't draw any conclusions beyond the obvious one that these pairs don't experience as much interaction as other pairs.

Create a second pivot table with the same rows, columns, and filters, and with number of trips as values. To help distinguish cells with enough sample size to draw conclusions, cells with sufficient sample size are highlighted in green in the example below.

oRegion	SJV
dRegion	SJV

Sum of numVehTrips	Column Labels								
Row Labels	**Fresno**	**Kern**	**Kings**	**Madera**	**Merced**	**San Joaquin**	**Stanislaus**	**Tulare**	**Grand Total**
Fresno	1,716,778	1,962	13,634	18,028	8,853	266	1,077	22,169	1,782,766
Kern	2,265	1,439,497	162		448	162	211	9,538	1,452,284
Kings	14,181	470	215,434	269				8,006	238,360
Madera	20,314	330	269	165,030	3,725	-	1,463		191,130
Merced	9,487	583		3,981	372,138	716	25,554	121	412,581
San Joaquin	247			1,378	833	1,157,843	37,287		1,197,587
Stanislaus	556	621		1,120	25,876	36,474	793,667	500	858,813
Tulare	21,272	7,294	8,705	1,693		264	410	795,079	834,717
Grand Total	**1,785,099**	**1,450,758**	**238,204**	**191,498**	**411,873**	**1,195,725**	**859,669**	**835,413**	**6,968,238**

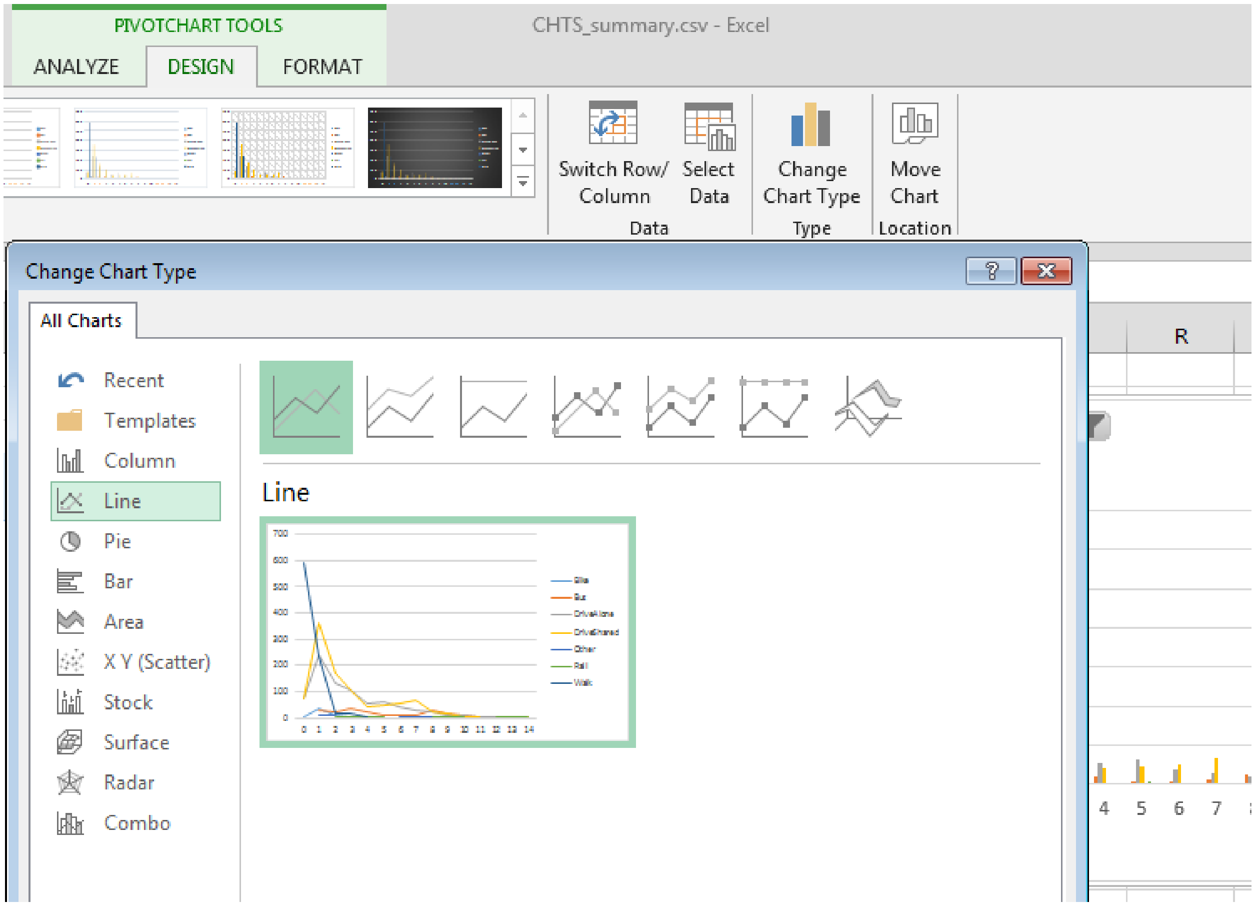
GRAPH OF TRIP DISTANCE BY MODE

Excel can create pivot tables and pivot charts which appear side-by-side with the same data. As before, confirm there are enough trips in the CHTS to summarize by creating a pivot table with mode as columns, distance as rows, raw person-trips as values (summarized by sum), and any desired filters. In this example, we certainly have enough trips for most modes, but should be cautious about drawing conclusions about

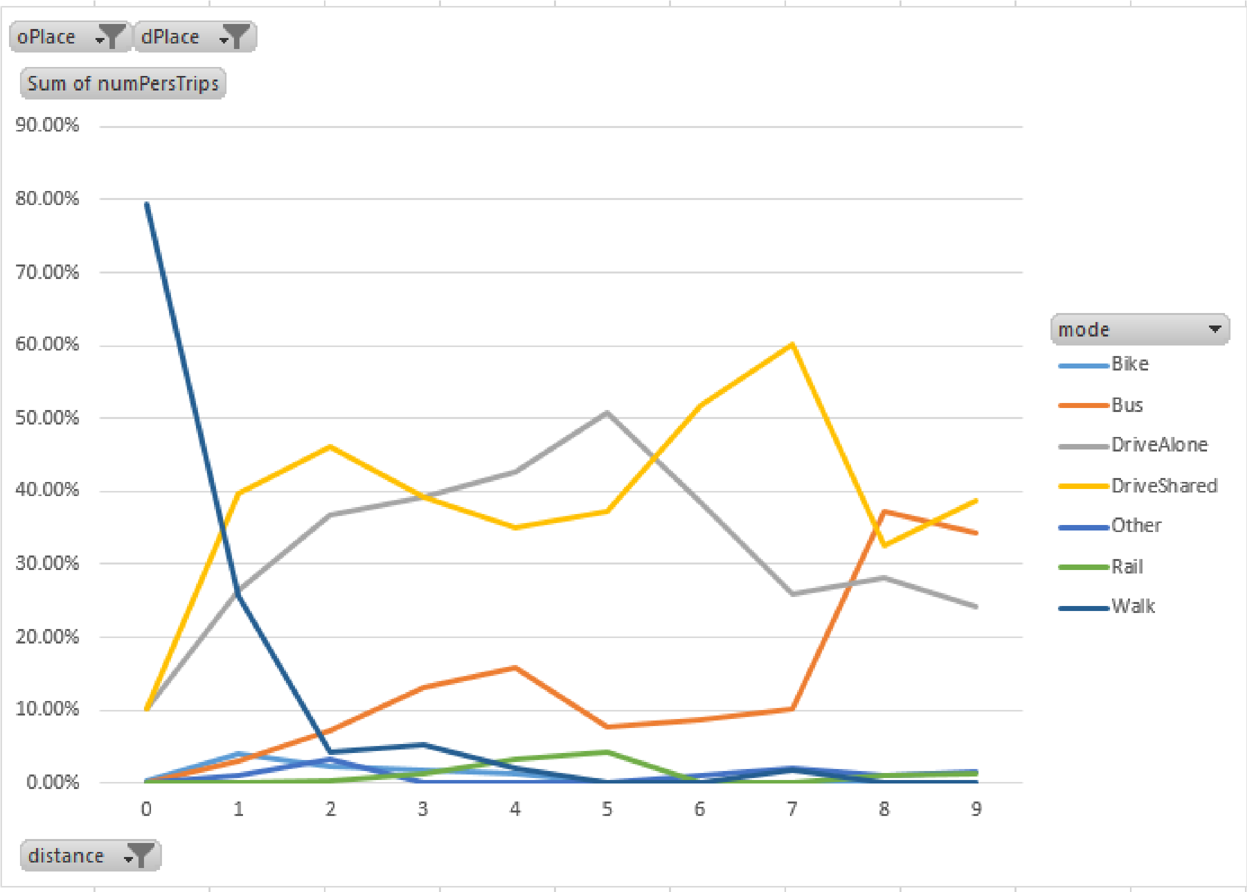
Rail or Other modes. Also, trips of 10 miles or longer are few enough that they should be considered as an aggregate rather than mile-by-mile.

oPlace	Oakland							
dPlace	Oakland							
Sum of rawPersTrips	Column Labels							
Row Labels	Bike	Bus	DriveAlone	DriveShared	Other	Rail	Walk	Grand Total
0	4		58	60			384	506
1	31	16	162	245	10		149	613
2	9	14	110	122	11	1	10	277
3	4	22	85	84		3	4	202
4	1	13	42	38		2	4	100
5		5	53	43		6		107
6		6	36	33	1			76
7		3	20	24	2		1	50
8		7	18	17	1	1		44
9		7	13	12	1	1		34
10		4	6	3		4		17
11		2	5	3				10
12		1	2			1		4
13			1	7		1		9
14				2		1		3
Grand Total	**49**	**100**	**611**	**693**	**26**	**21**	**552**	**2052**

To create the graph, change the value field from raw person trips to number of person trips (still summarized by sum). While the default pivot-chart bar chart format conveys some information, it's probably clearer to see if we change the chart type to a line chart:



If we’d rather look at mode share for each distance, we can show the values as a percentage of the row total – remembering that trips of 10 miles are longer may show unreasonable variability because there are so few of them in the survey.


oPlace
dPlace
Sum of numPersTrips
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
0
1
2
3
4
5
6
7
8
9
distance
mode
Bike
Bus
DriveAlone
DriveShared
Other
Rail
Walk

APPENDIX G:

DATA DICTIONARY FOR TAZ DATA INPUTS

The table below is a data dictionary for the elements of the TAZdata.csv model input.

DATA DICTIONARY FOR TAZDATA.CSV

Name	Description
TAZ	Traffic Analysis Zone ID
AIRBASIN	For counties containing multiple air basins,
MID_BNDRY	Middle school boundary
HIGH_BNDRY	High school boundary
GENPARKCOST	Parking cost, general public
EMPCOST	Parking cost, employees
INTDEN	Intersection density (No longer used, replaced by Python script)
WALKPERC	Percentage of TAZ lane miles that are walkable (No longer used, replaced by Python script)
MHHINC	Median household income
AREA_AC	Total area of the TAZ, in acres, including undeveloped land
RESACRE	Total developed area of TAZ devoted to residential uses
EMPACRE	Total developed area of TAZ devoted to non-residential uses
HWYCOM	Percentage of commercial that is highway focused
PTERM	Additional out-of-vehicle time required for drive trip productions to reach vehicle
ATERM	Additional out-of-vehicle time required for drive trip attractions to reach vehicle
PKFREQ	Frequency of peak-period transit service (used for synthetic transit)
OPFREQ	Frequency of off-peak transit service (used for synthetic transit)
EJ	Environmental Justice code
HBWH_ix	Percentage of home-based work (high income) trips produced which leave the model
HBWH_xi	Percentage of home-based work (high income) trips attracted from outside the model
HBWM_ix	Percentage of home-based work (medium income) trips produced which leave the model

DATA DICTIONARY FOR TAZDATA.CSV

Name	Description
HBWM_xi	Percentage of home-based work (medium income) trips attracted from outside the model
HBWL_ix	Percentage of home-based work (low income) trips produced which leave the model
HBWL_xi	Percentage of home-based work (low income) trips attracted from outside the model
HBS_ix	Percentage of home-based shop trips produced which leave the model
HBS_xi	Percentage of home-based shop trips attracted from outside the model
HBK_ix	Percentage of home-based school (K-12) trips produced which leave the model **(NOT used in the model: all HBK trips are assumed to be internal to the model.)**
HBK_xi	Percentage of home-based school (K-12) trips attracted from outside the model **(NOT used in the model: all HBK trips are assumed to be internal to the model.)**
HBC_ix	Percentage of home-based college trips produced which leave the model
HBC_xi	Percentage of home-based college trips attracted from outside the model
HBO_ix	Percentage of home-based other trips produced which leave the model
HBO_xi	Percentage of home-based other trips attracted from outside the model
WBO_ix	Percentage of work-based other trips produced which leave the model
WBO_xi	Percentage of work-based other trips attracted from outside the model
OBO_ix	Percentage of other-based other trips produced which leave the model
OBO_xi	Percentage of other-based other trips attracted from outside the model
EMP_EDUH	Percentage of educational employment that is high-income
EMP_EDUM	Percentage of educational employment that is medium-income
EMP_EDUL	Percentage of educational employment that is low-income
EMP_FOOH	Percentage of food/entertainment employment that is high-income
EMP_FOOM	Percentage of food/entertainment employment that is medium-income
EMP_FOOL	Percentage of food/entertainment employment that is low-income
EMP_GOVH	Percentage of government employment that is high-income
EMP_GOVM	Percentage of government employment that is medium-income
EMP_GOVL	Percentage of government employment that is low-income
EMP_INDH	Percentage of industrial employment that is high-income

DATA DICTIONARY FOR TAZDATA.CSV

Name	Description
EMP_INDM	Percentage of industrial employment that is medium-income
EMP_INDL	Percentage of industrial employment that is low-income
EMP_MEDH	Percentage of medical employment that is high-income
EMP_MEDM	Percentage of medical employment that is medium-income
EMP_MEDL	Percentage of medical employment that is low-income
EMP_OFCH	Percentage of office employment that is high-income
EMP_OFCM	Percentage of office employment that is medium-income
EMP_OFCL	Percentage of office employment that is low-income
EMP_RETH	Percentage of retail employment that is high-income
EMP_RETM	Percentage of retail employment that is medium-income
EMP_RETL	Percentage of retail employment that is low-income
EMP_OTHH	Percentage of mining/manufacturing employment that is high-income
EMP_OTHM	Percentage of mining/manufacturing employment that is medium-income
EMP_OTHL	Percentage of mining/manufacturing employment that is low-income
EMP_AGRH	Percentage of agricultural employment that is high-income
EMP_AGRM	Percentage of agricultural employment that is medium-income
EMP_AGRL	Percentage of agricultural employment that is low-income

APPENDIX H:
ACCESSIBILITY VARIABLES

The table below lists all of the accessibility and D-variables calculated during the Accessibility portions of the model. Note that the accessibility metrics are calculated during the Input Preparation phase of the model, and updated as the model runs through each iteration.

TABLE H-1: DATA DICTIONARY FOR TAZ-LEVEL ACCESSIBILITY VARIABLES

Variable	Description
ATYPE	Place type, calculated from EMP_30AUT + WRK_30AUT
TOTHH_SF	Total households in single-family residential units
HHPOP_SF	Total household population in single-family residential units
TOTHH_MF	Total households in multi-family residential units
HHPOP_MF	Total household population in multi-family residential units.
WRKPOP	Total working-age population.
INTDEN	Intersection density (intersections per square mile, including undeveloped area)
DIRECT	Not currently used; placeholder for measure of directness
WALK_MI	Miles of walkable roadway links
WALKPERC	Percentage of TAZ which is walkable
RESACRE	Developed acres for residential purposes
EMPACRE	Developed acres for non-residential purposes
HH_05TRN	Households within half-mile of transit
WRK_05TRN	Working-age population within half-mile of transit
EMP_05TRN	Jobs within half-mile of transit
EMP_30TRN	Jobs within 30 minutes by transit
WRK_30TRN	Working-age population within 30 minutes by transit
EMP_1WALK	Jobs within 1-mile walk
WRK_1WALK	Working-age population within 1-mile walk
EMP_3BIKE	Jobs within 3-mile bike ride

TABLE H-1: DATA DICTIONARY FOR TAZ-LEVEL ACCESSIBILITY VARIABLES

Variable	Description
WRK_3BIKE	Working-age population within 3-mile bike ride
EMP_30AUT	Jobs within 30 minutes by auto
WRK_30AUT	Working-age population within 30 minutes by auto
ACT_30AUT	Activity (jobs + working-age population) within 30 minutes by auto
ACT_30TRN	Activity (jobs + working-age population) within 30 minutes by transit
COMMUTECOST	Average annual cost of commuting by auto

APPENDIX I:

COMPARISON OF LAND USE CATEGORIES

The table below shows the residential land use data elements and how the VMIP 2 grouping compares to other data sources including the CHTS, ACS, and VMIP 1 categorization.

TABLE 3.2-8:
RESIDENTIAL AGGREGATION STRUCTURE FOR VMIP 2

	VMIP 2 (grouped)	VMIP 2	2012 CHTS	2012 ACS 5 Year	VMIP 1		CTPP 2010
Residence Type			*resty*	*B25024 (BG)*			
		RUG1 (SF)	01 1, detached	RU1	RU1	1, detached	SF detached (RU1)
			02 1, attached	RU2	RU2	1, attached	SF attached (RU2)
		RUG2 (MF)	04 2-4 units	RU3	RU3	2	MF 2-4 (RU3 + RU4)
				RU4	RU4	3 or 4	
			05 5-19 units	RU5	RU5	5 to 9	MF 5-19 (RU5 + RU6)
				RU6	RU6	10 to 19	
			06 20+ units	RU7	RU7	20 to 49	MF 20-49 (RU7)
				RU8	RU8	50 or more	MF 50+ (RU8)
		RUG3 (OTH)	03 Mobile home	RU9	RU9	Mobile home	MH (RU9)
			07 Boat, RV, van, etc.	RU10	RU10	Boat, RV, van, etc.	Other (RU10)
Household Size			*hhsize*	*B25009 (BG)*			
		HH1	Range is 1-15	1-person	HH1	HOUSEHOLD SIZE 1	1-person
		HH2		2-person	HH2	HOUSEHOLD SIZE 2	2-person
		HH3		3-person	HH3	HOUSEHOLD SIZE 3	3-person
		HH4		4-person	HH4	HOUSEHOLD SIZE 4	4-or-more-person
		HH5		5-person	HH5	HOUSEHOLD SIZE 5	
				6-person	HH6	HOUSEHOLD SIZE 6	
				7-or-more-person	HH7	HOUSEHOLD SIZE 7 or more	
				Total Households	TOTHH	TOTAL HOUSEHOLD	
Household Vehicles			*hhveh*	*B25044 (BG)*			
		Veh0	Range is 0-15	No vehicle available	Veh0	No vehicle available	0 cars
		Veh1		1 vehicle available	Veh1	1 vehicle available	1 car
		Veh2		2 vehicles available	Veh2	2 vehicles available	2 cars

TABLE 3.2-8:
RESIDENTIAL AGGREGATION STRUCTURE FOR VMIP 2

	VMIP 2 (grouped)	VMIP 2	2012 CHTS	2012 ACS 5 Year	VMIP 1		CTPP 2010
		Veh3		3 vehicles available	Veh3	3 vehicles available	3 cars
		Veh4		4 vehicles available	Veh4	4 vehicles available	4-or-more-cars
				5 or more vehicles available	Veh5	5 or more vehicles available	
Household Income			*incom*	*S1901 (BG)*			
	INCLOW	INC1	1 Less than $10,000	Less than $10,000	INC1	Less than $10,000	Less than $15,000
			2 $10,000 - $24,999	$10,000 to $14,999	INC2	$10,000 to $14,999	
				$15,000 to $19,999	INC3	$15,000 to $24,999	$15,000-$24,999
				$20,000 to $24,999			
		INC2	3 $25,000 - $34,999	$25,000 to $29,999	INC4	$25,000 to $34,999	$25,000-$34,999
				$30,000 to $34,999			
			4 $35,000 - $49,999	$35,000 to $39,999	INC5	$35,000 to $49,999	$35,000-$49,999
				$40,000 to $44,999			
				$45,000 to $49,999			
	INCMED	INC3	5 $50,000 - $74,999	$50,000 to $59,999	INC6	$50,000 to $74,999	$50,000-$74,999
				$60,000 to $74,999			
		INC4	6 $75,000 - $99,999	$75,000 to $99,999	INC7	$75,000 to $99,999	$75,000-$99,999
	INCHIGH	INC5	7 $100,000 - $149,999	$100,000 to $124,999	INC8	$100,000 to $149,999	$100,000-$149,999
				$125,000 to $149,999			
			8 $150,000 - $199,999	$150,000 to $199,999	INC9	$150,000 to $199,999	$150,000 or more
			9 $200,000 - $249,999	$200,000 or more	INC10	$200,000 or more	
			10 $250,000 or more				
				Total, household income	TOTINC	TOTAL HH INCOME	Total, household income
Population by Age			*age*	*B01001 (BG)*	AGE		
		POP0005	*Range is 0-98, 99 for 99+*	Under 5 years		People 0 to 5 years	
		POP0514		5 to 9 years		People 5 to 14 years	
				10 to 14 years			
		POP1517		15 to 17 years		People 15 to 17 years	
		POP1824		18 and 19 years		People 18 to 24 years	
				20 years			
				21 years			
				22 to 24 years			

TABLE 3.2-8:
RESIDENTIAL AGGREGATION STRUCTURE FOR VMIP 2

	VMIP 2 (grouped)	VMIP 2	2012 CHTS	2012 ACS 5 Year	VMIP 1		CTPP 2010
		POP2554		25 to 29 years		People 25 to 54 years	
				30 to 34 years			
				35 to 39 years			
				40 to 44 years			
				45 to 49 years			
				50 to 54 years			
		POP5564		55 to 59 years		People 55 to 64 years	
				60 and 61 years			
				62 to 64 years			
		POP6574		65 and 66 years		People 65 to 74 years	
				67 to 69 years			
				70 to 74 years			
		POP75		75 to 79 years		People 75 years and over	
				80 to 84 years			
				85 years and over			
Age of head of household			*age*	*SF1-2010 H17 (ACS B19037 has fewer categories)*			
		AGE1524		Householder 15 to 24 years	Hage1	Householder 15 to 24 years	Householder 15 to 17 years
		AGE2564	*Not a separate variable but does have ages of all household members to use for calculation of this variable*	Householder 25 to 34 years	Hage2	Householder 25 to 34 years	Householder 18 to 24 years
				Householder 35 to 44 years	Hage3	Householder 35 to 44 years	Householder 25 to 44 years
				Householder 45 to 54 years	Hage4	Householder 45 to 54 years	Householder 45 to 59 years
				Householder 55 to 59 years	Hage5	Householder 55 to 59 years	Householder 60 to 64 years
				Householder 60 to 64 years	Hage6	Householder 60 to 64 years	Householder 65 to 74 years
		AGE6574		Householder 65 to 74 years	Hage7	Householder 65 to 74 years	Householder 75 years and over
		AGE75		Householder 75 to 84 years	Hage8	Householder 75 to 84 years	
				Householder 85 years and over	Hage9	Householder 85 years and over	
work trip Travel time			*totalTime (F&P created)*				
			All travel times are measured in minutes; for transit trips totalTime is a sum of IVT, waitTime, accessTime, xferTime,egressTime		TT1	Less than 10 minutes	Less than 5
					TT2	10 to 14 minutes	5 to 9 minutes
					TT3	15 to 19 minutes	15 to 19 minutes
					TT4	20 to 24 minutes	20 to 20 minutes
					TT5	25 to 29 minutes	30 to 44 minutes
					TT6	30 to 34 minutes	45 to 59 minutes
					TT7	35 to 44 minutes	60 to 74 minutes
					TT8	45 to 59 minutes	75 to 89 minutes

TABLE 3.2-8:
RESIDENTIAL AGGREGATION STRUCTURE FOR VMIP 2

	VMIP 2 (grouped)	VMIP 2	2012 CHTS	2012 ACS 5 Year		VMIP 1	CTPP 2010
				*same as VMIP 1	TT9	60 or more minutes *is available as same in CTPP *still looking for place of work by census tract	90 minutes or more **aggregate option

TABLE 3-2.9: NON-RESIDENTIAL LAND USE CATEGORY AGGREGATION STRUCTURE					
VMIP 2	**VMIP 1**	**Description**	**NAICS**	**CTPP**	**CSTDM**
EMPEDU	EDUCATION	Educational Services (Schools, Junior Colleges, Colleges, Universities, Professional Schools	61	Edu / Health	Education and health
EMPFOO	ACCOMODTNS	Accommodation	721	Arts/Rec/Accom/Food	Leisure and hospitality
	FOOD	Food Services	722	Arts/Rec/Accom/Food	Leisure and hospitality
	ENT_REC	Arts, Entertainment, and Recreation	71	Arts/Rec/Accom/Food	Leisure and hospitality
EMPGOV	PUBLIC	Public Administration	92	Government	Office
EMPIND	CONSTRUCTN	Construction	23	Construction	Primary and Secondary
	UTILITIES	Utilities	22	Trans / Util.	Trans / Util.
	SVC_OTHER	Other Services (except Public Administration)	81	Other Service	Other Service
	WHOLESALE	Wholesale Trade	42	Wholesale	Wholesale
	WAREHOUSE	Transportation and Warehousing	48-49	Trans / Util.	Trans / Util.
EMPMED	HEALTH	Health Care and Social Assistance	62	Edu / Health	Education and health

TABLE 3-2.9: NON-RESIDENTIAL LAND USE CATEGORY AGGREGATION STRUCTURE					
VMIP 2	**VMIP 1**	**Description**	**NAICS**	**CTPP**	**CSTDM**
EMPOFC	INFORMATN	Information	51	Information	Office
	FINAN_INSR	Finance and Insurance	52	FIRE	Office
	REALESTATE	Real Estate and Rental and Leasing	53	FIRE	Office
	SVC_PROF	Professional, Scientific, and Technical Services	54	Prof Sci, Admin	Office
	SVC_MNGMNT	Management of Companies and Enterprises	55	Prof Sci, Admin	Office
	SVC_ADMIN	Administrative and Support and Waste Management and Remediation Services	56	Prof Sci, Admin	Office
EMPRET	RETAIL	Retail Trade	44-45	Retail	Retail
EMPOTH	MANUFACTUR	Manufacturing	31-33	Manufacturing	Primary and Secondary
	MINING	Mining, Quarrying, and Oil and Gas Extraction	21	Ag_Mining	Primary and Secondary
EMPAGR	AGRICULTUR	Agriculture, Forestry, Fishing and Hunting	11	Ag_Mining	Primary and Secondary

APPENDIX J:

GUIDANCE ON STATIC VALIDATION

TABLE A-1:
DRAFT SUMMARY OF MODEL PERFORMANCE – STATIC VALIDATION

Model Component	Validation Statistic	Evaluation Criterion	Source	Notes, further guidance[1]	Documentation
Static Validation					
Transit Assignment	1. Difference between actual ridership to model results for entire system	+/- 20%	2010 RTP Guidelines Daily	Source of actual daily ridership: http://www.ntdprogram.gov/ntdprogram/archives.htm (National transit database for base year, typically 2008) 2010 RTP Guidelines specify difference between actual ridership to model results for a given year by route group (i.e., Local Bus, Express Bus, etc.). However, National transit database only specifies transit ridership for entire system. Valley Transit operators do not use consistent route groups.	Table
Traffic Assignment	2. % of Links within Caltrans Deviation Allowance	At Least 75%	2010 RTP Guidelines *Travel Forecasting Guidelines*, Caltrans, 1992	Source of traffic data: Vehicle count database for each County for comparison Daily, non-directional	Table, Figure of location and deviation color (valid, +1, +2, -1, -2). Graph (model validation scatter plot).
	3. % of Screenlines within Caltrans Deviation Allowance	100%	2010 RTP Guidelines *Travel Forecasting Guidelines*, Caltrans, 1992	Daily, non-directional	Table

[1] Potential solutions to unexpected results may vary-: TMIP Guidelines are the standard reference for troubleshooting and solutions: http://tmip.fhwa.dot.gov/resources/clearinghouse/docs/FHWA-HEP-10-042/FHWA-HEP-10-042.pdf

TABLE A-1:
DRAFT SUMMARY OF MODEL PERFORMANCE – STATIC VALIDATION

Model Component	Validation Statistic	Evaluation Criterion	Source	Notes, further guidance[1]	Documentation
	4. Correlation Coefficient	At Least 0.88	3.2010 RTP Guidelines *Travel Forecasting Guidelines*, Caltrans, 1992	Daily, non-directional	Table
	5. Percent Root Mean Squared Error (RMSE) (model-wide)	Below 40%	2010 RTP Guidelines	Daily, non-directional	Table
	6. Percent Root Mean Squared Error (RMSE) (functional classification)	Below 40%		No specific criteria available Daily, non-directional Functional Class: Freeway Highway Expressway Arterial Collector	Table
	7. Percent Root Mean Squared Error (RMSE) (volume range)	0-4,999 – <116% 5,000 to 9,999 – <43% 10,000 to 19,999 – <28% 20,000 to 39,999 – < 25% 40,000 to 59,000 – < 30% 60,000 to 89,999 – <-19%	Harvey, G., et al. A Manual of Regional Transportation Modeling Practice for Air Quality Analysis for the Natural Association of Regional Councils, Washington, D.C. July 1993	Is there a minimum number of counts in a volume range or functional class range that we want to consider?	Table

TABLE A-1:
DRAFT SUMMARY OF MODEL PERFORMANCE – STATIC VALIDATION

Model Component	Validation Statistic	Evaluation Criterion	Source	Notes, further guidance[1]	Documentation
	8. Model Volume to Count Ratio (model-wide)	General relationship (i.e., high or low) between model volumes and counts	2010 RTP Guidelines	Daily, non-directional *Minimum Travel Demand Model Calibration and Validation Guidelines for State of Tennessee*. FHWA - identifies that model volumes should be within 5-10% of observed traffic volumes on the highway network. This is the range reference in TMIP, *Model Validation and Reasonableness Checking Manual*, 1997 for screenlines	Table
	9. Model Volume to Count Ratio (roadway functional classification)	Freeway – +/- 7% Major Arterial – 10% Minor Arterial – 15% Collector – 25%	TMIP, *Model Validation and Reasonableness Checking Manual*, 1997	Daily, non-directional Percent difference targets for daily traffic volumes by facility type.	Table
	XX. Distribution of Class by Time of Day	Comparison to collected count data		Total vehicles trips stratified by class and time of day.	Table
	XX. Distribution of Time of Day by Class	Comparison to collected count data		Total vehicles trips stratified by time of day and class.	Table

TABLE A-1:
DRAFT SUMMARY OF MODEL PERFORMANCE – STATIC VALIDATION

Model Component	Validation Statistic	Evaluation Criterion	Source	Notes, further guidance[1]	Documentation
	10. Model Volume to Count Ratio (volume range)	<1,000 < 60% 1,000-2,500 < 47% 2,500-5,000 – <36% 5,000-10,000 – <29% 10,000-25,000 – <25% 25,000-50,000 – <22% >50,000 – <21%	TMIP, *Model Validation and Reasonableness Checking Manual*, 1997	Percent difference targets for daily traffic volumes for individual links.	Table
Reasonableness Checks					
Highway and Transit Networks	11. General roadway network and transit line coding	Reasonableness Check	TDF Model	Centerline	
Trip Generation	12. PA Balance	+/- 10% by purpose and overall	TDF Model	after including IX/XI trips	Table or bar chart comparing balance before and after adjustment
Trip Distribution	13. Zonal Trip Distribution		TDF Model	Select link assignment for gateways, TAZ near gateway, and TAZ central to model network.	Network bandwidth plots.

**TABLE A-1:
DRAFT SUMMARY OF MODEL PERFORMANCE – STATIC VALIDATION**

Model Component	Validation Statistic	Evaluation Criterion	Source	Notes, further guidance[1]	Documentation
Vehicle Availability	14.		2010 ACS (Surveys from 2006-2010) and CHTS http://www.dot.ca.gov/hq/tsip/tab/documents/travelsurveys/Final2001_StwTravelSurveyWkdayRpt.pdf	County level comparison Compare percent of households (single and multiple) with 0, 1, 2, 3+ autos CHTS includes survey data for Fresno, Kern, Merced, San Joaquin, Stanislaus, and Tulare counties. (Table 4, Pages 26 – 30)	
Feedback Loop	15.			Convergence	
Comparisons					
Land Use	16. Total Population	Within 3% (based on RHNA criteria)	Census	by income group	Bar chart comparing model to census data.
	17. Total Households	Ideally within 3% (RHNA criteria)	Census or Department of Finance	RHNA allocations are not anticipated until mid-2013	Bar chart comparing model to census data.
	18. Total Employment	Note	Department of Finance	Check reasonableness of retail jobs per household and non-retail jobs per household. Job mix?	Bar chart comparing model to census data.
Trip Generation	19. Person trip rates		CHTS, ITE	Convert person trip rates to ITE rates using Ave Veh Occ by purpose	Table
Trip Distribution	20. Average Trip Length by Purpose		CHTS	3-County model also has OD survey	Table
	21. Trip Length Frequency Distribution by Purpose		CHTS	3-County model also has OD survey	Graph for each purpose

TABLE A-1:
DRAFT SUMMARY OF MODEL PERFORMANCE – STATIC VALIDATION

Model Component	Validation Statistic	Evaluation Criterion	Source	Notes, further guidance[1]	Documentation
	XX. Percentage of IX/XI/XX trips for long-distance trips		Cellphone Inter-regional Data	Compare percentage of II/IX/XI trips from model trip tables with percentage of II/IX/XI trips from cellphone inter-regional travel data.	Table and/or Map
Trip Assignment	22. Vehicle class		Count data	Percent by class for each period Percent by time period for each class	Table
	23. VMT	+/- 5%	HPMS http://www.dot.ca.gov/hq/tsip/hpms/hpmslibrary	Compare countywide daily VMT estimate from HPMS (Table 10, Page 80) Reasonableness of comparison should be based on how the model compares to HMPS estimates. In general, The model should be VMT forecasts should be lower than the HPMS estimate, since HPMS VMT is estimated for local streets that are not in the model networks.	Table
	24. Travel Speed by Functional Classification		Existing Data	Compare by functional classification based on observed data. For all classifications, summarize average speed, minimum, and maximum. If observed data is not available, compare relative congested speed by functional class.	Table
	25. Average Travel Time by Trip Purpose		CHTS	Daily CHTS provide travel time for HBW trips and total trips. http://www.dot.ca.gov/hq/tsip/tab/documents/travelsurveys/Final2001_StwTravelSurveyWkdayRpt.pdf	Table
Mode Split	26. Mode split by purpose		CHTS	Daily	Pie chart

Source: Fehr & Peers, 2016

APPENDIX K:

MEMO ON AUTO OPERATING COST

MEMORANDUM

To: Ken Kirkey, MTC; Huasha Liu, SCAG; Gordan Garry, SACOG; Muggs Stoll, SANDAG

From: David Ory, MTC; Guoxiong Huang, SCAG; Bruce Griesenbeck, SACOG; Clint Daniels, SANDAG

Re: Automobile Operating Cost for the Second Round of Sustainable Communities Strategies

Date: October 13, 2014

This memorandum summarizes our collective thinking regarding fuel price assumptions for the second round of sustainable communities strategies (SCSs)[2].

Background

The Regional Targets Advisory Committee (or RTAC) formed by the California Air Resources Board (ARB) recommended that MPOs use "consistent long-range planning assumptions statewide, to the degree practicable, including … existing and forecasted fuel prices and automobile operating costs."[3] For the first round of sustainable communities strategies, we agreed to use the following sets of assumptions:

- Base Year Fuel Price: Region-specific, set during model calibration
- Year 2020 Fuel Price: $4.74 (Year 2009 dollars, $2009);
- Year 2035 Fuel Price: $5.24 ($2009);
- Effective Fleet-wide Fuel Efficiency: Region-specific, derived from ARB's Emission Factor (EMFAC) software;
- Year 2020 Non-fuel-related Operating Cost (if included in region-specific automobile operating cost calculations): $0.09 ($2009);

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[2] The first round beginning with SANDAG's 2011 RTP/SCS; the second round beginning with SANDAG's 2015 RTP/SCS.
[3] See page 10 of *Recommendations of the Regional Targets Advisory Committee Pursuant to Senate Bill 375: A Report to the California Air Resources Board*.

- Year 2035 Non-fuel-related Operating Cost (if included in region-specific automobile operating cost calculation): $0.11 ($2009).

This set of assumptions were used to compute the assumed perceived automobile operating cost for each MPO. The resulting values are shown in **Table 54**.

Table 49: Assumed Perceived Automobile Operating Costs ($2009) for First Round of SCSs

MPO	Base Year Cost (year)	Year 2020 Cost	Year 2035 Cost	Avg Annual Growth (Base to 2035)
SCAG	$0.23 (2005)	$0.32	$0.32	1.1%
MTC	$0.18 (2010)	$0.28	$0.28	1.8%
SACOG	$0.21 (2008)	$0.27	$0.29	1.2%
SANDAG	$0.19 (2008)	$0.22	$0.21	0.4%

Using the above assumptions, we achieved consistency in forecast year fuel price as well as the approach to computing perceived automobile operating cost. Unfortunately, we were not able to achieve consistency in base year assumptions. Achieving consistency across MPOs for base year input is more difficult than achieving consistency across forecast year input because base year input is part of the expensive and time consuming model development process.

The result of using consistent forecast year assumptions and inconsistent base year assumptions were uneven changes in the assumed increase in perceived automobile operating cost across MPOs. For example, between 2010 and 2035, MTC assumes a 1.8 percent average annual increase in perceived automobile operating cost; between 2008 and 2035, SANDAG assumes a 0.4 percent average annual increase. It is worth noting that the base year differences may reflect actual base year differences (i.e., fuel prices changing from 2005 to 2010) and do reflect regional differences in the assumed average fleet-wide fuel efficiency. In any case, the differences in growth rates make it difficult to claim that the perceived automobile operating costs were handled in a consistent manner.

Proposed Approach

Our proposed remedy for the above-described problem is *not* to try and achieve consistent base year assumptions. The model calibration process is difficult enough without adding the constraint of a single perceived automobile operating cost introduced at an unknown time in the model development cycle. Rather, we propose using a consistent growth in fuel price between the SB 375 base year of 2005 and the forecast years used in the SCS, specifically the target years 2020, and 2035. In addition, we propose using a consistent non-fuel-related operating cost as well as consistent data sources for effective fleet-wide fuel efficiency and base year gas price.

The following subsections outline the approach. Note that the below assumptions do not account for potential increases in fuel costs from California's Cap-and-Trade program.

Fuel Price Assumptions

The Department of Energy issues an annual forecast of motor vehicle gasoline prices. The 2013 forecast[4] is paired with historical information from 2005 to compute a consistent fuel price ratio that will be used by each MPO. The target value for the calculation is not the midpoint between the low and high forecast, but rather three-quarters of the way between the low and high forecasts, plus 32 cents ($2010) – the 32 cents accounts for gasoline generally being more expensive in California than the rest of the nation. These calculations are shown in **Table 55**.

Table 50: Department of Energy Forecasts and Resulting Growth Ratio (Prices in Year 2010 Dollars)

Year	Low	High	Low plus 75% Diff + 32 cents	Ratio to 2005
2005	---	---	$2.82*	---
2015	$2.70	$3.77	$3.82	1.35
2020	$2.54	$4.17	$4.08	1.45
2025	$2.53	$4.39	$4.25	1.51
2030	$2.52	$4.77	$4.53	1.61
2035	$2.53	$5.18	$4.84	1.72
2040	$2.57	$5.70	$5.24	1.86

* – Historical price taken from http://www.eia.gov/dnav/pet/pet_pri_gnd_a_epm0_pte_dpgal_a.htm, and converted to year 2010 dollars.

To compute an MPO-specific forecast year fuel price, the growth ratios in **Table 55** are paired with base year prices. We propose using base year prices from a consistent source, specifically the retail gasoline price data from the Oil Price Information Service (OPIS); these prices will be introduced during our next round of model development activities. The assumed base year prices are shown in **Table 56** for each of the MPO areas for years 2005 through 2012. These prices will be used in subsequent model development activities[5].

Table 51: Historical Gas Prices per OPIS (All prices in Year 2010 dollars)

Year*	MTC	SCAG	SACOG	SANDAG
2005	$2.83	$2.85	$2.74	$2.84

[4] The data is here: http://www.eia.gov/forecasts/archive/aeo13/source_oil.cfm.

[5] Some MPOs will be recalibrating their models and generating a "new" "forecasts" (or "backcasts") of year 2005. Others will not. Those generating new forecasts will use the fuel prices listed in **Table 56**; those not generating new forecasts will leave their prices as they were set in their model development processes.

2008	$3.68	$3.53	$3.53	$3.35
2010	$3.17	n/a	$3.09	$2.92
2012	$3.87	$3.90	$3.85	$3.64

* - The base year prices are only shown (and, in some cases, only purchased) for 2005 and potential model calibration years. For example, SCAG intends to use a 2012 calibration year, and, as such, did not purchase the year 2010 prices from OPIS.

Non-Fuel-Related Operating Costs

As noted above, the calculation of perceived automobile operating cost is assumed to have two components: fuel costs and non-fuel-related costs. Similar to the base year fuel price, we propose using base year non-fuel-related operating costs from a consistent source, specifically the American Automobile Association (AAA). The assumed non-fuel-related base year prices are shown in **Table 57**; these are national estimates that we'll assume apply to each of the MPO areas. These prices will be used in subsequent model development activities.

Table 52: Non-Fuel-Related Operating Costs (Prices in Year 2010 dollars per mile)

Year	Maintenance	Tires	Maint. + Tires
2005	$0.0437	$0.0062	$0.05
2006	$0.0453	$0.0065	$0.05
2007	$0.0437	$0.0069	$0.05
2008	$0.0452	$0.0076	$0.05
2009	$0.0447	$0.0082	$0.05
2010	$0.0444	$0.0096	$0.05
2011	$0.0461	$0.0103	$0.06
2012	$0.0524	$0.0105	$0.06

The above data can be used to estimate forecast-year non-fuel-related costs. Using a simple linear regression and extrapolation, the forecast year values shown in **Table 58** can be computed. Similar to the gasoline price, the MPOs will use the computed ratio to calculate the forecast year values from whatever values were or are assumed for year 2005.

Table 53: Forecast Year Non-Fuel-Related Operating Costs Ratios (Prices in Year 2010 dollars)

Year	Estimate	Ratio to 2005
2005	$0.050	---
2012	$0.063	1.26
2015	$0.062	1.25
2020	$0.069	1.38
2025	$0.075	1.50
2030	$0.081	1.62
2035	$0.087	1.75
2040	$0.093	1.87

Effective Fleet-wide Fuel Efficiency

The computation of perceived automobile operating cost requires an assumption be made about the effective passenger-vehicle[6] fuel efficiency. ARB's EMFAC software provides two estimates of carbon dioxide (CO_2) emissions. The first estimate is for a hypothetical future in which fuel and vehicle regulations are not enacted; this hypothetical future is used only for computing emissions for SB 375 purposes (method A). The second estimate is for the expected future in which fuel and vehicle regulations are enacted (method B). This future is assumed for all non-SB 375 purposes, including federally-mandated conformity analyses. Unfortunately, the EMFAC software only provides a fuel consumption result for the first set (method A) of CO_2 emissions. The effective fleet-wide fuel efficiency needs to be calculated from the second estimate. Each MPO will use the following equation to compute the effective fleet-wide fuel efficiency:

$$FE = \frac{VMT}{\frac{(CO_2)_B \cdot FLCFS}{(CO_2)_A} \cdot FC_A}$$

where VMT is passenger-vehicle miles traveled, $(CO_2)_A$ is the passenger-vehicle CO_2 estimate from method A, $(CO_2)_B$ is the passenger-vehicle CO_2 estimate from method B, and FC_A is the passenger-vehicle fuel consumption from method A. FLCFS is an adjustment factor to account for Low Carbon Fuel Standards (LCFS) CO_2 reduction factors assumed in EMFAC 2011. LCFS is a fuel standard that requires a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020 (see Table 5-2, http://www.arb.ca.gov/msei/emfac2011-technical-documentation-final-updated-0712-v03.pdf). FLCFS is set at 1.11 to offset this reduction factor in the fuel efficiency calculations as the reduction

[6] Defined as EMFAC vehicle types LDA, LDT1, LDT2, and MDV.

from LCFS is related to carbon content rather than fuel consumption. The calculation assumes a linear relationship between CO_2 emissions and fuel consumption.

Using the effective fuel efficiency derived from EMFAC presents a "chicken or egg" problem, as one cannot generate the fuel-efficiency estimate unless an input assumption about operating cost is made, but the operating cost assumption requires a fuel-efficiency estimate. In practice, each MPO will select a representative fuel efficiency estimate during the SCS development process that will be carried through SCS adoption.

Region-Specific Calculations

Detailed calculations are provided below for each of the MPO regions. The regions differ as to whether they will update the year 2005 simulation results using the prices presented in **Table 56** and **Table 57**; either way, consistent ratios for fuel prices (presented in **Table 55**) and non-fuel-related prices (**Table 58**) are applied to either the updated or non-updated 2005 assumptions.

MTC: Assuming updated Year 2005 Simulation Results

Using the above information, MTC will compute the year 2005, 2020, and 2035 perceived automobile operating cost estimates using the approach detailed in **Table 59**.

Table 54: MTC Region Example Calculations Assuming Updated 2005 Results (Prices in Year 2010 dollars)

Year	Quantity	Value
2005	Region-specific fuel price (Table 56, dollars per mile)	$2.83
	Non-fuel-related price (Table 57, dollars per mile)	$0.05
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	20.09
	Perceived automobile operating cost (cents per mile)	19.1¢
2020	Consistent fuel price ratio (Table 55)	1.45
	Region-specific fuel price (Ratio x 2005 price)	$4.09
	Consistent non-fuel-related price ratio (Table 58)	1.38
	Region-specific non-fuel-related price	$0.07
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	25.15[†]
	Perceived automobile operating cost (cents per mile)	23.1¢
2035	Consistent fuel price ratio (Table 55)	1.72
	Region-specific fuel price (Ratio x 2005 price)	$4.85
	Consistent non-fuel-related price ratio (Table 58)	1.75

	Region-specific non-fuel-related price	$0.09
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	28.85[†]
	Perceived automobile operating cost (cents per mile)	25.6¢

[†] - Value may change during the planning process.

SCAG: Assuming Updated Year 2005 Simulation Results

Using the information contained in this memorandum, SCAG will compute the year 2020 and 2035 perceived automobile operating cost estimates using the approach detailed in **Table 61**.

Table 55: SCAG Region Example Calculations (Prices in Year 2010 dollars)

Year	Quantity	Value
2005	Region-specific fuel price (Table 56, dollars per gallon)	$2.85
	Non-fuel-related price (Table 57, dollars per mile)	$0.05
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	18.63
	Perceived automobile operating cost (cents per mile)	20.3¢
2020	Consistent fuel price ratio (Table 55)	1.45
	Region-specific fuel price (Ratio x 2005 price)	$4.12
	Consistent non-fuel-related price ratio (Table 58)	1.38
	Region-specific non-fuel-related price	$0.07
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	23.63†
	Perceived automobile operating cost (cents per mile)	24.3¢
2035	Consistent fuel price ratio (Table 55)	1.72
	Region-specific fuel price (Ratio x 2005 price)	$4.89
	Consistent non-fuel-related price ratio (Table 58)	1.75
	Region-specific non-fuel-related price	$0.09
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	26.40†
	Perceived automobile operating cost (cents per mile)	27.3¢

† - Value may change during the planning process.

SACOG: Assuming Static Year 2005 Simulation Results

Using the information contained in this memorandum, SACOG will compute the year 2020 and 2035 perceived automobile operating cost estimates using the approach detailed in **Table 61**.

Table 56: SACOG Region Example Calculations (Prices in Year 2010 dollars)

Year	Quantity	Value
2005	Region-specific fuel price (Table 3, dollars per gallon)	$2.74
	Non-fuel-related price (Table 4, dollars per mile)	$0.05
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	19.50
	Perceived automobile operating cost (cents per mile)	19.1¢
2020	Consistent fuel price ratio (Table 55)	1.45
	Region-specific fuel price (Ratio x 2005 price)	$3.96
	Consistent non-fuel-related price ratio (Table 58)	1.38
	Region-specific non-fuel-related price	$0.07
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	24.92†
	Perceived automobile operating cost (cents per mile)	22.8¢
2035	Consistent fuel price ratio (Table 55)	1.72
	Region-specific fuel price (Ratio x 2005 price)	$4.70
	Consistent non-fuel-related price ratio (Table 58)	1.75
	Region-specific non-fuel-related price	$0.09
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	28.30†
	Perceived automobile operating cost (cents per mile)	25.4¢

† - Value may change during the planning process.

SANDAG: Assuming Static Year 2005 Simulation Results

Using the information contained in this memorandum, SANDAG will compute the year 2020 and 2035 perceived automobile operating cost estimates using the approach detailed in **Table 62**.

Table 57: SANDAG Region Example Calculations (Prices in Year 2010 dollars)

Year	Quantity	Value
2005	Region-specific fuel price (Table 56, dollars per gallon)	$2.84
	Non-fuel-related price (Table 57, dollars per mile)	$0.05
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	18.89
	Perceived automobile operating cost (cents per mile)	20.0¢
2020	Consistent fuel price ratio (Table 55)	1.45
	Region-specific fuel price (Ratio x 2005 price)	$4.11
	Consistent non-fuel-related price ratio (Table 58)	1.38
	Region-specific non-fuel-related price	$0.07
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	23.98†
	Perceived automobile operating cost (cents per mile)	24.0¢
2035	Consistent fuel price ratio (Table 55)	1.72
	Region-specific fuel price (Ratio x 2005 price)	$4.87
	Consistent non-fuel-related price ratio (Table 58)	1.75
	Region-specific non-fuel-related price	$0.09
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	27.20†
	Perceived automobile operating cost (cents per mile)	26.7¢

† - Value may change during the planning process.

Comparisons across SCS Rounds

Table 63 compares the fuel price and resulting automobile operating cost results across SCS rounds for each MPO *assuming* the effective fleet-wide fuel efficiency number remains unchanged from the first to second round – this number will change during the planning process.

Table 58: Fuel Price and Automobile Operating Cost Comparison across SCS Rounds (Prices in Year 2010 Dollars)

Year	Quantity	MTC		SCAG		SANDAG		SACOG	
		Rnd 1	Rnd 2	Rnd 1	Rnd 2	Rnd 1	Rnd 2	Rnd 1	Rnd 2
2005	Fuel price	$2.79	$2.83	$2.83	$2.85	$2.68	$2.84	$2.70	$2.74
	Auto. Oper. Cost	21.2¢	19.1¢	23.8¢	20.3¢	19.2¢	18.9¢	19.7¢	19.1¢
2020	Fuel price	$4.74	$4.09	$4.74	$4.12	$4.74	$4.11	$4.74	$3.96
	Auto. Oper. cost	28.7¢	23.1¢	31.9¢	24.3¢	22.6¢	24.0¢	27.0¢	22.8¢
2035	Fuel price	$5.24	$4.85	$5.24	$4.89	$5.24	$4.87	$5.24	$4.70
	Auto. Oper. cost	28.6¢	25.6¢	32.3¢	27.3¢	21.7¢	26.7¢	28.9¢	25.4¢
Ratios	2020 to 2005	1.34	1.21	1.34	1.20	1.18	1.20	1.37	1.20
	2035 to 2005	1.33	1.34	1.36	1.34	1.13	1.33	1.47	1.33

Next Steps

This memorandum proposes a consistent approach for computing fuel price for each of our MPOs for the second round of sustainable community strategies. After collecting your feedback and modifying our approach accordingly, we will share this approach with ARB and the other MPOs across the state.

APPENDIX L:

CALIBRATED PARAMETERS

Auto Operating Cost

	Fresno	Kern	Kings	Madera	TCM	Tulare
2005	19.12	20.43	19.13	19.79	19.56	19.48
2006	20.68	20.68	20.68	20.68	20.68	20.68
2007	22.23	22.23	22.23	22.23	22.23	22.23
2008	23.78	25.75	23.82	24.61	24.45	24.86
2009	22.63	22.63	22.63	22.63	22.63	22.63
2010	21.48	22.96	21.50	22.17	22.08	21.99
2011	21.70	21.70	21.70	21.70	21.70	21.70
2012	21.92	21.92	21.92	21.92	21.92	21.92
2013	22.14	22.14	22.14	22.14	22.14	22.14
2014	22.36	22.36	22.36	22.36	22.36	22.36
2015	22.58	22.58	22.58	22.58	22.58	22.58
2016	22.80	22.80	22.80	22.80	22.80	22.80
2017	23.02	23.02	23.02	23.02	23.02	23.02
2018	23.24	23.24	23.24	23.24	23.24	23.24
2019	23.46	23.46	23.46	23.46	23.46	23.46
2020	23.68	24.81	23.22	24.87	24.45	24.35
2021	23.57	23.57	23.57	23.57	23.57	23.57
2022	23.46	23.46	23.46	23.46	23.46	23.46
2023	23.36	23.36	23.36	23.36	23.36	23.36
2024	23.25	23.25	23.25	23.25	23.25	23.25
2025	23.14	23.14	23.14	23.14	23.14	23.14
2026	23.03	23.03	23.03	23.03	23.03	23.03
2027	22.93	22.93	22.93	22.93	22.93	22.93
2028	22.82	22.82	22.82	22.82	22.82	22.82
2029	22.71	22.71	22.71	22.71	22.71	22.71
2030	22.60	22.60	22.60	22.60	22.60	22.60
2031	22.50	22.50	22.50	22.50	22.50	22.50
2032	22.39	22.39	22.39	22.39	22.39	22.39
2033	22.28	22.28	22.28	22.28	22.28	22.28
2034	22.17	22.17	22.17	22.17	22.17	22.17
2035	22.07	23.07	21.84	23.29	22.54	22.47
2036	22.29	22.29	22.29	22.29	22.29	22.29
2037	22.52	22.52	22.52	22.52	22.52	22.52
2038	22.74	22.74	22.74	22.74	22.74	22.74
2039	22.97	22.97	22.97	22.97	22.97	22.97
2040	23.19	24.28	22.96	24.47	23.66	23.58

		Fresno	Kern	Kings	Madera	TCM			Tulare	MTC	SCAG	SACOG	SANDAG
						Merced	San Joaquin	Stanislaus					
2005	Region-specific fuel price[1] (dollars per gallon)	$ 2.81	$ 2.79	$ 2.78	$ 2.82	$ 2.84	$ 2.82	$ 2.84	$ 2.88	2.83	2.85	2.74	2.84
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	19.87	18.09	19.66	19.05	19.47	19.47	19.47	19.2	20.09	18.3	19.5	18.89
	Fuel related automobile operating cost (dollars per mile)	$ 0.14	$ 0.15	$ 0.14	$ 0.15	$ 0.15	$ 0.14	$ 0.15	$ 0.15				
	Non-fuel-related price[2] (dollars per mile)	$ 0.05	$ 0.05	$ 0.05	$ 0.05	$ 0.05	$ 0.05	$ 0.05	$ 0.05	$ 0.05	$ 0.05	$ 0.05	$ 0.05
	Perceived automobile operating cost (cents per mile)	19.12	20.43	19.13	19.79	19.56	19.48	19.58	20.00	19.1	20.3	19.1	20
2008	Region-specific fuel price[1] (dollars per gallon)	$ 3.65	$ 3.63	$ 3.61	$ 3.67	$ 3.69	$ 3.67	$ 3.69	$ 3.75	3.68	3.53	3.53	3.35
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	19.74	17.74	19.49	18.97	19.21	19.21	19.21	19.14				
	Fuel related automobile operating cost (cents per mile)	$ 0.19	$ 0.20	$ 0.19	$ 0.19	$ 0.19	$ 0.19	$ 0.19	$ 0.20				
	Non-fuel-related price[2] (dollars per mile)	$ 0.05	$ 0.05	$ 0.05	$ 0.05	$ 0.05	$ 0.05	$ 0.05	$ 0.05				
	Perceived automobile operating cost (cents per mile)	23.78	25.75	23.82	24.61	24.49	24.38	24.50	24.86				
2010	Region-specific fuel price[1] (dollars per gallon)	$ 3.15	$ 3.13	$ 3.11	$ 3.16	$ 3.18	$ 3.16	$ 3.18	$ 3.23	3.17	n/a	3.09	2.92
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	19.57	17.81	19.34	18.83	19.05	19.05	19.05	18.95				
	Fuel related automobile operating cost (cents per mile)	$ 0.16	$ 0.18	$ 0.16	$ 0.17	$ 0.17	$ 0.17	$ 0.17	$ 0.17				
	Non-fuel-related price[2] (dollars per mile)	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054				
	Perceived automobile operating cost (cents per mile)	21.48	22.96	21.50	22.17	22.08	21.99	22.10	22.44				
2020	Region-specific fuel price[1] (dollars per gallon)	$ 4.06	$ 4.04	$ 4.02	$ 4.07	$ 4.10	$ 4.08	$ 4.10	$ 4.17	4.09	4.12	3.96	4.1
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	24.19	22.53	24.61	22.68	23.37	23.37	23.37	24.17	25.15	23.63	24.92	23.98
	Fuel related automobile operating cost (cents per mile)	$ 0.17	$ 0.18	$ 0.16	$ 0.18	$ 0.18	$ 0.17	$ 0.18	$ 0.17				
	Non-fuel-related price[2] (dollars per mile)	$ 0.07	$ 0.07	$ 0.07	$ 0.07	$ 0.07	$ 0.07	$ 0.07	$ 0.07	$ 0.07	$ 0.07	$ 0.07	$ 0.07
	Perceived automobile operating cost (cents per mile)	23.68	24.81	23.22	24.87	24.45	24.35	24.46	24.14	23.1	24.3	22.8	24
2035	Region-specific fuel price[1] (dollars per gallon)	$ 4.81	$ 4.79	$ 4.76	$ 4.83	$ 4.86	$ 4.83	$ 4.87	$ 4.94	4.85	4.89	4.7	4.87
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	36.01	33.3	36.24	33.11	35.12	35.12	35.12	36.97	28.85	26.4	28.3	27.2
	Fuel related automobile operating cost (cents per mile)	$ 0.13	$ 0.14	$ 0.13	$ 0.15	$ 0.14	$ 0.14	$ 0.14	$ 0.13				
	Non-fuel-related price[2] (dollars per mile)	$ 0.09	$ 0.09	$ 0.09	$ 0.09	$ 0.09	$ 0.09	$ 0.09	$ 0.09	$ 0.09	0.087	0.087	0.087
	Perceived automobile operating cost (cents per mile)	22.07	23.07	21.84	23.29	22.54	22.47	22.56	22.06	25.6	27.3	25.4	26.7
2040	Region-specific fuel price[1] (dollars per gallon)	$ 5.21	$ 5.18	$ 5.15	$ 5.22	$ 5.26	$ 5.23	$ 5.26	$ 5.34				
	Effective passenger vehicle fuel efficiency (EMFAC, miles per gallon)	37.46	34.55	37.7	34.45	36.62	36.62	36.62	38.61				
	Fuel related automobile operating cost (cents per mile)	$ 0.14	$ 0.15	$ 0.14	$ 0.15	$ 0.14	$ 0.14	$ 0.14	$ 0.14				
	Non-fuel-related price[2] (dollars per mile)	$ 0.09	$ 0.09	$ 0.09	$ 0.09	$ 0.09	$ 0.09	$ 0.09	$ 0.09				
	Perceived automobile operating cost (cents per mile)	23.19	24.28	22.96	24.47	23.66	23.58	23.67	23.14				

Based on the memo prepared by MTC, SCAG, SACOG, and SANDAG in October 2014 titled Automobile Operating Cost for the Second Round of Sustainable Communities Strategies.

Notes
1. See Table 2 of *Automobile Operating Cost for the Second Round of Sustainable Communities Strategies*
2. See Table 5 of *Automobile Operating Cost for the Second Round of Sustainable Communities Strategies*

;Index	Veh0	Veh1	Veh2	Veh3	Veh4	key
1	0	0	0	0	0	;Alt-specific Constant (set in calibration)
2	7.51	3.95	0	0	0	;commute_cost_ratio
3	0.0093	0	0	-0.0036	-0.0036	;ped-oriented intersection density
4	0.000009	0.00001	0	-5.1E-05	-0.000112	;transit accessibility
5	0.39	0.24	0	0	-0.19	;log employment density
11	0	0	0	0	0	;RU_group=RUG1
12	1.27	0.53	0	-1.53	-1.53	;RU_group=RUG3
13	0.27	0.27	0	0	0	;RU_group=RUG6
21	-1.16	1.5	0	-3.15	-4.94	;HH_size=HH1
22	-3.03	-0.42	0	-2.26	-4.19	;HH_size=HH2
23	-3.37	-0.24	0	-1.34	-3.4	;HH_size=HH3
24	-4.02	-0.66	0	-1.61	-3.13	;HH_size=HH4
25	-3.5	-0.89	0	-1.32	-2.44	;HH_size=HH5
31	0	0	0	0	0	;HH_inc=IncG1
32	-1.33	-0.28	0	0.86	0.98	;HH_inc=IncG2
33	-3.87	-0.93	0	1.2	2.35	;HH_inc=IncG3
34	-2.98	-1.55	0	1.55	2.35	;HH_inc=IncG4
35	-4.23	-1.96	0	1.44	2.87	;HH_inc=IncG5

/* Area Type	LU Code	LU_Type	HW_P	HS_P	HK_P	HC_P	HO_P	WO_P	OO_P	HY_P	TS_P	TM_P	TH_P	HW_A	HS_A	HK_A	HC_A	HO_A	WO_A
1	1001	TOTHH	0.293	0.26	0	0	0.426	0	0	0	0	0	0	0	0	0	0	0	0
1	1002	HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1003	GQPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1004	RU1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1005	RU3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1006	RU6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1007	RUSPARE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1008	RUSPARE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1009	RUSPARE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1010	RUSPARE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1011	RU1_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1012	RU3_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1013	RU9_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1014	RU7SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1015	RU8SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1016	RU9SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1017	RU10SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1018	RU1_HHSIZE1_INC1	0.741	0.66	0	0	1.077	0	0	0	0	0	0	0	0	0	0	0	0
1	1019	RU1_HHSIZE1_INC2	0.741	0.66	0	0	1.077	0	0	0	0	0	0	0	0	0	0	0	0
1	1020	RU1_HHSIZE1_INC3	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
1	1021	RU1_HHSIZE1_INC4	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
1	1022	RU1_HHSIZE1_INC5	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
1	1023	RU1_HHSIZE2_INC1	1.247	1.1	0	0	1.817	0	0	0	0	0	0	0	0	0	0	0	0
1	1024	RU1_HHSIZE2_INC2	1.247	1.1	0	0	1.817	0	0	0	0	0	0	0	0	0	0	0	0
1	1025	RU1_HHSIZE2_INC3	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
1	1026	RU1_HHSIZE2_INC4	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
1	1027	RU1_HHSIZE2_INC5	0.947	1.36	0	0	1.837	0	0	0	0	0	0	0	0	0	0	0	0
1	1028	RU1_HHSIZE3_INC1	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
1	1029	RU1_HHSIZE3_INC2	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
1	1030	RU1_HHSIZE3_INC3	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
1	1031	RU1_HHSIZE3_INC4	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
1	1032	RU1_HHSIZE3_INC5	1.71	2.46	0	0	3.319	0	0	0	0	0	0	0	0	0	0	0	0
1	1033	RU1_HHSIZE4_INC1	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
1	1034	RU1_HHSIZE4_INC2	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
1	1035	RU1_HHSIZE4_INC3	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
1	1036	RU1_HHSIZE4_INC4	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
1	1037	RU1_HHSIZE4_INC5	2.07	2.97	0	0	4.009	0	0	0	0	0	0	0	0	0	0	0	0
1	1038	RU1_HHSIZE5_INC1	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
1	1039	RU1_HHSIZE5_INC2	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
1	1040	RU1_HHSIZE5_INC3	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
1	1041	RU1_HHSIZE5_INC4	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
1	1042	RU1_HHSIZE5_INC5	2.753	3.95	0	0	5.329	0	0	0	0	0	0	0	0	0	0	0	0
1	1043	RU3_HHSIZE1_INC1	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
1	1044	RU3_HHSIZE1_INC2	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
1	1045	RU3_HHSIZE1_INC3	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
1	1046	RU3_HHSIZE1_INC4	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
1	1047	RU3_HHSIZE1_INC5	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
1	1048	RU3_HHSIZE2_INC1	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
1	1049	RU3_HHSIZE2_INC2	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
1	1050	RU3_HHSIZE2_INC3	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
1	1051	RU3_HHSIZE2_INC4	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
1	1052	RU3_HHSIZE2_INC5	0.947	1.36	0	0	1.837	0	0	0	0	0	0	0	0	0	0	0	0
1	1053	RU3_HHSIZE3_INC1	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
1	1054	RU3_HHSIZE3_INC2	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
1	1055	RU3_HHSIZE3_INC3	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
1	1056	RU3_HHSIZE3_INC4	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
1	1057	RU3_HHSIZE3_INC5	1.71	2.46	0	0	3.319	0	0	0	0	0	0	0	0	0	0	0	0
1	1058	RU3_HHSIZE4_INC1	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
1	1059	RU3_HHSIZE4_INC2	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
1	1060	RU3_HHSIZE4_INC3	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
1	1061	RU3_HHSIZE4_INC4	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
1	1062	RU3_HHSIZE4_INC5	2.07	2.97	0	0	4.009	0	0	0	0	0	0	0	0	0	0	0	0
1	1063	RU3_HHSIZE5_INC1	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
1	1064	RU3_HHSIZE5_INC2	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
1	1065	RU3_HHSIZE5_INC3	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
1	1066	RU3_HHSIZE5_INC4	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
1	1067	RU3_HHSIZE5_INC5	2.753	3.95	0	0	5.329	0	0	0	0	0	0	0	0	0	0	0	0
1	1068	RU9_HHSIZE1_INC1	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
1	1069	RU9_HHSIZE1_INC2	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
1	1070	RU9_HHSIZE1_INC3	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0

/* Area Type	LU Code	LU_Type	HW_P	HS_P	HK_P	HC_P	HO_P	WO_P	OO_P	HY_P	TS_P	TM_P	TH_P	HW_A	HS_A	HK_A	HC_A	HO_A	WO_A
1	1071	RU9_HHSIZE1_INC4	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
1	1072	RU9_HHSIZE1_INC5	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
1	1073	RU9_HHSIZE2_INC1	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
1	1074	RU9_HHSIZE2_INC2	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
1	1075	RU9_HHSIZE2_INC3	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
1	1076	RU9_HHSIZE2_INC4	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
1	1077	RU9_HHSIZE2_INC5	0.947	1.36	0	0	1.837	0	0	0	0	0	0	0	0	0	0	0	0
1	1078	RU9_HHSIZE3_INC1	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
1	1079	RU9_HHSIZE3_INC2	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
1	1080	RU9_HHSIZE3_INC3	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
1	1081	RU9_HHSIZE3_INC4	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
1	1082	RU9_HHSIZE3_INC5	1.71	2.46	0	0	3.319	0	0	0	0	0	0	0	0	0	0	0	0
1	1083	RU9_HHSIZE4_INC1	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
1	1084	RU9_HHSIZE4_INC2	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
1	1085	RU9_HHSIZE4_INC3	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
1	1086	RU9_HHSIZE4_INC4	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
1	1087	RU9_HHSIZE4_INC5	2.07	2.97	0	0	4.009	0	0	0	0	0	0	0	0	0	0	0	0
1	1088	RU9_HHSIZE5_INC1	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
1	1089	RU9_HHSIZE5_INC2	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
1	1090	RU9_HHSIZE5_INC3	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
1	1091	RU9_HHSIZE5_INC4	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
1	1092	RU9_HHSIZE5_INC5	2.753	3.95	0	0	5.329	0	0	0	0	0	0	0	0	0	0	0	0
1	1093	RU1_AGE1524	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1094	RU1_AGE2564	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1095	RU1_AGE6574	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1096	RU1_AGE75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1097	RU3_AGE1524	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1098	RU3_AGE2564	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1099	RU3_AGE6574	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1100	RU3_AGE75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1101	RU9_AGE1524	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1102	RU9_AGE2564	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1103	RU9_AGE6574	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1104	RU9_AGE75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1105	POP0005	0	0	0.04	0	0	0	0	0	0	0	0	0	0	0.049	0	0.03	0.0361815
1	1106	POP0514	0	0	0.34	0	0	0	0	0	0	0	0	0	0	0.391	0	0.25	0.3186756
1	1107	POP1517	0	0	0.12	0.46	0	0	0	0	0	0	0	0	0	0	0.41	0	0
1	1108	POP1824	0	0	0	0.24	0	0	0	0	0	0	0	0	0	0	0.079	0	0
1	1109	POP2554	0	0	0	0.02	0	0	0	0	0	0	0	0	0	0	0.01	0	0
1	1110	POP5564	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1111	POP6574	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1112	POP75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1113	EMPEDU	0	0	0	0	0	0	0	0	0	0	0	0.74	0	0	0	0	0
1	1114	EMPFOO	0	0	0	0	0	4.764	8.998	0	0	0	0	1.26	11.07	0	0	8.57	2.699697
1	1115	EMPGOV	0	0	0	0	0	1.311	0.734	0	0	0	0	3.11	0	0	0	2.58	0.7862519
1	1116	EMPIND	0	0	0	0	0	0	0	0	0	0	0	2.04	0	0	0	1.79	0
1	1117	EMPMED	0	0	0	0	0	0.637	0.349	0	0	0	0	1.51	0	0	0	1.26	0.3799058
1	1118	EMPOFC	0	0	0	0	0	0.831	0.469	0	0	0	0	1.98	0	0	0	1.64	0.5037579
1	1119	EMPOTH	0	0	0	0	0	0	0	0	0	0	0	0.62	0	0	0	0.54	0
1	1120	EMPRET	0	0	0	0	0	3.573	6.748	0	0	0	0	0.94	8.3	0	0	6.43	2.0247727
1	1121	EMPAGR	0	0	0	0	0	0	0	0	0	0	0	0.62	0	0	0	0.54	0
1	1122	POPDORM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1123	POPASSIST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1124	POPMILITARY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1125	EMPSPARE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1126	EMPSPARE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1127	EMPSPARE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1128	EMPSPARE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1129	EMPSPARE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1130	EMPSPARE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1131	EMPSPARE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1132	EMPSPARE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1133	ELEM	0	0	1.01	0	0	0	0	0	0	0	0	0	0	1.171	0	0.75	0.9448939
1	1134	HS	0	0	0.44	1.75	0	0	0	0	0	0	0	0	0	0	1.543	0	0
1	1135	COLLEGE	0	0	0	0.28	0	0	0	0	0	0	0	0	0	0	0.097	0	0
2	2001	TOTHH	0.293	0.26	0	0	0.426	0	0	0	0	0	0	0	0	0	0	0	0
2	2002	HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2003	GQPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2004	RU1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2005	RU3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

/* Area Type	LU Code	LU_Type	HW_P	HS_P	HK_P	HC_P	HO_P	WO_P	OO_P	HY_P	TS_P	TM_P	TH_P	HW_A	HS_A	HK_A	HC_A	HO_A	WO_A
2	2006	RU6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2007	RUSPARE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2008	RUSPARE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2009	RUSPARE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2010	RUSPARE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2011	RU1_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2012	RU3_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2013	RU9_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2014	RU7SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2015	RU8SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2016	RU9SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2017	RU10SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2018	RU1_HHSIZE1_INC1	0.741	0.66	0	0	1.077	0	0	0	0	0	0	0	0	0	0	0	0
2	2019	RU1_HHSIZE1_INC2	0.741	0.66	0	0	1.077	0	0	0	0	0	0	0	0	0	0	0	0
2	2020	RU1_HHSIZE1_INC3	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
2	2021	RU1_HHSIZE1_INC4	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
2	2022	RU1_HHSIZE1_INC5	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
2	2023	RU1_HHSIZE2_INC1	1.247	1.1	0	0	1.817	0	0	0	0	0	0	0	0	0	0	0	0
2	2024	RU1_HHSIZE2_INC2	1.247	1.1	0	0	1.817	0	0	0	0	0	0	0	0	0	0	0	0
2	2025	RU1_HHSIZE2_INC3	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
2	2026	RU1_HHSIZE2_INC4	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
2	2027	RU1_HHSIZE2_INC5	0.947	1.36	0	0	1.837	0	0	0	0	0	0	0	0	0	0	0	0
2	2028	RU1_HHSIZE3_INC1	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
2	2029	RU1_HHSIZE3_INC2	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
2	2030	RU1_HHSIZE3_INC3	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
2	2031	RU1_HHSIZE3_INC4	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
2	2032	RU1_HHSIZE3_INC5	1.71	2.46	0	0	3.319	0	0	0	0	0	0	0	0	0	0	0	0
2	2033	RU1_HHSIZE4_INC1	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
2	2034	RU1_HHSIZE4_INC2	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
2	2035	RU1_HHSIZE4_INC3	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
2	2036	RU1_HHSIZE4_INC4	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
2	2037	RU1_HHSIZE4_INC5	2.07	2.97	0	0	4.009	0	0	0	0	0	0	0	0	0	0	0	0
2	2038	RU1_HHSIZE5_INC1	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
2	2039	RU1_HHSIZE5_INC2	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
2	2040	RU1_HHSIZE5_INC3	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
2	2041	RU1_HHSIZE5_INC4	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
2	2042	RU1_HHSIZE5_INC5	2.753	3.95	0	0	5.329	0	0	0	0	0	0	0	0	0	0	0	0
2	2043	RU3_HHSIZE1_INC1	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
2	2044	RU3_HHSIZE1_INC2	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
2	2045	RU3_HHSIZE1_INC3	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
2	2046	RU3_HHSIZE1_INC4	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
2	2047	RU3_HHSIZE1_INC5	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
2	2048	RU3_HHSIZE2_INC1	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
2	2049	RU3_HHSIZE2_INC2	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
2	2050	RU3_HHSIZE2_INC3	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
2	2051	RU3_HHSIZE2_INC4	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
2	2052	RU3_HHSIZE2_INC5	0.947	1.36	0	0	1.837	0	0	0	0	0	0	0	0	0	0	0	0
2	2053	RU3_HHSIZE3_INC1	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
2	2054	RU3_HHSIZE3_INC2	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
2	2055	RU3_HHSIZE3_INC3	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
2	2056	RU3_HHSIZE3_INC4	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
2	2057	RU3_HHSIZE3_INC5	1.71	2.46	0	0	3.319	0	0	0	0	0	0	0	0	0	0	0	0
2	2058	RU3_HHSIZE4_INC1	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
2	2059	RU3_HHSIZE4_INC2	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
2	2060	RU3_HHSIZE4_INC3	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
2	2061	RU3_HHSIZE4_INC4	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
2	2062	RU3_HHSIZE4_INC5	2.07	2.97	0	0	4.009	0	0	0	0	0	0	0	0	0	0	0	0
2	2063	RU3_HHSIZE5_INC1	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
2	2064	RU3_HHSIZE5_INC2	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
2	2065	RU3_HHSIZE5_INC3	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
2	2066	RU3_HHSIZE5_INC4	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
2	2067	RU3_HHSIZE5_INC5	2.753	3.95	0	0	5.329	0	0	0	0	0	0	0	0	0	0	0	0
2	2068	RU9_HHSIZE1_INC1	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
2	2069	RU9_HHSIZE1_INC2	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
2	2070	RU9_HHSIZE1_INC3	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
2	2071	RU9_HHSIZE1_INC4	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
2	2072	RU9_HHSIZE1_INC5	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
2	2073	RU9_HHSIZE2_INC1	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
2	2074	RU9_HHSIZE2_INC2	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
2	2075	RU9_HHSIZE2_INC3	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0

/* Area Type	LU Code	LU_Type	HW_P	HS_P	HK_P	HC_P	HO_P	WO_P	OO_P	HY_P	TS_P	TM_P	TH_P	HW_A	HS_A	HK_A	HC_A	HO_A	WO_A
2	2076	RU9_HHSIZE2_INC4	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
2	2077	RU9_HHSIZE2_INC5	0.947	1.36	0	0	1.837	0	0	0	0	0	0	0	0	0	0	0	0
2	2078	RU9_HHSIZE3_INC1	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
2	2079	RU9_HHSIZE3_INC2	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
2	2080	RU9_HHSIZE3_INC3	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
2	2081	RU9_HHSIZE3_INC4	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
2	2082	RU9_HHSIZE3_INC5	1.71	2.46	0	0	3.319	0	0	0	0	0	0	0	0	0	0	0	0
2	2083	RU9_HHSIZE4_INC1	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
2	2084	RU9_HHSIZE4_INC2	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
2	2085	RU9_HHSIZE4_INC3	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
2	2086	RU9_HHSIZE4_INC4	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
2	2087	RU9_HHSIZE4_INC5	2.07	2.97	0	0	4.009	0	0	0	0	0	0	0	0	0	0	0	0
2	2088	RU9_HHSIZE5_INC1	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
2	2089	RU9_HHSIZE5_INC2	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
2	2090	RU9_HHSIZE5_INC3	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
2	2091	RU9_HHSIZE5_INC4	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
2	2092	RU9_HHSIZE5_INC5	2.753	3.95	0	0	5.329	0	0	0	0	0	0	0	0	0	0	0	0
2	2093	RU1_AGE1524	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2094	RU1_AGE2564	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2095	RU1_AGE6574	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2096	RU1_AGE75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2097	RU3_AGE1524	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2098	RU3_AGE2564	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2099	RU3_AGE6574	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2100	RU3_AGE75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2101	RU9_AGE1524	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2102	RU9_AGE2564	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2103	RU9_AGE6574	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2104	RU9_AGE75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2105	POP0005	0	0	0.04	0	0	0	0	0	0	0	0	0	0	0.049	0	0.03	0.0361815
2	2106	POP0514	0	0	0.34	0	0	0	0	0	0	0	0	0	0	0.391	0	0.25	0.3186756
2	2107	POP1517	0	0	0.12	0.46	0	0	0	0	0	0	0	0	0	0	0.41	0	0
2	2108	POP1824	0	0	0	0.24	0	0	0	0	0	0	0	0	0	0	0.079	0	0
2	2109	POP2554	0	0	0	0.02	0	0	0	0	0	0	0	0	0	0	0.01	0	0
2	2110	POP5564	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2111	POP6574	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2112	POP75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2113	EMPEDU	0	0	0	0	0	0	0	0	0	0	0	0.74	0	0	0	0	0
2	2114	EMPFOO	0	0	0	0	0	4.764	8.998	0	0	0	0	1.26	11.07	0	0	8.57	2.699697
2	2115	EMPGOV	0	0	0	0	0	1.311	0.734	0	0	0	0	3.11	0	0	0	2.58	0.7862519
2	2116	EMPIND	0	0	0	0	0	0	0	0	0	0	0	2.04	0	0	0	1.79	0
2	2117	EMPMED	0	0	0	0	0	0.637	0.349	0	0	0	0	1.51	0	0	0	1.26	0.3799058
2	2118	EMPOFC	0	0	0	0	0	0.831	0.469	0	0	0	0	1.98	0	0	0	1.64	0.5037579
2	2119	EMPOTH	0	0	0	0	0	0	0	0	0	0	0	0.62	0	0	0	0.54	0
2	2120	EMPRET	0	0	0	0	0	3.573	6.748	0	0	0	0	0.94	8.3	0	0	6.43	2.0247727
2	2121	EMPAGR	0	0	0	0	0	0	0	0	0	0	0	0.62	0	0	0	0.54	0
2	2122	POPDORM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2123	POPASSIST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2124	POPMILITARY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2125	EMPSPARE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2126	EMPSPARE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2127	EMPSPARE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2128	EMPSPARE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2129	EMPSPARE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2130	EMPSPARE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2131	EMPSPARE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2132	EMPSPARE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2133	ELEM	0	0	1.01	0	0	0	0	0	0	0	0	0	0	1.171	0	0.75	0.9448939
2	2134	HS	0	0	0.44	1.75	0	0	0	0	0	0	0	0	0	0	1.543	0	0
2	2135	COLLEGE	0	0	0	0.28	0	0	0	0	0	0	0	0	0	0	0.097	0	0
3	3001	TOTHH	0.293	0.26	0	0	0.426	0	0	0	0	0	0	0	0	0	0	0	0
3	3002	HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3003	GQPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3004	RU1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3005	RU3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3006	RU6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3007	RUSPARE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3008	RUSPARE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3009	RUSPARE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3010	RUSPARE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

/* Area Type	LU Code	LU_Type	HW_P	HS_P	HK_P	HC_P	HO_P	WO_P	OO_P	HY_P	TS_P	TM_P	TH_P	HW_A	HS_A	HK_A	HC_A	HO_A	WO_A
3	3011	RU1_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3012	RU3_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3013	RU9_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3014	RU7SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3015	RU8SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3016	RU9SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3017	RU10SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3018	RU1_HHSIZE1_INC1	0.741	0.66	0	0	1.077	0	0	0	0	0	0	0	0	0	0	0	0
3	3019	RU1_HHSIZE1_INC2	0.741	0.66	0	0	1.077	0	0	0	0	0	0	0	0	0	0	0	0
3	3020	RU1_HHSIZE1_INC3	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
3	3021	RU1_HHSIZE1_INC4	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
3	3022	RU1_HHSIZE1_INC5	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
3	3023	RU1_HHSIZE2_INC1	1.247	1.1	0	0	1.817	0	0	0	0	0	0	0	0	0	0	0	0
3	3024	RU1_HHSIZE2_INC2	1.247	1.1	0	0	1.817	0	0	0	0	0	0	0	0	0	0	0	0
3	3025	RU1_HHSIZE2_INC3	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
3	3026	RU1_HHSIZE2_INC4	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
3	3027	RU1_HHSIZE2_INC5	0.947	1.36	0	0	1.837	0	0	0	0	0	0	0	0	0	0	0	0
3	3028	RU1_HHSIZE3_INC1	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
3	3029	RU1_HHSIZE3_INC2	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
3	3030	RU1_HHSIZE3_INC3	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
3	3031	RU1_HHSIZE3_INC4	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
3	3032	RU1_HHSIZE3_INC5	1.71	2.46	0	0	3.319	0	0	0	0	0	0	0	0	0	0	0	0
3	3033	RU1_HHSIZE4_INC1	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
3	3034	RU1_HHSIZE4_INC2	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
3	3035	RU1_HHSIZE4_INC3	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
3	3036	RU1_HHSIZE4_INC4	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
3	3037	RU1_HHSIZE4_INC5	2.07	2.97	0	0	4.009	0	0	0	0	0	0	0	0	0	0	0	0
3	3038	RU1_HHSIZE5_INC1	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
3	3039	RU1_HHSIZE5_INC2	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
3	3040	RU1_HHSIZE5_INC3	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
3	3041	RU1_HHSIZE5_INC4	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
3	3042	RU1_HHSIZE5_INC5	2.753	3.95	0	0	5.329	0	0	0	0	0	0	0	0	0	0	0	0
3	3043	RU3_HHSIZE1_INC1	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
3	3044	RU3_HHSIZE1_INC2	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
3	3045	RU3_HHSIZE1_INC3	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
3	3046	RU3_HHSIZE1_INC4	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
3	3047	RU3_HHSIZE1_INC5	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
3	3048	RU3_HHSIZE2_INC1	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
3	3049	RU3_HHSIZE2_INC2	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
3	3050	RU3_HHSIZE2_INC3	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
3	3051	RU3_HHSIZE2_INC4	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
3	3052	RU3_HHSIZE2_INC5	0.947	1.36	0	0	1.837	0	0	0	0	0	0	0	0	0	0	0	0
3	3053	RU3_HHSIZE3_INC1	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
3	3054	RU3_HHSIZE3_INC2	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
3	3055	RU3_HHSIZE3_INC3	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
3	3056	RU3_HHSIZE3_INC4	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
3	3057	RU3_HHSIZE3_INC5	1.71	2.46	0	0	3.319	0	0	0	0	0	0	0	0	0	0	0	0
3	3058	RU3_HHSIZE4_INC1	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
3	3059	RU3_HHSIZE4_INC2	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
3	3060	RU3_HHSIZE4_INC3	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
3	3061	RU3_HHSIZE4_INC4	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
3	3062	RU3_HHSIZE4_INC5	2.07	2.97	0	0	4.009	0	0	0	0	0	0	0	0	0	0	0	0
3	3063	RU3_HHSIZE5_INC1	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
3	3064	RU3_HHSIZE5_INC2	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
3	3065	RU3_HHSIZE5_INC3	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
3	3066	RU3_HHSIZE5_INC4	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
3	3067	RU3_HHSIZE5_INC5	2.753	3.95	0	0	5.329	0	0	0	0	0	0	0	0	0	0	0	0
3	3068	RU9_HHSIZE1_INC1	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
3	3069	RU9_HHSIZE1_INC2	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
3	3070	RU9_HHSIZE1_INC3	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
3	3071	RU9_HHSIZE1_INC4	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
3	3072	RU9_HHSIZE1_INC5	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
3	3073	RU9_HHSIZE2_INC1	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
3	3074	RU9_HHSIZE2_INC2	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
3	3075	RU9_HHSIZE2_INC3	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
3	3076	RU9_HHSIZE2_INC4	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
3	3077	RU9_HHSIZE2_INC5	0.947	1.36	0	0	1.837	0	0	0	0	0	0	0	0	0	0	0	0
3	3078	RU9_HHSIZE3_INC1	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
3	3079	RU9_HHSIZE3_INC2	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
3	3080	RU9_HHSIZE3_INC3	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0

/* Area Type	LU Code	LU_Type	HW_P	HS_P	HK_P	HC_P	HO_P	WO_P	OO_P	HY_P	TS_P	TM_P	TH_P	HW_A	HS_A	HK_A	HC_A	HO_A	WO_A
3	3081	RU9_HHSIZE3_INC4	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
3	3082	RU9_HHSIZE3_INC5	1.71	2.46	0	0	3.319	0	0	0	0	0	0	0	0	0	0	0	0
3	3083	RU9_HHSIZE4_INC1	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
3	3084	RU9_HHSIZE4_INC2	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
3	3085	RU9_HHSIZE4_INC3	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
3	3086	RU9_HHSIZE4_INC4	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
3	3087	RU9_HHSIZE4_INC5	2.07	2.97	0	0	4.009	0	0	0	0	0	0	0	0	0	0	0	0
3	3088	RU9_HHSIZE5_INC1	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
3	3089	RU9_HHSIZE5_INC2	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
3	3090	RU9_HHSIZE5_INC3	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
3	3091	RU9_HHSIZE5_INC4	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
3	3092	RU9_HHSIZE5_INC5	2.753	3.95	0	0	5.329	0	0	0	0	0	0	0	0	0	0	0	0
3	3093	RU1_AGE1524	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	3094	RU1_AGE2564	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	3095	RU1_AGE6574	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	3096	RU1_AGE75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	3097	RU3_AGE1524	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	3098	RU3_AGE2564	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	3099	RU3_AGE6574	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	3100	RU3_AGE75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	3101	RU9_AGE1524	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	3102	RU9_AGE2564	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	3103	RU9_AGE6574	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	3104	RU9_AGE75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	3105	POP0005	0	0	0.04	0	0	0	0	0	0	0	0	0	0	0.049	0	0.03	0.0361815
3	3106	POP0514	0	0	0.34	0	0	0	0	0	0	0	0	0	0	0.391	0	0.25	0.3186756
3	3107	POP1517	0	0	0.12	0.46	0	0	0	0	0	0	0	0	0	0	0.41	0	0
3	3108	POP1824	0	0	0	0.24	0	0	0	0	0	0	0	0	0	0	0.079	0	0
3	3109	POP2554	0	0	0	0.02	0	0	0	0	0	0	0	0	0	0	0.01	0	0
3	3110	POP5564	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3111	POP6574	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3112	POP75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3113	EMPEDU	0	0	0	0	0	0	0	0	0	0	0	0.74	0	0	0	0	0
3	3114	EMPFOO	0	0	0	0	0	4.764	8.998	0	0	0	0	1.26	11.07	0	0	8.57	2.699697
3	3115	EMPGOV	0	0	0	0	0	1.311	0.734	0	0	0	0	3.11	0	0	0	2.58	0.7862519
3	3116	EMPIND	0	0	0	0	0	0	0	0	0	0	0	2.04	0	0	0	1.79	0
3	3117	EMPMED	0	0	0	0	0	0.637	0.349	0	0	0	0	1.51	0	0	0	1.26	0.3799058
3	3118	EMPOFC	0	0	0	0	0	0.831	0.469	0	0	0	0	1.98	0	0	0	1.64	0.5037579
3	3119	EMPOTH	0	0	0	0	0	0	0	0	0	0	0	0.62	0	0	0	0.54	0
3	3120	EMPRET	0	0	0	0	0	3.573	6.748	0	0	0	0	0.94	8.3	0	0	6.43	2.0247727
3	3121	EMPAGR	0	0	0	0	0	0	0	0	0	0	0	0.62	0	0	0	0.54	0
3	3122	POPDORM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3123	POPASSIST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3124	POPMILITARY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3125	EMPSPARE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3126	EMPSPARE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3127	EMPSPARE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3128	EMPSPARE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3129	EMPSPARE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3130	EMPSPARE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3131	EMPSPARE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3132	EMPSPARE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3133	ELEM	0	0	1.01	0	0	0	0	0	0	0	0	0	0	1.171	0	0.75	0.9448939
3	3134	HS	0	0	0.44	1.75	0	0	0	0	0	0	0	0	0	0	1.543	0	0
3	3135	COLLEGE	0	0	0	0.28	0	0	0	0	0	0	0	0	0	0	0.097	0	0
4	4001	TOTHH	0.293	0.26	0	0	0.426	0	0	0	0	0	0	0	0	0	0	0	0
4	4002	HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4003	GQPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4004	RU1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4005	RU3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4006	RU6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4007	RUSPARE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4008	RUSPARE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4009	RUSPARE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4010	RUSPARE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4011	RU1_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4012	RU3_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4013	RU9_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4014	RU7SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4015	RU8SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

/* Area Type	LU Code	LU_Type	HW_P	HS_P	HK_P	HC_P	HO_P	WO_P	OO_P	HY_P	TS_P	TM_P	TH_P	HW_A	HS_A	HK_A	HC_A	HO_A	WO_A
4	4016	RU9SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4017	RU10SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4018	RU1_HHSIZE1_INC1	0.741	0.66	0	0	1.077	0	0	0	0	0	0	0	0	0	0	0	0
4	4019	RU1_HHSIZE1_INC2	0.741	0.66	0	0	1.077	0	0	0	0	0	0	0	0	0	0	0	0
4	4020	RU1_HHSIZE1_INC3	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
4	4021	RU1_HHSIZE1_INC4	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
4	4022	RU1_HHSIZE1_INC5	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
4	4023	RU1_HHSIZE2_INC1	1.247	1.1	0	0	1.817	0	0	0	0	0	0	0	0	0	0	0	0
4	4024	RU1_HHSIZE2_INC2	1.247	1.1	0	0	1.817	0	0	0	0	0	0	0	0	0	0	0	0
4	4025	RU1_HHSIZE2_INC3	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
4	4026	RU1_HHSIZE2_INC4	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
4	4027	RU1_HHSIZE2_INC5	0.947	1.36	0	0	1.837	0	0	0	0	0	0	0	0	0	0	0	0
4	4028	RU1_HHSIZE3_INC1	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
4	4029	RU1_HHSIZE3_INC2	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
4	4030	RU1_HHSIZE3_INC3	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
4	4031	RU1_HHSIZE3_INC4	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
4	4032	RU1_HHSIZE3_INC5	1.71	2.46	0	0	3.319	0	0	0	0	0	0	0	0	0	0	0	0
4	4033	RU1_HHSIZE4_INC1	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
4	4034	RU1_HHSIZE4_INC2	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
4	4035	RU1_HHSIZE4_INC3	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
4	4036	RU1_HHSIZE4_INC4	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
4	4037	RU1_HHSIZE4_INC5	2.07	2.97	0	0	4.009	0	0	0	0	0	0	0	0	0	0	0	0
4	4038	RU1_HHSIZE5_INC1	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
4	4039	RU1_HHSIZE5_INC2	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
4	4040	RU1_HHSIZE5_INC3	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
4	4041	RU1_HHSIZE5_INC4	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
4	4042	RU1_HHSIZE5_INC5	2.753	3.95	0	0	5.329	0	0	0	0	0	0	0	0	0	0	0	0
4	4043	RU3_HHSIZE1_INC1	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
4	4044	RU3_HHSIZE1_INC2	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
4	4045	RU3_HHSIZE1_INC3	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
4	4046	RU3_HHSIZE1_INC4	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
4	4047	RU3_HHSIZE1_INC5	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
4	4048	RU3_HHSIZE2_INC1	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
4	4049	RU3_HHSIZE2_INC2	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
4	4050	RU3_HHSIZE2_INC3	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
4	4051	RU3_HHSIZE2_INC4	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
4	4052	RU3_HHSIZE2_INC5	0.947	1.36	0	0	1.837	0	0	0	0	0	0	0	0	0	0	0	0
4	4053	RU3_HHSIZE3_INC1	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
4	4054	RU3_HHSIZE3_INC2	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
4	4055	RU3_HHSIZE3_INC3	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
4	4056	RU3_HHSIZE3_INC4	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
4	4057	RU3_HHSIZE3_INC5	1.71	2.46	0	0	3.319	0	0	0	0	0	0	0	0	0	0	0	0
4	4058	RU3_HHSIZE4_INC1	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
4	4059	RU3_HHSIZE4_INC2	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
4	4060	RU3_HHSIZE4_INC3	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
4	4061	RU3_HHSIZE4_INC4	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
4	4062	RU3_HHSIZE4_INC5	2.07	2.97	0	0	4.009	0	0	0	0	0	0	0	0	0	0	0	0
4	4063	RU3_HHSIZE5_INC1	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
4	4064	RU3_HHSIZE5_INC2	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
4	4065	RU3_HHSIZE5_INC3	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
4	4066	RU3_HHSIZE5_INC4	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
4	4067	RU3_HHSIZE5_INC5	2.753	3.95	0	0	5.329	0	0	0	0	0	0	0	0	0	0	0	0
4	4068	RU9_HHSIZE1_INC1	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
4	4069	RU9_HHSIZE1_INC2	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
4	4070	RU9_HHSIZE1_INC3	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
4	4071	RU9_HHSIZE1_INC4	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
4	4072	RU9_HHSIZE1_INC5	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
4	4073	RU9_HHSIZE2_INC1	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
4	4074	RU9_HHSIZE2_INC2	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
4	4075	RU9_HHSIZE2_INC3	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
4	4076	RU9_HHSIZE2_INC4	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
4	4077	RU9_HHSIZE2_INC5	0.947	1.36	0	0	1.837	0	0	0	0	0	0	0	0	0	0	0	0
4	4078	RU9_HHSIZE3_INC1	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
4	4079	RU9_HHSIZE3_INC2	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
4	4080	RU9_HHSIZE3_INC3	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
4	4081	RU9_HHSIZE3_INC4	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
4	4082	RU9_HHSIZE3_INC5	1.71	2.46	0	0	3.319	0	0	0	0	0	0	0	0	0	0	0	0
4	4083	RU9_HHSIZE4_INC1	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
4	4084	RU9_HHSIZE4_INC2	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
4	4085	RU9_HHSIZE4_INC3	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0

/* Area Type	LU Code	LU_Type	HW_P	HS_P	HK_P	HC_P	HO_P	WO_P	OO_P	HY_P	TS_P	TM_P	TH_P	HW_A	HS_A	HK_A	HC_A	HO_A	WO_A
4	4086	RU9_HHSIZE4_INC4	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
4	4087	RU9_HHSIZE4_INC5	2.07	2.97	0	0	4.009	0	0	0	0	0	0	0	0	0	0	0	0
4	4088	RU9_HHSIZE5_INC1	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
4	4089	RU9_HHSIZE5_INC2	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
4	4090	RU9_HHSIZE5_INC3	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
4	4091	RU9_HHSIZE5_INC4	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
4	4092	RU9_HHSIZE5_INC5	2.753	3.95	0	0	5.329	0	0	0	0	0	0	0	0	0	0	0	0
4	4093	RU1_AGE1524	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	4094	RU1_AGE2564	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	4095	RU1_AGE6574	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	4096	RU1_AGE75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	4097	RU3_AGE1524	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	4098	RU3_AGE2564	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	4099	RU3_AGE6574	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	4100	RU3_AGE75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	4101	RU9_AGE1524	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	4102	RU9_AGE2564	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	4103	RU9_AGE6574	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	4104	RU9_AGE75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	4105	POP0005	0	0	0.04	0	0	0	0	0	0	0	0	0	0	0.049	0	0.03	0.0361815
4	4106	POP0514	0	0	0.34	0	0	0	0	0	0	0	0	0	0	0.391	0	0.25	0.3186756
4	4107	POP1517	0	0	0.12	0.46	0	0	0	0	0	0	0	0	0	0	0.41	0	0
4	4108	POP1824	0	0	0	0.24	0	0	0	0	0	0	0	0	0	0	0.079	0	0
4	4109	POP2554	0	0	0	0.02	0	0	0	0	0	0	0	0	0	0	0.01	0	0
4	4110	POP5564	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4111	POP6574	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4112	POP75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4113	EMPEDU	0	0	0	0	0	0	0	0	0	0	0	0.74	0	0	0	0	0
4	4114	EMPFOO	0	0	0	0	0	4.764	8.998	0	0	0	0	1.26	11.07	0	0	8.57	2.699697
4	4115	EMPGOV	0	0	0	0	0	1.311	0.734	0	0	0	0	3.11	0	0	0	2.58	0.7862519
4	4116	EMPIND	0	0	0	0	0	0	0	0	0	0	0	2.04	0	0	0	1.79	0
4	4117	EMPMED	0	0	0	0	0	0.637	0.349	0	0	0	0	1.51	0	0	0	1.26	0.3799058
4	4118	EMPOFC	0	0	0	0	0	0.831	0.469	0	0	0	0	1.98	0	0	0	1.64	0.5037579
4	4119	EMPOTH	0	0	0	0	0	0	0	0	0	0	0	0.62	0	0	0	0.54	0
4	4120	EMPRET	0	0	0	0	0	3.573	6.748	0	0	0	0	0.94	8.3	0	0	6.43	2.0247727
4	4121	EMPAGR	0	0	0	0	0	0	0	0	0	0	0	0.62	0	0	0	0.54	0
4	4122	POPDORM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4123	POPASSIST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4124	POPMILITARY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4125	EMPSPARE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4126	EMPSPARE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4127	EMPSPARE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4128	EMPSPARE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4129	EMPSPARE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4130	EMPSPARE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4131	EMPSPARE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4132	EMPSPARE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4133	ELEM	0	0	1.01	0	0	0	0	0	0	0	0	0	0	1.171	0	0.75	0.9448939
4	4134	HS	0	0	0.44	1.75	0	0	0	0	0	0	0	0	0	0	1.543	0	0
4	4135	COLLEGE	0	0	0	0.28	0	0	0	0	0	0	0	0	0	0	0.097	0	0
5	5001	TOTHH	0.293	0.26	0	0	0.426	0	0	0	0	0	0	0	0	0	0	0	0
5	5002	HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5003	GQPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5004	RU1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5005	RU3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5006	RU6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5007	RUSPARE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5008	RUSPARE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5009	RUSPARE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5010	RUSPARE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5011	RU1_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5012	RU3_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5013	RU9_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5014	RU7SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5015	RU8SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5016	RU9SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5017	RU10SPARE_HHPOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5018	RU1_HHSIZE1_INC1	0.741	0.66	0	0	1.077	0	0	0	0	0	0	0	0	0	0	0	0
5	5019	RU1_HHSIZE1_INC2	0.741	0.66	0	0	1.077	0	0	0	0	0	0	0	0	0	0	0	0
5	5020	RU1_HHSIZE1_INC3	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0

/* Area Type	LU Code	LU_Type	HW_P	HS_P	HK_P	HC_P	HO_P	WO_P	OO_P	HY_P	TS_P	TM_P	TH_P	HW_A	HS_A	HK_A	HC_A	HO_A	WO_A
5	5021	RU1_HHSIZE1_INC4	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
5	5022	RU1_HHSIZE1_INC5	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
5	5023	RU1_HHSIZE2_INC1	1.247	1.1	0	0	1.817	0	0	0	0	0	0	0	0	0	0	0	0
5	5024	RU1_HHSIZE2_INC2	1.247	1.1	0	0	1.817	0	0	0	0	0	0	0	0	0	0	0	0
5	5025	RU1_HHSIZE2_INC3	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
5	5026	RU1_HHSIZE2_INC4	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
5	5027	RU1_HHSIZE2_INC5	0.947	1.36	0	0	1.837	0	0	0	0	0	0	0	0	0	0	0	0
5	5028	RU1_HHSIZE3_INC1	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
5	5029	RU1_HHSIZE3_INC2	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
5	5030	RU1_HHSIZE3_INC3	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
5	5031	RU1_HHSIZE3_INC4	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
5	5032	RU1_HHSIZE3_INC5	1.71	2.46	0	0	3.319	0	0	0	0	0	0	0	0	0	0	0	0
5	5033	RU1_HHSIZE4_INC1	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
5	5034	RU1_HHSIZE4_INC2	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
5	5035	RU1_HHSIZE4_INC3	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
5	5036	RU1_HHSIZE4_INC4	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
5	5037	RU1_HHSIZE4_INC5	2.07	2.97	0	0	4.009	0	0	0	0	0	0	0	0	0	0	0	0
5	5038	RU1_HHSIZE5_INC1	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
5	5039	RU1_HHSIZE5_INC2	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
5	5040	RU1_HHSIZE5_INC3	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
5	5041	RU1_HHSIZE5_INC4	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
5	5042	RU1_HHSIZE5_INC5	2.753	3.95	0	0	5.329	0	0	0	0	0	0	0	0	0	0	0	0
5	5043	RU3_HHSIZE1_INC1	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
5	5044	RU3_HHSIZE1_INC2	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
5	5045	RU3_HHSIZE1_INC3	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
5	5046	RU3_HHSIZE1_INC4	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
5	5047	RU3_HHSIZE1_INC5	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
5	5048	RU3_HHSIZE2_INC1	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
5	5049	RU3_HHSIZE2_INC2	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
5	5050	RU3_HHSIZE2_INC3	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
5	5051	RU3_HHSIZE2_INC4	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
5	5052	RU3_HHSIZE2_INC5	0.947	1.36	0	0	1.837	0	0	0	0	0	0	0	0	0	0	0	0
5	5053	RU3_HHSIZE3_INC1	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
5	5054	RU3_HHSIZE3_INC2	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
5	5055	RU3_HHSIZE3_INC3	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
5	5056	RU3_HHSIZE3_INC4	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
5	5057	RU3_HHSIZE3_INC5	1.71	2.46	0	0	3.319	0	0	0	0	0	0	0	0	0	0	0	0
5	5058	RU3_HHSIZE4_INC1	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
5	5059	RU3_HHSIZE4_INC2	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
5	5060	RU3_HHSIZE4_INC3	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
5	5061	RU3_HHSIZE4_INC4	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
5	5062	RU3_HHSIZE4_INC5	2.07	2.97	0	0	4.009	0	0	0	0	0	0	0	0	0	0	0	0
5	5063	RU3_HHSIZE5_INC1	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
5	5064	RU3_HHSIZE5_INC2	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
5	5065	RU3_HHSIZE5_INC3	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
5	5066	RU3_HHSIZE5_INC4	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
5	5067	RU3_HHSIZE5_INC5	2.753	3.95	0	0	5.329	0	0	0	0	0	0	0	0	0	0	0	0
5	5068	RU9_HHSIZE1_INC1	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
5	5069	RU9_HHSIZE1_INC2	0.499	0.44	0	0	0.72	0	0	0	0	0	0	0	0	0	0	0	0
5	5070	RU9_HHSIZE1_INC3	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
5	5071	RU9_HHSIZE1_INC4	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
5	5072	RU9_HHSIZE1_INC5	0.625	0.9	0	0	1.217	0	0	0	0	0	0	0	0	0	0	0	0
5	5073	RU9_HHSIZE2_INC1	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
5	5074	RU9_HHSIZE2_INC2	1.19	1.06	0	0	1.735	0	0	0	0	0	0	0	0	0	0	0	0
5	5075	RU9_HHSIZE2_INC3	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
5	5076	RU9_HHSIZE2_INC4	0.932	1.34	0	0	1.807	0	0	0	0	0	0	0	0	0	0	0	0
5	5077	RU9_HHSIZE2_INC5	0.947	1.36	0	0	1.837	0	0	0	0	0	0	0	0	0	0	0	0
5	5078	RU9_HHSIZE3_INC1	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
5	5079	RU9_HHSIZE3_INC2	1.77	1.57	0	0	2.569	0	0	0	0	0	0	0	0	0	0	0	0
5	5080	RU9_HHSIZE3_INC3	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
5	5081	RU9_HHSIZE3_INC4	1.247	1.79	0	0	2.415	0	0	0	0	0	0	0	0	0	0	0	0
5	5082	RU9_HHSIZE3_INC5	1.71	2.46	0	0	3.319	0	0	0	0	0	0	0	0	0	0	0	0
5	5083	RU9_HHSIZE4_INC1	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
5	5084	RU9_HHSIZE4_INC2	2.415	2.14	0	0	3.512	0	0	0	0	0	0	0	0	0	0	0	0
5	5085	RU9_HHSIZE4_INC3	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
5	5086	RU9_HHSIZE4_INC4	1.923	2.75	0	0	3.714	0	0	0	0	0	0	0	0	0	0	0	0
5	5087	RU9_HHSIZE4_INC5	2.07	2.97	0	0	4.009	0	0	0	0	0	0	0	0	0	0	0	0
5	5088	RU9_HHSIZE5_INC1	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
5	5089	RU9_HHSIZE5_INC2	3.332	2.97	0	0	4.851	0	0	0	0	0	0	0	0	0	0	0	0
5	5090	RU9_HHSIZE5_INC3	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0

/* Area Type	LU Code	LU_Type	HW_P	HS_P	HK_P	HC_P	HO_P	WO_P	OO_P	HY_P	TS_P	TM_P	TH_P	HW_A	HS_A	HK_A	HC_A	HO_A	WO_A
5	5091	RU9_HHSIZE5_INC4	3.105	4.45	0	0	6.019	0	0	0	0	0	0	0	0	0	0	0	0
5	5092	RU9_HHSIZE5_INC5	2.753	3.95	0	0	5.329	0	0	0	0	0	0	0	0	0	0	0	0
5	5093	RU1_AGE1524	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	5094	RU1_AGE2564	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	5095	RU1_AGE6574	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	5096	RU1_AGE75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	5097	RU3_AGE1524	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	5098	RU3_AGE2564	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	5099	RU3_AGE6574	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	5100	RU3_AGE75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	5101	RU9_AGE1524	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	5102	RU9_AGE2564	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	5103	RU9_AGE6574	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	5104	RU9_AGE75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	5105	POP0005	0	0	0.04	0	0	0	0	0	0	0	0	0	0	0.049	0	0.03	0.0361815
5	5106	POP0514	0	0	0.34	0	0	0	0	0	0	0	0	0	0	0.391	0	0.25	0.3186756
5	5107	POP1517	0	0	0.12	0.46	0	0	0	0	0	0	0	0	0	0	0.41	0	0
5	5108	POP1824	0	0	0	0.24	0	0	0	0	0	0	0	0	0	0	0.079	0	0
5	5109	POP2554	0	0	0	0.02	0	0	0	0	0	0	0	0	0	0	0.01	0	0
5	5110	POP5564	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5111	POP6574	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5112	POP75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5113	EMPEDU	0	0	0	0	0	0	0	0	0	0	0	0.74	0	0	0	0	0
5	5114	EMPFOO	0	0	0	0	0	4.764	8.998	0	0	0	0	1.26	11.07	0	0	8.57	2.699697
5	5115	EMPGOV	0	0	0	0	0	1.311	0.734	0	0	0	0	3.11	0	0	0	2.58	0.7862519
5	5116	EMPIND	0	0	0	0	0	0	0	0	0	0	0	2.04	0	0	0	1.79	0
5	5117	EMPMED	0	0	0	0	0	0.637	0.349	0	0	0	0	1.51	0	0	0	1.26	0.3799058
5	5118	EMPOFC	0	0	0	0	0	0.831	0.469	0	0	0	0	1.98	0	0	0	1.64	0.5037579
5	5119	EMPOTH	0	0	0	0	0	0	0	0	0	0	0	0.62	0	0	0	0.54	0
5	5120	EMPRET	0	0	0	0	0	3.573	6.748	0	0	0	0	0.94	8.3	0	0	6.43	2.0247727
5	5121	EMPAGR	0	0	0	0	0	0	0	0	0	0	0	0.62	0	0	0	0.54	0
5	5122	POPDORM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5123	POPASSIST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5124	POPMILITARY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5125	EMPSPARE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5126	EMPSPARE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5127	EMPSPARE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5128	EMPSPARE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5129	EMPSPARE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5130	EMPSPARE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5131	EMPSPARE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5132	EMPSPARE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5133	ELEM	0	0	1.01	0	0	0	0	0	0	0	0	0	0	1.171	0	0.75	0.9448939
5	5134	HS	0	0	0.44	1.75	0	0	0	0	0	0	0	0	0	0	1.543	0	0
5	5135	COLLEGE	0	0	0	0.28	0	0	0	0	0	0	0	0	0	0	0.097	0	0

/* LU Code	LU_Type	TS_People	TS_Mail	TS_UrbFrt	TS_Const	TS_Service	TM_People	TM_Mail	TM_UrbFrt	TM_Const	TM_Service	TH_People	TH_Mail	TM_UrbFrt	TH_Const	TH_Service */
101	TOTHH	0.0075	0.00167	0.03551	0.03041	0.35243	0.0077	0.00012	0.01085	0.01615	0.14309	0	0.00001	0.00323	0.00369	0.00151
102	TOTEMP	0.0121	0.00167	0	0.03041	0.32839	0.00238	0.00012	0	0.01615	0.12736	0	0.00001	0	0.00369	0.00151
103	RETAIL	0	0	0.12571	0	0	0	0	0.02769	0	0	0	0	0.00554	0	0
104	AG	0	0	0.15714	0	0	0	0	0.03167	0	0	0	0	0.01482	0	0
105	MINING	0	0	0.15714	0	0	0	0	0.03167	0	0	0	0	0.01482	0	0
106	CONSTR	0	0	0.15714	0.03041	0	0	0	0.03167	0.01615	0	0	0	0.01482	0.00369	0
107	MFGPROD	0	0	0.13278	0	0	0	0	0.02653	0	0	0	0	0.00885	0	0
108	MFGEQUIP	0	0	0.13278	0	0	0	0	0.02653	0	0	0	0	0.00885	0	0
109	TRANSP	0	0	0.13278	0	0	0	0	0.02653	0	0	0	0	0.00885	0	0
110	WHLSALE	0	0	0.13278	0	0	0	0	0.02653	0	0	0	0	0.00885	0	0
111	FINANCE	0	0	0.06186	0	0	0	0	0.0074	0	0	0	0	0.00076	0	0
112	EDUGOV	0	0	0.06186	0	0	0	0	0.0074	0	0	0	0	0.00076	0	0

INDEX	A	KEY
1	-999	;INTCAP_HBW_CONSTANT
2	-999	;INTCAP_HBW_MXD_EMP
3	-999	;INTCAP_HBW_MXD_AREA
4	-999	;INTCAP_HBW_DIVERSITY
5	-999	;INTCAP_HBW_INTDEN
6	-999	;INTCAP_HBW_HHSIZE
7	-999	;INTCAP_HBW_VEHOWN
8	-999	;INTCAP_HBO_CONSTANT
9	-999	;INTCAP_HBO_MXD_EMP
10	-999	;INTCAP_HBO_MXD_AREA
11	-999	;INTCAP_HBO_DIVERSITY
12	-999	;INTCAP_HBO_INTDEN
13	-999	;INTCAP_HBO_HHSIZE
14	-999	;INTCAP_HBO_VEHOWN
15	-999	;INTCAP_NHB_CONSTANT
16	-999	;INTCAP_NHB_MXD_EMP
17	-999	;INTCAP_NHB_MXD_AREA
18	-999	;INTCAP_NHB_DIVERSITY
19	-999	;INTCAP_NHB_INTDEN
20	-999	;INTCAP_NHB_HHSIZE
21	-999	;INTCAP_NHB_VEHOWN
22	-999	;EXTWALK_HBW_CONSTANT
23	-999	;EXTWALK_HBW_MXD_AREA
24	-999	;EXTWALK_HBW_DENSITY
25	-999	;EXTWALK_HBW_DIVERSITY
26	-999	;EXTWALK_HBW_RETAIL_DIVERSITY
27	-999	;EXTWALK_HBW_INTDEN
28	-999	;EXTWALK_HBW_EMP_1WALK
29	-999	;EXTWALK_HBW_HHSIZE
30	-999	;EXTWALK_HBW_VEHOWN
31	-999	;EXTWALK_HBO_CONSTANT
32	-999	;EXTWALK_HBO_MXD_AREA
33	-999	;EXTWALK_HBO_DENSITY
34	-999	;EXTWALK_HBO_DIVERSITY
35	-999	;EXTWALK_HBO_RETAIL_DIVERSITY
36	-999	;EXTWALK_HBO_INTDEN
37	-999	;EXTWALK_HBO_EMP_1WALK
38	-999	;EXTWALK_HBO_HHSIZE
39	-999	;EXTWALK_HBO_VEHOWN
40	-999	;EXTWALK_NHB_CONSTANT
41	-999	;EXTWALK_NHB_MXD_AREA
42	-999	;EXTWALK_NHB_DENSITY
43	-999	;EXTWALK_NHB_DIVERSITY
44	-999	;EXTWALK_NHB_RETAIL_DIVERSITY
45	-999	;EXTWALK_NHB_INTDEN
46	-999	;EXTWALK_NHB_EMP_1WALK

INDEX	A	KEY
47	-999	;EXTWALK_NHB_HHSIZE
48	-999	;EXTWALK_NHB_VEHOWN
49	-999	;EXTTRAN_HBW_CONSTANT
50	-999	;EXTTRAN_HBW_MXD_EMP
51	-999	;EXTTRAN_HBW_INTDEN
52	-999	;EXTTRAN_HBW_EMP_30TRN
53	-999	;EXTTRAN_HBW_HHSIZE
54	-999	;EXTTRAN_HBW_VEHOWN
55	-999	;EXTTRAN_HBO_CONSTANT
56	-999	;EXTTRAN_HBO_MXD_EMP
57	-999	;EXTTRAN_HBO_INTDEN
58	-999	;EXTTRAN_HBO_EMP_30TRN
59	-999	;EXTTRAN_HBO_HHSIZE
60	-999	;EXTTRAN_HBO_VEHOWN
61	-999	;EXTTRAN_NHB_CONSTANT
62	-999	;EXTTRAN_NHB_MXD_EMP
63	-999	;EXTTRAN_NHB_INTDEN
64	-999	;EXTTRAN_NHB_EMP_30TRN
65	-999	;EXTTRAN_NHB_HHSIZE
66	-999	;EXTTRAN_NHB_VEHOWN
67	-999	;AVG_MXD_EMP
68	-999	;AVG_MXD_AREA
69	-999	;AVG_DIVERSITY
70	-999	;AVG_INTDEN
71	-999	;AVG_HHSIZE
72	-999	;AVG_VEHOWN
73	-999	;AVG_DENSITY
74	-999	;AVG_RETAIL_DIVERSITY
75	-999	;AVG_EMP_1WALK
76	-999	;AVG_EMP_30TRN

;Mode Choice Coefficients				IVT	OVT/IVT	ParkCostFa	Cost	VOT	Constants										Accessibility variables		
;1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
;INDEX	PURP	SEGMENT	Period	CI_C_TIME	CI_FAC_Ov	CI_PKCOST	CI_COST	CI_VOT	CI_C_D1	CI_C_S2	CI_C_S3	CI_C_TWB	CI_C_TWR	CI_C_TDB	CI_C_TDR	CI_C_BK	CI_C_WK	CI_C_SB	CI_LE_D1	CI_LE_S2	CI_LE_S3
11	1	1	PK	-0.035	2	0.25	-0.003	6	0.1	0.161598	-0.06672	-0.87411	-0.87411	-0.87411	-0.87411	-3.02416	1.508496	0	0	0.506	0.408
12	1	2	PK	-0.04	2	0.25	-0.002	10.06	0.1	-2.4826	-2.48208	-0.88467	-0.88467	-3.15767	-3.15767	-3.77774	0.061496	0	0	0.506	0.408
13	1	3	PK	-0.04	2	0.25	-0.001	18	0.1	-3.0808	-2.88744	-1.75023	-1.75023	-4.93323	-4.42823	-4.93632	-1.0435	0	0	0.506	0.408
21	2	1	OK	-0.025	2	0.25	-0.005	3	2.75	3.675118	2.693838	0.723128	0.723128	0.723128	0.723128	1.32299	5.074608	0	0	0.297	0.026
22	2	2	OK	-0.025	2	0.25	-0.003	6	2.75	2.834177	2.813133	0.472896	0.472896	0.472896	0.472896	-1.68101	2.318608	0	0	0.297	0.026
23	2	3	OK	-0.025	2	0.25	-0.002	6.32	2.75	2.751236	2.750927	-0.20031	-0.20031	-0.20031	-0.20031	-0.53802	-0.55639	0	0	0.161	0.161
31	3	1	OK	-0.025	2	0.25	-0.005	3	0	2.639697	2.946478	3.923114	3.923114	3.923114	3.923114	-2.00521	2.787008	2.165628	0	0	0
32	3	2	OK	-0.025	2	0.25	-0.003	6	0	2.671046	2.634217	1.793328	1.793328	1.793328	1.793328	-3.21581	2.787008	2.066443	0	0	0
33	3	3	OK	-0.025	2	0.25	-0.002	9	0	0.781395	1.209957	1.017771	1.017771	1.017771	1.017771	-5.61041	1.610008	2.163257	0	0	0
41	4	1	OK	-0.025	2	0.25	-0.005	3	0	-1.32257	-2.03859	-1.35706	-1.35706	-1.35706	-1.35706	-0.23633	-0.23633	0	0	0	0
42	4	2	OK	-0.025	2	0.25	-0.003	6	0	-0.98736	-1.97789	-1.77559	-1.77559	-1.77559	-1.77559	-2.00521	-0.86867	0	0	0	0
43	4	3	OK	-0.025	2	0.25	-0.002	9	0	-0.65114	-1.91718	-2.19311	-2.19311	-2.19311	-2.19311	-3.21581	-2.36329	0	0	0	0
51	5	1	OK	-0.025	2	0.25	-0.005	3	0	1.000694	0.781757	-0.99946	-0.99946	-0.99946	-0.99946	-5.61041	3.187849	0	0	0	0
52	5	2	OK	-0.025	2	0.25	-0.003	6	0	0.574542	0.564635	-1.89519	-1.89519	-1.89519	-1.89519	-3.33711	0.772849	0	0	0	0
53	5	3	OK	-0.025	2	0.25	-0.002	9	0	0.178389	0.384514	-2.79291	-2.79291	-2.79291	-2.79291	-3.79381	-0.20415	0	0	0	0
61	6	1	OK	-0.035	2.515	0.25	-0.004	6.08	0	-1.37835	-2.90079	-3.67523	-3.67523	-2.88823	-2.88823	-1.5948	-0.72818	0	0	0	0
62	6	2	OK	-0.035	2.515	0.25	-0.001	16.62	0	-1.35902	-3.32618	-3.98685	-3.98685	-3.19985	-3.19985	-0.67871	-0.72818	0	0	0	0
63	6	3	OK	-0.03	2.515	0.25	-0.001	18	0	-1.4207	-3.86458	-2.44546	-2.44546	-3.27746	-2.48946	-1.77061	-0.77318	0	0	0	0
71	7	1	OK	-0.03	2	0.25	-0.004	5.19	0	2.53277	2.204668	3.081883	3.081883	1.828883	1.828883	0.95001	4.622395	0	0	0	0
72	7	2	OK	-0.03	2	0.25	-0.003	6	0	1.082656	0.650502	-0.80718	-0.80718	-0.80718	-0.80718	-3.66748	1.247395	0	0	0	0
73	7	3	OK	-0.074	2	0.25	-0.005	9	0	0.520541	0.462336	-1.46223	-1.46223	-2.42923	-2.42923	-3.86798	0.071395	0	0	0	0
81	8	1	OK	-0.025	2	0.25	-0.003	6	0	-1.978	-1.978	-10	-10	-10	-10	-10	-10	0	0	0	0
82	8	2	OK	-0.025	2	0.25	-0.001	12	0	-0.642	-0.642	-10	-10	-10	-10	-10	-10	0	0	0	0
83	8	3	OK	-0.025	2	0.25	-0.001	18	0	-0.244	-0.244	-10	-10	-10	-10	-10	-10	0	0	0	0

;Mode Choice Coefficients

;1	2	3	4	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
;INDEX	PURP	SEGMENT	Period	CI_LE_TWE	CI_LE_TWF	CI_LE_TDB	CI_LE_TDR	CI_LE_BK	CI_LE_WK	CI_TA_D1	CI_TA_S2	CI_TA_S3	CI_TA_TWI	CI_TA_TWI	CI_TA_TDB	CI_TA_TDR	CI_TA_BK	CI_TA_WK	CI_PID_D1	CI_PID_S2	CI_PID_S3
11	1	1	PK	0.5	0.5	0.5	0.5	0.506	0.5	0	0.013	0.013	0.03	0.03	0.03	0.03	0.03	0.04	0	0	0
12	1	2	PK	0.5	0.5	0.5	0.5	0.506	0.178	0	0.013	0.013	0.027	0.027	0.027	0.027	0.031	0.031	0	0	0
13	1	3	PK	0.5	0.5	0.5	0.5	0.506	0.005	0	0.005	0.005	0.013	0.013	0.013	0.013	0.015	0.015	0	0	0
21	2	1	OK	0.5	0.5	0.5	0.5	0.4	0.19	0	0	0	0	0	0	0	0	0	0	0	0
22	2	2	OK	0.5	0.5	0.5	0.5	0.4	0.19	0	0	0	0	0	0	0	0	0	0	0	0
23	2	3	OK	0.5	0.5	0.5	0.5	0.4	0.19	0	0	0	0	0	0	0	0	0	0	0	0
31	3	1	OK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.008	0.007
32	3	2	OK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.008	0.007
33	3	3	OK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.008	0.007
41	4	1	OK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.004	-0.019
42	4	2	OK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.004	-0.019
43	4	3	OK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	5	1	OK	0.5	0.5	0.048	0.048	0.312	0.455	0	0	0	0	0	0	0	0	0	0	0	0
52	5	2	OK	0.5	0.5	0.363	0.363	0.312	0.455	0	0	0	0	0	0	0	0	0	0	0	0
53	5	3	OK	0.315	0.315	0.363	0.363	0.455	0.455	0	0	0	0	0	0	0	0	0	0	0	0
61	6	1	OK	0	0	0	0	0	0	0	0	0	0.023	0.023	0.023	0.023	0.03	0.04	0	0	0
62	6	2	OK	0	0	0	0	0	0	0	0	0	0.023	0.023	0.023	0.023	0.03	0.04	0	0	0
63	6	3	OK	0	0	0	0	0	0	0	0	0	0.023	0.023	0.023	0.023	0.03	0.04	0	0	0
71	7	1	OK	0	0	0	0	0	0	0	-0.007	-0.01	0.04	0.04	0.04	0.04	0.03	0.039	0	0	0
72	7	2	OK	0	0	0	0	0	0	0	-0.007	-0.01	0.04	0.04	0.04	0.04	0.03	0.039	0	0	0
73	7	3	OK	0	0	0	0	0	0	0	0	0	0.025	0.025	0.025	0.025	0	0.039	0	0	0
81	8	1	OK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
82	8	2	OK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
83	8	3	OK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

;Mode Choice Coefficients

;1	2	3	4	41	42	43	44	45	46	47	48	49	50	51	
;INDEX	PURP	SEGMENT	Period	CI_PID_TW	CI_PID_TW	CI_PID_TDI	CI_PID_TDI	CI_PID_BK	CI_PID_WK	CI_PID_SB	TIMEPEN_S	TIMEPEN_S	TIMEPEN_S	DACC_PEN	KEY
11	1	1	PK	0	0	0	0	0	0	0	5	7	0	2	;HW 0 Veh HH
12	1	2	PK	0	0	0	0	0	0	0	5	7	0	2	;HW 1 Veh-2PHH
13	1	3	PK	0	0	0	0	0	0	0	5	7	0	2	;HW All Other HH
21	2	1	OK	0	0	0	0	0	0	0	5	7	0	2	;HS 0 Veh HH
22	2	2	OK	0	0	0	0	0	0	0	5	7	0	2	;HS 1 Veh-2PHH
23	2	3	OK	0	0	0	0	0	0	0	5	7	0	2	;HS All Other HH
31	3	1	OK	0.006	0.006	0	0	0.008	0.004	0	5	7	10	2	;HK 0 Veh HH
32	3	2	OK	0.006	0.006	0	0	0.008	0.004	0	5	7	10	2	;HK 1 Veh-2PHH
33	3	3	OK	0.006	0.006	0	0	0.008	0.004	0	5	7	10	2	;HK All Other HH
41	4	1	OK	0.004	0	0	0	0.005	0.005	0	5	7	0	2	;HC All Other HH
42	4	2	OK	0.004	0	0	0	0.005	0.005	0	5	7	0	2	;HC 1 Veh-2PHH
43	4	3	OK	0	0	0	0	0.005	0.005	0	5	7	0	2	;HC All Other HH
51	5	1	OK	0	0	0	0	0	0	0	5	7	0	2	;HO 0 Veh HH
52	5	2	OK	0	0	0	0	0	0	0	5	7	0	2	;HO 1 Veh-2PHH
53	5	3	OK	0	0	0	0	0	0	0	5	7	0	2	;HO All Other HH
61	6	1	OK	0	0	0	0	0	0	0	5	7	0	2	;WO 0 Veh HH
62	6	2	OK	0	0	0	0	0	0	0	5	7	0	2	;WO 1 Veh-2PHH
63	6	3	OK	0	0	0	0	0	0	0	5	7	0	2	;WO All Other HH
71	7	1	OK	0	0	0	0	0	0	0	5	7	0	2	;OO 0 Veh HH
72	7	2	OK	0	0	0	0	0	0	0	5	7	0	2	;OO 1 Veh-2PHH
73	7	3	OK	0	0	0	0	0	0	0	5	7	0	2	;OO All Other HH
81	8	1	OK	0	0	0	0	0	0	0	5	7	0	2	;HY 0 Veh HH
82	8	2	OK	0	0	0	0	0	0	0	5	7	0	2	;HY 1 Veh-2PHH
83	8	3	OK	0	0	0	0	0	0	0	5	7	0	2	;HY All Other HH

;INDEX	A	B	C	KEY
1	100000	-0.1	0	;HWH
2	100000	-0.1	0	;HWM
3	100000	-0.15	0	;HWL
4	100000	-0.5	0	;HS
5	100000	-0.09	0	;HK
6	100000	-0.06	0	;HC
7	100000	-0.2	0	;HO
8	100000	-0.085	0	;WO
9	100000	-0.09	0	;OO
10	100000	-0.065	0	;HY
11	100000	-0.07	-0.5	;TS
12	100000	-0.07	-0.5	;TM
13	100000	-0.07	-0.5	;TH

; Diurnal factors by mode and purpose
; Drive Alone

; Lookup	D1	Hour	DEP_HW	DEP_HS	DEP_HK	DEP_HC	DEP_HO	DEP_WO	DEP_OO	DEP_HY	DEP_TS	DEP_TM	DEP_TH	RET_HW	RET_HS	RET_HK	RET_HC	RET_HO	RET_WO	RET_OO	RET_HY	RET_TS	RET_TM	RET_TH	DEP_HW_X	DEP_HS_X
101	1	1	0.09048	0.08983	0.00507	0.00507	0.04628	0.01417	0.04979	0.08983	0.20449	0.1183	0.18252	0.1222	0.12597	0.08645	0.08645	0.14391	0.00676	0.04823	0.12597	0.20449	0.1183	0.18252	0.09048	0.08983
102	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
103	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
105	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
106	1	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
107	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
108	1	8	0.19228	0.0181	0.219	0.219	0.1123	0.012	0.0228	0.0181	0.025	0.0408	0.0345	0.0004	0.0019	0	0	0.0371	0.0883	0.0698	0.0019	0.025	0.0408	0.0345	0.1748	0.0181
109	1	9	0.1018	0.02416	0.0576	0.0576	0.05792	0.01584	0.01104	0.02416	0.04	0.06528	0.0552	0.0064	0.01336	0	0	0.03416	0.05128	0.01536	0.01336	0.04	0.06528	0.0552	0.11928	0.02416
110	1	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111	1	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	1	12	0.11418	0.25861	0.21538	0.21538	0.23958	0.46915	0.2794	0.25861	0.13013	0.19404	0.18403	0.13607	0.24893	0.35926	0.35926	0.23254	0.22352	0.39534	0.24893	0.13013	0.19404	0.18403	0.11418	0.25861
113	1	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
114	1	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
115	1	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
116	1	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
117	1	17	0.0124	0.0737	0.0346	0.0346	0.0543	0.0798	0.0492	0.0737	0.1156	0.0828	0.0734	0.162	0.0979	0.0373	0.0373	0.0641	0.0033	0.083	0.0979	0.1156	0.0828	0.0734	0.0124	0.0737
118	1	18	0.003825	0.04913	0.02176	0.02176	0.01938	0.06885	0.02567	0.04913	0.04913	0.03519	0.031195	0.10727	0.065025	0.015895	0.015895	0.03689	0.0051	0.032215	0.065025	0.04913	0.03519	0.031195	0.003825	0.04913
119	1	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	1	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
121	1	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
122	1	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
123	1	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
124	1	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

; Shared-ride 2

;Lookup	SR2	Hour	DEP_HW	DEP_HS	DEP_HK	DEP_HC	DEP_HO	DEP_WO	DEP_OO	DEP_HY	DEP_TS	DEP_TM	DEP_TH	RET_HW	RET_HS	RET_HK	RET_HC	RET_HO	RET_WO	RET_OO	RET_HY	RET_TS	RET_TM	RET_TH	DEP_HW_X	DEP_HS_X
201	2	1	0.09048	0.08983	0.00507	0.00507	0.04628	0.01417	0.04979	0.08983	0.20449	0.1183	0.18252	0.1222	0.12597	0.08645	0.08645	0.14391	0.00676	0.04823	0.12597	0.20449	0.1183	0.18252	0.09048	0.08983
202	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
203	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
204	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
205	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
206	2	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
207	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
208	2	8	0.19228	0.0181	0.219	0.219	0.1123	0.012	0.0228	0.0181	0.025	0.0408	0.0345	0.0004	0.0019	0	0	0.0371	0.0883	0.0698	0.0019	0.025	0.0408	0.0345	0.1748	0.0181
209	2	9	0.1018	0.02416	0.0576	0.0576	0.05792	0.01584	0.01104	0.02416	0.04	0.06528	0.0552	0.0064	0.01336	0	0	0.03416	0.05128	0.01536	0.01336	0.04	0.06528	0.0552	0.11928	0.02416
210	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
211	2	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
212	2	12	0.11418	0.25861	0.21538	0.21538	0.23958	0.46915	0.2794	0.25861	0.13013	0.19404	0.18403	0.13607	0.24893	0.35926	0.35926	0.23254	0.22352	0.39534	0.24893	0.13013	0.19404	0.18403	0.11418	0.25861
213	2	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
214	2	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
215	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
216	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
217	2	17	0.0124	0.0737	0.0346	0.0346	0.0543	0.0798	0.0492	0.0737	0.1156	0.0828	0.0734	0.162	0.0979	0.0373	0.0373	0.0641	0.0033	0.083	0.0979	0.1156	0.0828	0.0734	0.0124	0.0737
218	2	18	0.003825	0.04913	0.02176	0.02176	0.01938	0.06885	0.02567	0.04913	0.04913	0.03519	0.031195	0.10727	0.065025	0.015895	0.015895	0.03689	0.0051	0.032215	0.065025	0.04913	0.03519	0.031195	0.003825	0.04913
219	2	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
220	2	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
221	2	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
222	2	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
223	2	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
224	2	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

; Shared-ride 3+

;Lookup	SR3+	Hour	DEP_HW	DEP_HS	DEP_HK	DEP_HC	DEP_HO	DEP_WO	DEP_OO	DEP_HY	DEP_TS	DEP_TM	DEP_TH	RET_HW	RET_HS	RET_HK	RET_HC	RET_HO	RET_WO	RET_OO	RET_HY	RET_TS	RET_TM	RET_TH	DEP_HW_X	DEP_HS_X
301	3	1	0.09048	0.08983	0.00507	0.00507	0.04628	0.01417	0.04979	0.08983	0.20449	0.1183	0.18252	0.1222	0.12597	0.08645	0.08645	0.14391	0.00676	0.04823	0.12597	0.20449	0.1183	0.18252	0.09048	0.08983
302	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
303	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
304	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
305	3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
306	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
307	3	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
308	3	8	0.19228	0.0181	0.219	0.219	0.1123	0.012	0.0228	0.0181	0.025	0.0408	0.0345	0.0004	0.0019	0	0	0.0371	0.0883	0.0698	0.0019	0.025	0.0408	0.0345	0.1748	0.0181
309	3	9	0.1018	0.02416	0.0576	0.0576	0.05792	0.01584	0.01104	0.02416	0.04	0.06528	0.0552	0.0064	0.01336	0	0	0.03416	0.05128	0.01536	0.01336	0.04	0.06528	0.0552	0.11928	0.02416
310	3	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
311	3	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
312	3	12	0.11418	0.25861	0.21538	0.21538	0.23958	0.46915	0.2794	0.25861	0.13013	0.19404	0.18403	0.13607	0.24893	0.35926	0.35926	0.23254	0.22352	0.39534	0.24893	0.13013	0.19404	0.18403	0.11418	0.25861
313	3	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
314	3	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
315	3	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
316	3	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

; Lookup	D1	Hour		DEP_HW	DEP_HS	DEP_HK	DEP_HC	DEP_HO	DEP_WO	DEP_OO	DEP_HY	DEP_TS	DEP_TM	DEP_TH	RET_HW	RET_HS	RET_HK	RET_HC	RET_HO	RET_WO	RET_OO	RET_HY	RET_TS	RET_TM	RET_TH	DEP_HW_X	DEP_HS_X
317	3	17		0.0124	0.0737	0.0346	0.0346	0.0543	0.0798	0.0492	0.0737	0.1156	0.0828	0.0734	0.162	0.0979	0.0373	0.0373	0.0641	0.0033	0.083	0.0979	0.1156	0.0828	0.0734	0.0124	0.0737
318	3	18		0.003825	0.04913	0.02176	0.02176	0.01938	0.06885	0.02567	0.04913	0.04913	0.03519	0.031195	0.10727	0.065025	0.015895	0.015895	0.03689	0.0051	0.032215	0.065025	0.04913	0.03519	0.031195	0.003825	0.04913
319	3	19		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
320	3	20		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
321	3	21		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
322	3	22		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
323	3	23		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
324	3	24		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
;	; Transit																										
;Lookup	TRN	Hour		DEP_HW	DEP_HS	DEP_HK	DEP_HC	DEP_HO	DEP_WO	DEP_OO	DEP_HY	DEP_TS	DEP_TM	DEP_TH	RET_HW	RET_HS	RET_HK	RET_HC	RET_HO	RET_WO	RET_OO	RET_HY	RET_TS	RET_TM	RET_TH	DEP_HW_X	DEP_HS_X
401	4	1		0.09048	0.08983	0.00507	0.00507	0.04628	0.01417	0.04979	0.08983	0.20449	0.1183	0.18252	0.1222	0.12597	0.08645	0.08645	0.14391	0.00676	0.04823	0.12597	0.20449	0.1183	0.18252	0.09048	0.08983
402	4	2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
403	4	3		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
404	4	4		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
405	4	5		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
406	4	6		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
407	4	7		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
408	4	8		0.19228	0.0181	0.219	0.219	0.1123	0.012	0.0228	0.0181	0.025	0.0408	0.0345	0.0004	0.0019	0	0	0.0371	0.0883	0.0698	0.0019	0.025	0.0408	0.0345	0.1748	0.0181
409	4	9		0.1018	0.02416	0.0576	0.0576	0.05792	0.01584	0.01104	0.02416	0.04	0.06528	0.0552	0.0064	0.01336	0	0	0.03416	0.05128	0.01536	0.01336	0.04	0.06528	0.0552	0.11928	0.02416
410	4	10		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
411	4	11		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
412	4	12		0.11418	0.25861	0.21538	0.21538	0.23958	0.46915	0.2794	0.25861	0.13013	0.19404	0.18403	0.13607	0.24893	0.35926	0.35926	0.23254	0.22352	0.39534	0.24893	0.13013	0.19404	0.18403	0.11418	0.25861
413	4	13		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
414	4	14		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
415	4	15		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
416	4	16		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
417	4	17		0.0124	0.0737	0.0346	0.0346	0.0543	0.0798	0.0492	0.0737	0.1156	0.0828	0.0734	0.162	0.0979	0.0373	0.0373	0.0641	0.0033	0.083	0.0979	0.1156	0.0828	0.0734	0.0124	0.0737
418	4	18		0.003825	0.04913	0.02176	0.02176	0.01938	0.06885	0.02567	0.04913	0.04913	0.03519	0.031195	0.10727	0.065025	0.015895	0.015895	0.03689	0.0051	0.032215	0.065025	0.04913	0.03519	0.031195	0.003825	0.04913
419	4	19		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
420	4	20		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
421	4	21		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
422	4	22		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
423	4	23		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
424	4	24		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
; Walk/Bike																											
;Lookup	WLK	Hour		DEP_HW	DEP_HS	DEP_HK	DEP_HC	DEP_HO	DEP_WO	DEP_OO	DEP_HY	DEP_TS	DEP_TM	DEP_TH	RET_HW	RET_HS	RET_HK	RET_HC	RET_HO	RET_WO	RET_OO	RET_HY	RET_TS	RET_TM	RET_TH	DEP_HW_X	DEP_HS_X
501	5	1		0.09048	0.08983	0.00507	0.00507	0.04628	0.01417	0.04979	0.08983	0.20449	0.1183	0.18252	0.1222	0.12597	0.08645	0.08645	0.14391	0.00676	0.04823	0.12597	0.20449	0.1183	0.18252	0.09048	0.08983
502	5	2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
503	5	3		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
504	5	4		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
505	5	5		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
506	5	6		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
507	5	7		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
508	5	8		0.19228	0.0181	0.219	0.219	0.1123	0.012	0.0228	0.0181	0.025	0.0408	0.0345	0.0004	0.0019	0	0	0.0371	0.0883	0.0698	0.0019	0.025	0.0408	0.0345	0.1748	0.0181
509	5	9		0.1018	0.02416	0.0576	0.0576	0.05792	0.01584	0.01104	0.02416	0.04	0.06528	0.0552	0.0064	0.01336	0	0	0.03416	0.05128	0.01536	0.01336	0.04	0.06528	0.0552	0.11928	0.02416
510	5	10		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
511	5	11		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
512	5	12		0.11418	0.25861	0.21538	0.21538	0.23958	0.46915	0.2794	0.25861	0.13013	0.19404	0.18403	0.13607	0.24893	0.35926	0.35926	0.23254	0.22352	0.39534	0.24893	0.13013	0.19404	0.18403	0.11418	0.25861
513	5	13		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
514	5	14		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
515	5	15		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
516	5	16		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
517	5	17		0.0124	0.0737	0.0346	0.0346	0.0543	0.0798	0.0492	0.0737	0.1156	0.0828	0.0734	0.162	0.0979	0.0373	0.0373	0.0641	0.0033	0.083	0.0979	0.1156	0.0828	0.0734	0.0124	0.0737
518	5	18		0.003825	0.04913	0.02176	0.02176	0.01938	0.06885	0.02567	0.04913	0.04913	0.03519	0.031195	0.10727	0.065025	0.015895	0.015895	0.03689	0.0051	0.032215	0.065025	0.04913	0.03519	0.031195	0.003825	0.04913
519	5	19		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
520	5	20		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
521	5	21		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
522	5	22		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
523	5	23		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
524	5	24		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
;Truck																											
;Lookup	TRK	Hour		DEP_HW	DEP_HS	DEP_HK	DEP_HC	DEP_HO	DEP_WO	DEP_OO	DEP_HY	DEP_TS	DEP_TM	DEP_TH	RET_HW	RET_HS	RET_HK	RET_HC	RET_HO	RET_WO	RET_OO	RET_HY	RET_TS	RET_TM	RET_TH	DEP_HW_X	DEP_HS_X
601	6	1		0.09048	0.08983	0.00507	0.00507	0.04628	0.01417	0.04979	0.08983	0.20449	0.1183	0.18252	0.1222	0.12597	0.08645	0.08645	0.14391	0.00676	0.04823	0.12597	0.20449	0.1183	0.18252	0.09048	0.08983
602	6	2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
603	6	3		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
604	6	4		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
605	6	5		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
606	6	6		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
607	6	7		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
608	6	8		0.19228	0.0181	0.219	0.219	0.1123	0.012	0.0228	0.0181	0.025	0.0408	0.0345	0.0004	0.0019	0	0	0.0371	0.0883	0.0698	0.0019	0.025	0.0408	0.0345	0.1748	0.0181

; Lookup	D1	Hour	DEP_HW	DEP_HS	DEP_HK	DEP_HC	DEP_HO	DEP_WO	DEP_OO	DEP_HY	DEP_TS	DEP_TM	DEP_TH	RET_HW	RET_HS	RET_HK	RET_HC	RET_HO	RET_WO	RET_OO	RET_HY	RET_TS	RET_TM	RET_TH	DEP_HW_X	DEP_HS_XX
609	6	9	0.1018	0.02416	0.0576	0.0576	0.05792	0.01584	0.01104	0.02416	0.04	0.06528	0.0552	0.0064	0.01336	0	0	0.03416	0.05128	0.01536	0.01336	0.04	0.06528	0.0552	0.11928	0.02416
610	6	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
611	6	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
612	6	12	0.11418	0.25861	0.21538	0.21538	0.23958	0.46915	0.2794	0.25861	0.13013	0.19404	0.18403	0.13607	0.24893	0.35926	0.35926	0.23254	0.22352	0.39534	0.24893	0.13013	0.19404	0.18403	0.11418	0.25861
613	6	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
614	6	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
615	6	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
616	6	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
617	6	17	0.0124	0.0737	0.0346	0.0346	0.0543	0.0798	0.0492	0.0737	0.1156	0.0828	0.0734	0.162	0.0979	0.0373	0.0373	0.0641	0.0033	0.083	0.0979	0.1156	0.0828	0.0734	0.0124	0.0737
618	6	18	0.003825	0.04913	0.02176	0.02176	0.01938	0.06885	0.02567	0.04913	0.04913	0.03519	0.031195	0.10727	0.065025	0.015895	0.015895	0.03689	0.0051	0.032215	0.065025	0.04913	0.03519	0.031195	0.003825	0.04913
619	6	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
620	6	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
621	6	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
622	6	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
623	6	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
624	6	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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ıe

D1		Hour	DEP_HK_X	DEP_HC_X	DEP_HO_X	DEP_WO_	DEP_OO_X	DEP_HY_X	DEP_TS_X	DEP_TM_X	DEP_TH_X	RET_HW_X	RET_HS_X	RET_HK_X	RET_HC_X	RET_HO_X	RET_WO_	RET_OO_X	RET_HY_X	RET_TS_XX	RET_TM_X	RET_TH_X	TOD
	1	1	0.00507	0.00507	0.04628	0.01417	0.04979	0.08983	0.20449	0.1183	0.18252	0.1222	0.12597	0.08645	0.08645	0.14391	0.00676	0.04823	0.12597	0.20449	0.1183	0.18252	; Off Peak
	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	8	0.219	0.219	0.1123	0.012	0.0228	0.0181	0.025	0.0408	0.0345	0.0004	0.0019	0	0	0.0371	0.0883	0.0698	0.0019	0.025	0.0408	0.0345	; AM Peak
	1	9	0.0576	0.0576	0.05792	0.01584	0.01104	0.02416	0.04	0.06528	0.0552	0.0064	0.01336	0	0	0.03416	0.05128	0.01536	0.01336	0.04	0.06528	0.0552	; AM Period
	1	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	12	0.21538	0.21538	0.23958	0.46915	0.2794	0.25861	0.13013	0.19404	0.18403	0.13607	0.24893	0.35926	0.35926	0.23254	0.22352	0.39534	0.24893	0.13013	0.19404	0.18403	; Mid-Day Period
	1	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	17	0.0346	0.0346	0.0543	0.0798	0.0492	0.0737	0.1156	0.0828	0.0734	0.162	0.0979	0.0373	0.0373	0.0641	0.0033	0.083	0.0979	0.1156	0.0828	0.0734	; PM Period
	1	18	0.02176	0.02176	0.01938	0.06885	0.02567	0.04913	0.04913	0.03519	0.031195	0.10727	0.065025	0.015895	0.015895	0.03689	0.0051	0.032215	0.065025	0.04913	0.03519	0.031195	; PM Peak
	1	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ıde 2																							
SR2		Hour	DEP_HK_X	DEP_HC_X	DEP_HO_X	DEP_WO_	DEP_OO_X	DEP_HY_X	DEP_TS_X	DEP_TM_X	DEP_TH_X	RET_HW_X	RET_HS_X	RET_HK_X	RET_HC_X	RET_HO_X	RET_WO_	RET_OO_X	RET_HY_X	RET_TS_XX	RET_TM_X	RET_TH_XX	
	2	1	0.00507	0.00507	0.04628	0.01417	0.04979	0.08983	0.20449	0.1183	0.18252	0.1222	0.12597	0.08645	0.08645	0.14391	0.00676	0.04823	0.12597	0.20449	0.1183	0.18252	; Off Peak
	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	8	0.219	0.219	0.1123	0.012	0.0228	0.0181	0.025	0.0408	0.0345	0.0004	0.0019	0	0	0.0371	0.0883	0.0698	0.0019	0.025	0.0408	0.0345	; AM Peak
	2	9	0.0576	0.0576	0.05792	0.01584	0.01104	0.02416	0.04	0.06528	0.0552	0.0064	0.01336	0	0	0.03416	0.05128	0.01536	0.01336	0.04	0.06528	0.0552	; AM Period
	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	12	0.21538	0.21538	0.23958	0.46915	0.2794	0.25861	0.13013	0.19404	0.18403	0.13607	0.24893	0.35926	0.35926	0.23254	0.22352	0.39534	0.24893	0.13013	0.19404	0.18403	; Mid-Day Period
	2	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	17	0.0346	0.0346	0.0543	0.0798	0.0492	0.0737	0.1156	0.0828	0.0734	0.162	0.0979	0.0373	0.0373	0.0641	0.0033	0.083	0.0979	0.1156	0.0828	0.0734	; PM Period
	2	18	0.02176	0.02176	0.01938	0.06885	0.02567	0.04913	0.04913	0.03519	0.031195	0.10727	0.065025	0.015895	0.015895	0.03689	0.0051	0.032215	0.065025	0.04913	0.03519	0.031195	; PM Peak
	2	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ıde 3+																							
SR3+		Hour	DEP_HK_X	DEP_HC_X	DEP_HO_X	DEP_WO_	DEP_OO_X	DEP_HY_X	DEP_TS_X	DEP_TM_X	DEP_TH_X	RET_HW_X	RET_HS_X	RET_HK_X	RET_HC_X	RET_HO_X	RET_WO_	RET_OO_X	RET_HY_X	RET_TS_XX	RET_TM_X	RET_TH_XX	
	3	1	0.00507	0.00507	0.04628	0.01417	0.04979	0.08983	0.20449	0.1183	0.18252	0.1222	0.12597	0.08645	0.08645	0.14391	0.00676	0.04823	0.12597	0.20449	0.1183	0.18252	; Off Peak
	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	8	0.219	0.219	0.1123	0.012	0.0228	0.0181	0.025	0.0408	0.0345	0.0004	0.0019	0	0	0.0371	0.0883	0.0698	0.0019	0.025	0.0408	0.0345	; AM Peak
	3	9	0.0576	0.0576	0.05792	0.01584	0.01104	0.02416	0.04	0.06528	0.0552	0.0064	0.01336	0	0	0.03416	0.05128	0.01536	0.01336	0.04	0.06528	0.0552	; AM Period
	3	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	12	0.21538	0.21538	0.23958	0.46915	0.2794	0.25861	0.13013	0.19404	0.18403	0.13607	0.24893	0.35926	0.35926	0.23254	0.22352	0.39534	0.24893	0.13013	0.19404	0.18403	; Mid-Day Period
	3	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

D1	Hour		DEP_HK_X	DEP_HC_X	DEP_HO_X	DEP_WO_	DEP_OO_X	DEP_HY_X	DEP_TS_X	DEP_TM_X	DEP_TH_X	RET_HW_X	RET_HS_X	RET_HK_X	RET_HC_X	RET_HO_X	RET_WO_	RET_OO_X	RET_HY_X	RET_TS_X	RET_TM_X	RET_TH_X	TOD
	3	17	0.0346	0.0346	0.0543	0.0798	0.0492	0.0737	0.1156	0.0828	0.0734	0.162	0.0979	0.0373	0.0373	0.0641	0.0033	0.083	0.0979	0.1156	0.0828	0.0734	; PM Period
	3	18	0.02176	0.02176	0.01938	0.06885	0.02567	0.04913	0.04913	0.03519	0.031195	0.10727	0.065025	0.015895	0.015895	0.03689	0.0051	0.032215	0.065025	0.04913	0.03519	0.031195	; PM Peak
	3	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
; Transit																							
TRN	Hour		DEP_HK_X	DEP_HC_X	DEP_HO_X	DEP_WO_	DEP_OO_X	DEP_HY_X	DEP_TS_X	DEP_TM_X	DEP_TH_X	RET_HW_X	RET_HS_X	RET_HK_X	RET_HC_X	RET_HO_X	RET_WO_	RET_OO_X	RET_HY_X	RET_TS_XX	RET_TM_X	RET_TH_XX	
	4	1	0.00507	0.00507	0.04628	0.01417	0.04979	0.08983	0.20449	0.1183	0.18252	0.1222	0.12597	0.08645	0.08645	0.14391	0.00676	0.04823	0.12597	0.20449	0.1183	0.18252	; Off Peak
	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	8	0.219	0.219	0.1123	0.012	0.0228	0.0181	0.025	0.0408	0.0345	0.0004	0.0019	0	0	0.0371	0.0883	0.0698	0.0019	0.025	0.0408	0.0345	; AM Peak
	4	9	0.0576	0.0576	0.05792	0.01584	0.01104	0.02416	0.04	0.06528	0.0552	0.0064	0.01336	0	0	0.03416	0.05128	0.01536	0.01336	0.04	0.06528	0.0552	; AM Period
	4	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	12	0.21538	0.21538	0.23958	0.46915	0.2794	0.25861	0.13013	0.19404	0.18403	0.13607	0.24893	0.35926	0.35926	0.23254	0.22352	0.39534	0.24893	0.13013	0.19404	0.18403	; Mid-Day Period
	4	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	17	0.0346	0.0346	0.0543	0.0798	0.0492	0.0737	0.1156	0.0828	0.0734	0.162	0.0979	0.0373	0.0373	0.0641	0.0033	0.083	0.0979	0.1156	0.0828	0.0734	; PM Period
	4	18	0.02176	0.02176	0.01938	0.06885	0.02567	0.04913	0.04913	0.03519	0.031195	0.10727	0.065025	0.015895	0.015895	0.03689	0.0051	0.032215	0.065025	0.04913	0.03519	0.031195	; PM Peak
	4	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
WLK	Hour		DEP_HK_X	DEP_HC_X	DEP_HO_X	DEP_WO_	DEP_OO_X	DEP_HY_X	DEP_TS_X	DEP_TM_X	DEP_TH_X	RET_HW_X	RET_HS_X	RET_HK_X	RET_HC_X	RET_HO_X	RET_WO_	RET_OO_X	RET_HY_X	RET_TS_XX	RET_TM_X	RET_TH_XX	
	5	1	0.00507	0.00507	0.04628	0.01417	0.04979	0.08983	0.20449	0.1183	0.18252	0.1222	0.12597	0.08645	0.08645	0.14391	0.00676	0.04823	0.12597	0.20449	0.1183	0.18252	; Off Peak
	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	8	0.219	0.219	0.1123	0.012	0.0228	0.0181	0.025	0.0408	0.0345	0.0004	0.0019	0	0	0.0371	0.0883	0.0698	0.0019	0.025	0.0408	0.0345	; AM Peak
	5	9	0.0576	0.0576	0.05792	0.01584	0.01104	0.02416	0.04	0.06528	0.0552	0.0064	0.01336	0	0	0.03416	0.05128	0.01536	0.01336	0.04	0.06528	0.0552	; AM Period
	5	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	12	0.21538	0.21538	0.23958	0.46915	0.2794	0.25861	0.13013	0.19404	0.18403	0.13607	0.24893	0.35926	0.35926	0.23254	0.22352	0.39534	0.24893	0.13013	0.19404	0.18403	; Mid-Day Period
	5	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	17	0.0346	0.0346	0.0543	0.0798	0.0492	0.0737	0.1156	0.0828	0.0734	0.162	0.0979	0.0373	0.0373	0.0641	0.0033	0.083	0.0979	0.1156	0.0828	0.0734	; PM Period
	5	18	0.02176	0.02176	0.01938	0.06885	0.02567	0.04913	0.04913	0.03519	0.031195	0.10727	0.065025	0.015895	0.015895	0.03689	0.0051	0.032215	0.065025	0.04913	0.03519	0.031195	; PM Peak
	5	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TRK	Hour		DEP_HK_X	DEP_HC_X	DEP_HO_X	DEP_WO_	DEP_OO_X	DEP_HY_X	DEP_TS_X	DEP_TM_X	DEP_TH_X	RET_HW_X	RET_HS_X	RET_HK_X	RET_HC_X	RET_HO_X	RET_WO_	RET_OO_X	RET_HY_X	RET_TS_XX	RET_TM_X	RET_TH_XX	
	6	1	0.00507	0.00507	0.04628	0.01417	0.04979	0.08983	0.20449	0.1183	0.18252	0.1222	0.12597	0.08645	0.08645	0.14391	0.00676	0.04823	0.12597	0.20449	0.1183	0.18252	; Off Peak
	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6	8	0.219	0.219	0.1123	0.012	0.0228	0.0181	0.025	0.0408	0.0345	0.0004	0.0019	0	0	0.0371	0.0883	0.0698	0.0019	0.025	0.0408	0.0345	; AM Peak

D1	Hour	DEP_HK_X	DEP_HC_X	DEP_HO_X	DEP_WO_	DEP_OO_X	DEP_HY_X	DEP_TS_X	DEP_TM_X	DEP_TH_X	RET_HW_X	RET_HS_X	RET_HK_X	RET_HC_X	RET_HO_X	RET_WO_	RET_OO_X	RET_HY_X	RET_TS_X	RET_TM_X	RET_TH_X	TOD
6	9	0.0576	0.0576	0.05792	0.01584	0.01104	0.02416	0.04	0.06528	0.0552	0.0064	0.01336	0	0	0.03416	0.05128	0.01536	0.01336	0.04	0.06528	0.0552	; AM Period
6	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6	12	0.21538	0.21538	0.23958	0.46915	0.2794	0.25861	0.13013	0.19404	0.18403	0.13607	0.24893	0.35926	0.35926	0.23254	0.22352	0.39534	0.24893	0.13013	0.19404	0.18403	; Mid-Day Period
6	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6	17	0.0346	0.0346	0.0543	0.0798	0.0492	0.0737	0.1156	0.0828	0.0734	0.162	0.0979	0.0373	0.0373	0.0641	0.0033	0.083	0.0979	0.1156	0.0828	0.0734	; PM Period
6	18	0.02176	0.02176	0.01938	0.06885	0.02567	0.04913	0.04913	0.03519	0.031195	0.10727	0.065025	0.015895	0.015895	0.03689	0.0051	0.032215	0.065025	0.04913	0.03519	0.031195	; PM Peak
6	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

; Roadway parameters by facility and typology

; Capacity (	Terrain	Area Type	Facility Typ	Capacity_1	Capacity_2	Speed Max	Alpha	Beta	OpsCap_1	OpsCap_2	Description
1	1	1	1	2100	2100	70	0.25	9	2205	2310	Flat, Rural, Freeway
2	1	1	2	1680	2100	45	0.08	6	1680	2200	Flat, Rural, Highway
3	1	1	3	1155	1155	55	0.08	6	1680	2200	Flat, Rural, Expressway
4	1	1	4	945	945	45	0.07	6	1680	1980	Flat, Rural, Arterial
5	1	1	5	735	735	50	0.07	6	1680	1980	Flat, Rural, Collector
6	1	1	6	600	600	40	0.34	4	1155	1870	Flat, Rural, Local
7	1	1	7	1900	1900	50	0.08	6	1890	1980	Flat, Rural, Ramp:Freeway-Freeway
8	1	1	8	1600	1600	50	0.74	5	1575	1650	Flat, Rural, Ramp:Slip
9	1	1	9	1300	1300	45	0.7	5	1313	1375	Flat, Rural, Ramp:Loop
10	1	1	10	0	0	35	0	0	0	0	Flat, Rural, Connector: Internal
11	1	2	1	2000	2000	70	0.25	9	2100	2200	Flat, Suburban, Freeway
12	1	2	2	1600	2000	45	0.08	6	1680	2200	Flat, Suburban, Highway
13	1	2	3	1100	1100	55	0.08	6	1155	1210	Flat, Suburban, Expressway
14	1	2	4	900	900	45	0.38	5	945	990	Flat, Suburban, Arterial
15	1	2	5	700	700	50	0.96	5	735	770	Flat, Suburban, Collector
16	1	2	6	600	600	40	1.11	5	630	660	Flat, Suburban, Local
17	1	2	7	1800	1800	50	0.08	6	1890	1980	Flat, Suburban, Ramp:Freeway-Freeway
18	1	2	8	1500	1500	50	0.74	5	1575	1650	Flat, Suburban, Ramp:Slip
19	1	2	9	1250	1250	45	0.7	5	1313	1375	Flat, Suburban, Ramp:Loop
20	1	2	11	0	0	15	0	0	0	0	Flat, Suburban, Connector: External
21	1	3	1	1900	1900	65	0.25	9	1995	2090	Flat, Urban, Freeway
22	1	3	2	1600	1600	45	0.34	4	1680	1760	Flat, Urban, Highway
23	1	3	3	1000	1000	55	0.74	5	1050	1100	Flat, Urban, Expressway
24	1	3	4	800	800	45	0.7	5	840	880	Flat, Urban, Arterial
25	1	3	5	700	700	40	1	5	735	770	Flat, Urban, Collector
26	1	3	6	600	600	40	1.2	5	630	660	Flat, Urban, Local
27	1	3	7	1800	1800	50	0.08	6	1890	1980	Flat, Urban, Ramp:Freeway-Freeway
28	1	3	8	1500	1500	50	0.74	5	1575	1650	Flat, Urban, Ramp:Slip
29	1	3	9	1250	1250	45	0.7	5	1313	1375	Flat, Urban, Ramp:Loop
30	1	3	0	0	0	0	0	0	0	0	#N/A
31	1	4	1	1800	1800	65	0.18	8.5	1890	1980	Flat, Fringe, Freeway
32	1	4	2	1500	1500	45	0.07	6	1575	1650	Flat, Fringe, Highway
33	1	4	3	900	900	55	0.74	5	945	990	Flat, Fringe, Expressway
34	1	4	4	800	800	45	0.7	5	840	880	Flat, Fringe, Arterial
35	1	4	5	700	700	40	1	5	735	770	Flat, Fringe, Collector
36	1	4	6	600	600	40	1.5	5	630	660	Flat, Fringe, Local
37	1	4	7	1800	1800	50	0.08	6	1890	1980	Flat, Fringe, Ramp:Freeway-Freeway
38	1	4	8	1500	1500	50	0.74	5	1575	1650	Flat, Fringe, Ramp:Slip
39	1	4	9	1250	1250	45	0.7	5	1313	1375	Flat, Fringe, Ramp:Loop
40	1	4	0	0	0	0	0	0	0	0	#N/A
41	1	5	1	1750	1750	65	0.1	10	1838	1925	Flat, CBD, Freeway
42	1	5	2	1300	1300	45	0.07	6	1365	1430	Flat, CBD, Highway
43	1	5	3	800	800	45	1.16	6	840	880	Flat, CBD, Expressway
44	1	5	4	750	750	45	1	5	788	825	Flat, CBD, Arterial
45	1	5	5	700	700	40	1.4	5	735	770	Flat, CBD, Collector
46	1	5	6	600	600	40	1.5	5	630	660	Flat, CBD, Local
47	1	5	7	1800	1800	50	0.08	6	1890	1980	Flat, CBD, Ramp:Freeway-Freeway
48	1	5	8	1500	1500	50	0.74	5	1575	1650	Flat, CBD, Ramp:Slip
49	1	5	9	1250	1250	45	0.7	5	1313	1375	Flat, CBD, Ramp:Loop
50	1	5	0	0	0	0	0	0	0	0	#N/A
51	2	1	1	1800	1800	70	0.25	9	1890	1980	Rolling, Rural, Freeway
52	2	1	2	1300	1800	45	0.08	6	1365	1980	Rolling, Rural, Highway
53	2	1	3	1300	1800	65	0.08	6	1365	1980	Rolling, Rural, Expressway
54	2	1	4	1300	1700	45	0.07	6	1365	1870	Rolling, Rural, Arterial
55	2	1	5	1300	1700	50	0.07	6	1365	1870	Rolling, Rural, Collector
56	2	1	6	1000	1600	50	0.34	4	1050	1760	Rolling, Rural, Local
57	2	1	7	1800	1800	50	0.08	6	1890	1980	Rolling, Rural, Ramp:Freeway-Freeway
58	2	1	8	1500	1500	50	0.74	5	1575	1650	Rolling, Rural, Ramp:Slip
59	2	1	9	1250	1250	45	0.7	5	1313	1375	Rolling, Rural, Ramp:Loop
60	2	1	10	0	0	35	0	0	0	0	Rolling, Rural, Connector: Internal
61	2	2	1	1800	1800	70	0.25	9	1890	1980	Rolling, Suburban, Freeway
62	2	2	2	1300	1800	45	0.08	6	1365	1980	Rolling, Suburban, Highway
63	2	2	3	890	890	65	0.08	6	935	979	Rolling, Suburban, Expressway
64	2	2	4	730	730	45	0.38	5	767	803	Rolling, Suburban, Arterial
65	2	2	5	570	570	50	0.96	5	599	627	Rolling, Suburban, Collector
66	2	2	6	550	550	50	1.11	5	578	605	Rolling, Suburban, Local
67	2	2	7	1800	1800	50	0.08	6	1890	1980	Rolling, Suburban, Ramp:Freeway-Freeway
68	2	2	8	1500	1500	50	0.74	5	1575	1650	Rolling, Suburban, Ramp:Slip
69	2	2	9	1250	1250	45	0.7	5	1313	1375	Rolling, Suburban, Ramp:Loop
70	2	2	11	0	0	15	0	0	0	0	Rolling, Suburban, Connector: External
71	2	3	1	1620	1620	70	0.18	8.5	1701	1782	Rolling, Urban, Freeway
72	2	3	2	1300	1300	45	0.34	4	1365	1430	Rolling, Urban, Highway
73	2	3	3	810	810	65	0.74	5	851	891	Rolling, Urban, Expressway
74	2	3	4	730	730	45	0.7	5	767	803	Rolling, Urban, Arterial

District

D 1 = 101-110 ; Alpaugh
D 2 = 111-131 ; Cutler
D 3 = 132-225 ; Dinuba
D 4 = 226-237 ; Ducor
D 5 = 238-265 ; Earlimart
D 6 = 266-290 ; East Porterville
D 7 = 291-375 ; Exeter
D 8 = 376-450 ; Farmersville
D 9 = 451-470 ; Goshen
D 10 = 471-510 ; Ivanhoe
D 11 = 511-600 ; Lindsay
D 12 = 601-611 ; London
D 13 = 612-675 ; Orosi
D 14 = 676-695 ; Pixley
D 15 = 696-700 ; Poplor-Cotton Cen
D 16 = 701-839 ; Porterville
D 17 = 911-936 ; Strathmore
D 18 = 937-950 ; Terra Bella
D 19 = 951-967 ; Three Rivers
D 20 = 968-975 ; Tipton
D 21 = 976-1000 ; Traver
D 22 = 1001-1156; Tulare
D 23 = 1201-1579 ; Visalia
D 24 = 1580-1625 ; Woodlake
D 25 = 1626-1628; Woodville
D 26 = 840-910,1011,1122,1136,1157-1200,1629-2105 ; Unincorporated

Lables

1 Alpaugh
2 Cutler
3 Dinuba
4 Ducor
5 Earlimart
6 East Porterville
7 Exeter
8 Farmersville
9 Goshen
10 Ivanhoe
11 Lindsay
12 London
13 Orosi
14 Pixley
15 Poplor-Cotton Cen
16 Porterville
17 Strathmore
18 Terra Bella
19 Three Rivers
20 Tipton
21 Traver
22 Tulare
23 Visalia
24 Woodlake
25 Woodville
26 Unincorporated

Note: This file has been transposed for reporting and should not be used directly as formated in the model

; LOS_NO	1	2	3	4	5	6
TEMP01	0	100	590	810	850	999999
U_FWY_G2_2	1270	2110	2940	3580	3980	999999
U_FWY_G2_3	1970	3260	4550	5530	6150	999999
U_FWY_G2_4	2660	4410	6150	7480	8320	999999
U_FWY_G2_5	3360	5560	7760	9440	10480	999999
U_FWY_G2_6	4050	6710	9360	11390	12650	999999
TEMP07	0	100	590	810	850	999999
TEMP08	0	100	590	810	850	999999
TEMP09	0	100	590	810	850	999999
TEMP10	0	100	590	810	850	999999
TEMP11	0	100	590	810	850	999999
U_FWY_L2_2	1130	1840	2660	3440	3910	999999
U_FWY_L2_3	1780	2890	4180	5410	6150	999999
U_FWY_L2_4	2340	3940	5700	7380	8380	999999
U_FWY_L2_5	3080	4990	7220	9340	10620	999999
U_FWY_L2_6	3730	6040	8740	11310	12850	999999
TEMP17	0	100	590	810	850	999999
TEMP18	0	100	590	810	850	999999
TEMP19	0	100	590	810	850	999999
TEMP20	0	100	590	810	850	999999
U_HWY_UI_1	100	340	670	950	1300	999999
U_HWY_UI_2	1060	1720	2500	3230	3670	999999
U_HWY_UI_3	1600	2590	3740	4840	5500	999999
TEMP24	0	100	590	810	850	999999
TEMP25	0	100	590	810	850	999999
TEMP26	0	100	590	810	850	999999
TEMP27	0	100	590	810	850	999999
TEMP28	0	100	590	810	850	999999
TEMP29	0	100	590	810	850	999999
TEMP30	0	100	590	810	850	999999
U_ART_C1_1	0	220	720	860	890	999999
U_ART_C1_2	250	1530	1810	1860	1861	999999
U_ART_C1_3	380	2330	2720	2790	2791	999999
U_ART_C1_4	490	3030	3460	3540	3541	999999
TEMP35	0	100	590	810	850	999999
U_ART_C2_1	0	100	590	810	850	999999
U_ART_C2_2	0	220	1360	1710	1800	999999
U_ART_C2_3	0	340	2110	2570	2710	999999
U_ART_C2_4	0	440	2790	3330	3500	999999
TEMP40	0	100	590	810	850	999999
U_ART_C3_1	0	1	280	660	810	999999
U_ART_C3_2	0	1	650	1510	1720	999999
U_ART_C3_3	0	1	1020	2330	2580	999999
U_ART_C3_4	0	1	1350	3070	3330	999999
TEMP45	0	100	590	810	850	999999
U_ART_C4_1	0	1	270	720	780	999999
U_ART_C4_2	0	1	650	1580	1660	999999
U_ART_C4_3	0	1	1000	2390	2490	999999
U_ART_C4_4	0	1	1350	3130	3250	999999
TEMP50	0	100	590	810	850	999999
U_MAJ_NS_1	0	1	480	760	810	999999
U_MAJ_NS_2	0	1	1120	1620	1720	999999
U_MAJ_NS_3	0	1	1740	2450	2580	999999
TEMP54	0	100	590	810	850	999999
TEMP55	0	100	590	810	850	999999
U_OTH_NS_1	0	1	250	530	660	999999
U_OTH_NS_2	0	1	580	1140	1320	999999
U_OTH_NS_3	0	1	870	1710	1980	999999
TEMP59	0	100	590	810	850	999999
TEMP60	0	100	590	810	850	999999
TEMP61	0	100	590	810	850	999999
TEMP62	0	100	590	810	850	999999
TEMP63	0	100	590	810	850	999999
TEMP64	0	100	590	810	850	999999
TEMP65	0	100	590	810	850	999999
TEMP66	0	100	590	810	850	999999
TEMP67	0	100	590	810	850	999999
TEMP68	0	100	590	810	850	999999
TEMP69	0	100	590	810	850	999999
TEMP70	0	100	590	810	850	999999
TEMP71	0	100	590	810	850	999999
R_FWY_RU_2	1220	2020	2740	3240	3600	999999
R_FWY_RU_3	1890	3110	4230	5000	5560	999999
R_FWY_RU_4	2560	4210	5720	6770	7520	999999
TEMP75	0	100	590	810	850	999999
TEMP76	0	100	590	810	850	999999
TEMP77	0	100	590	810	850	999999
TEMP78	0	100	590	810	850	999999
TEMP79	0	100	590	810	850	999999
TEMP80	0	100	590	810	850	999999
R_HWY_RU_1	120	250	410	650	1060	999999
R_HWY_RU_2	940	1540	2200	2830	3140	999999
R_HWY_RU_3	1410	2310	3330	4240	4710	999999
TEMP84	0	100	590	810	850	999999
TEMP85	0	100	590	810	850	999999
R_HWY_SU_1	120	350	600	820	1120	999999
R_HWY_SU_2	950	1540	2230	2890	3280	999999
R_HWY_SU_3	1430	2310	3350	4330	4920	999999
TEMP89	0	100	590	810	850	999999
TEMP90	0	100	590	810	850	999999
R_ART_SU_1	0	120	590	740	800	999999
R_ART_SU_2	0	290	1360	1570	1660	999999
R_ART_SU_3	0	450	2100	2360	2500	999999
TEMP94	0	100	590	810	850	999999
TEMP95	0	100	590	810	850	999999
R_LOC_SU_1	0	1	100	410	540	999999
TEMP97	0	100	590	810	850	999999
TEMP98	0	100	590	810	850	999999
TEMP99	0	100	590	810	850	999999