

SPRTA 2023 Model Development Report

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1.0 INTRODUCTION

1.1 Background

The first version of the Placer County travel demand model was developed for use in Placer County's 1992 Congestion Management Program. It was pieced together from earlier models for individual cities and from SACOG's regional model. This model was superseded in 1996 by a new model developed for use in updating the County's General Plan and for preparing nexus studies for impact fees in unincorporated parts of Placer County. The model was developed in MINUTP, a software package that was widely used at the time but has since been replaced by other, more powerful software packages. Trips to and from the other five counties in the SACOG region were based on SACOG's regional model SACMET.

The next model was developed in the early 2000's. It was sponsored by the Placer County Transportation Commission, now known as the Placer County Transportation Planning Agency (PCTPA), for use in the initial nexus study for the South Placer Regional Transportation Agency (SPRTA) impact fee program in 2002. There is limited documentation for this model, but it is clear that it switched software platforms from MINUTP to CUBE and focused on the southwest portion of the county. The model was updated in 2007, 2009, and 2014 for use in updates of the SPRTA fees.

In addition to the SPRTA model, there are other models currently in use that cover all or part of the SPRTA region. These include SACOG's SACSIM model, the replacement for SACMET, and local models maintained for the cities of Roseville, Rocklin, and Lincoln.

In 2020 PCTPA engaged WSP to update the SPRTA model for use in a nexus update of the SPRTA fee program. The updated model is intended for use in PCTPA's planning work and by member agencies in their traffic studies. In the interests of continuity, many features of previous models have been carried over into the new model, for example the CUBE software platform and the land use categories. However, new features have been added to keep abreast of modeling needs. For example, a component has been added to forecast VMT pursuant to a new requirement under SB-743.

1.2 Purpose of this Report

The purpose of this report is to document the structure, input data, model assumptions, and validation results of the updated PCTPA Model. This report can then be cited in the documentation of studies that make use of the model as evidence that the model used met or exceeded industry standards for accuracy.

A companion document, the *SPRTA 2021 Model User's Guide*, provides information that new users of the SPRTA model may find useful. The guide discusses the contents of the files that comprise the model and describes how to perform the most common modeling tasks.

2.0 COMPONENTS OF THE MODEL

The key components of the 2019 SPRTA Traffic Model, including input assumptions, are described below. Their relationship to each other is shown in Exhibit 1.

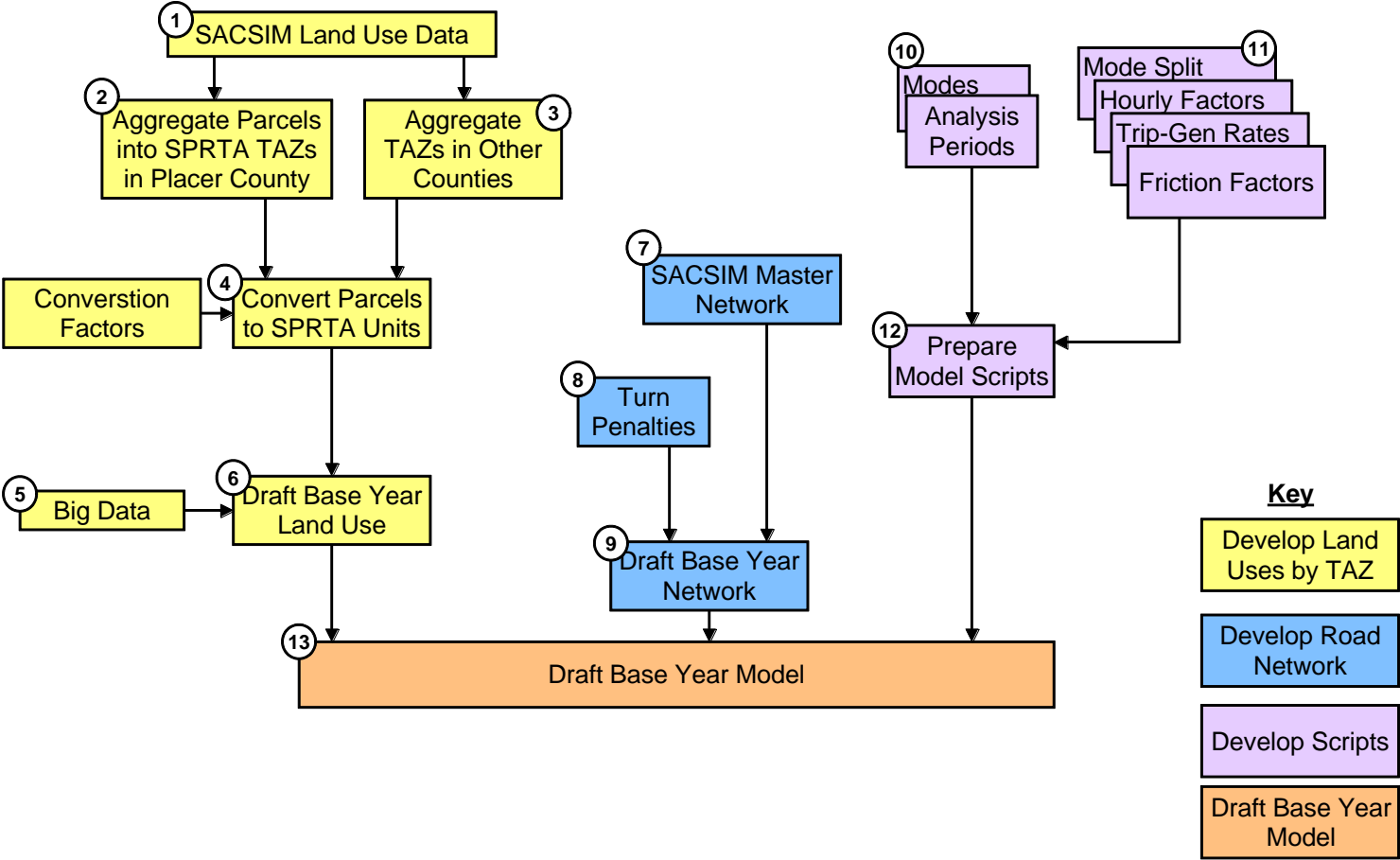
2.1 Population, Employment, and Traffic

- 1) *Land Use Data Source* – The starting point for preparing the model land use was SACSIM land use. This offers several key advantages, namely: (a) it was recently updated, (b) it covers the other five SACOG counties that functionally interact with Placer County, (c) it includes an approved set of assumptions for future development in those other counties (the Sustainable Communities Strategy), and (d) it is parcel-based, which makes it easy to delineate new travel analysis zones (TAZs) in the Placer County area.
- 2) *Aggregate Parcels to TAZs in SPRTA Area* – SACSIM was designed to fit SACOG’s modeling needs, which differ in some respects from those of PCTPA and its member agencies. The most obvious difference is that SACSIM does not have the desired level of detail in southwest Placer County. So instead of using the SACSIM TAZs in this area, the parcel-level data from SACSIM was aggregated into the TAZ system from the previous SPRTA travel demand model.
- 3) *Aggregating TAZs Outside of Placer County* – The biggest factor in the run time of most trip-based models is the number of TAZs. This affects the time required for the matrix math calculations. For example, doubling the number of TAZs approximately quadruples the time needed to process an origin-destination (O-D) table since it would double both the rows and the columns.

Our discussions with potential users found that they greatly preferred short run times and that while some detail was needed in the areas immediately adjacent to the SPRTA area (Citrus Heights, etc.), there was no need to have a lot of detail in more distant places like Placerville, Davis, or Elk Grove. We therefore aggregated SACSIM zones in those areas to reduce the total number of TAZs to keep run times as short as possible.

- 4) *Converting SACSIM Land Uses to SPRTA Fee Categories* – SACSIM’s land use data is in units of households (for residential land uses) and employees (for non-residential land uses). In contrast, the SPRTA fees are denominated in units of dwelling units for residential developments and in units of square feet for most non-residential uses. In addition, the household and job categories used in SACSIM do not align with the land-use categories used for SPRTA. Fortunately, the SACSIM GIS parcel boundary layer included dwelling units and more detailed land use categories than those in the SACSIM parcel input file. We therefore applied a set of conversion factors to change SACSIM’s detailed land use data into units suitable for SPRTA. The conversion factors were mostly estimated from ITE trip generation rates by KSF versus by the employee.

Exhibit 1: Components of the SPRTA Base Year Model



- 5) *Collect Big Data for External Trip Distance* – We used Replica and Streetlight data to estimate trip lengths for external trips. Replica Data, a web-based platform that utilizes publicly available data, such as mobile device data, census data, real estate data, and traffic counts to estimate the number and average length of trips that occur between external areas and gateways of the SPRTA region. The Replica Data platform includes an analysis called Select Zone, which provides the number of trips that occur between Placer County to any census geography (in this case, to the other counties). The average distance from the model edge to each county for those trips was estimated by Google Map. We then calculated the VMT of external-internal and internal-external (EI/IE) trips outside of the model area because the model will naturally include the VMT of their trips within the model area.
- 6) The results of steps 1 through 5 was the draft land use file for the updated SPRTA model.

2.2 Road Network

The road network file for the new SPRTA Model uses a master network file, meaning that the network contains links representing both existing and future roads. The user can enable and disable links depending on what scenario they would like to test.

- 7) *Model Network Data Source* – The starting point for preparing the new model network was the SACSIM master network file. Since SACOG has not yet developed a master network for SACSIM, WSP created a master network file by combining the network file for each modeling year. We then detailed out the Placer County area using aerial photography in Google Earth Pro and the local knowledge.
- 8) *Turn Penalty* – Most traffic models make the simplifying implicit assumption that vehicle travel times are controlled by each road segment’s length, cross-section, and volume/capacity ratio. But in an urban environment, delays at intersections can be significant and may affect the choice of routes a driver takes. For example, if no account is taken for intersection delay, then traffic in the model may route through arterials to avoid congestion at the I-80/SR-65 interchange. In addition, certain movements may be prohibited at some intersections. Turn penalties, which add travel time to individual movements at an intersection, can be used to represent delays at major intersections to make travel times and routing more realistic. They are labor-intensive to code, however, and so were only used where necessary during model validation to correct unrealistic routing.
- 9) The result of steps 7 and 8 was a draft road network file ready for testing.

2.3 Other Model Parameters and Scripts

- 10) *Non-auto Modes* –Prior to developing the model we had discussions with potential users from several SPRTA member agencies, who indicated that a three-step model can satisfy their needs and that they would prefer that model development resources be devoted to the auto mode rather than devoting substantial resources to develop an elaborate transit component. In accordance with this guidance, only autos and trucks are represented in the model, as was the case with previous Placer County models. However, the transit lines that are in the SACSIM19 model were retained in the SPRTA model, which would be helpful in the event that a future user wished to add a transit module to the model.

Another key decision was which time periods to represent in the model. Potential users indicated that modeling the a.m. and p.m. peak hours would be needed for planning and design work, and a daily period would be needed for the VMT analysis required under SB-743.

- 11) *Trip Generation Rates and Other Model Inputs* – The model requires a number of other parameters such as mode choice formulas, daily-to-hourly factors, trip generation rates, and friction factors. These are different from the land use, and road network files in that users would not ordinarily be editing them when evaluating projects.

Some of these parameters came from the SACSIM model, but others were developed specifically for the South Placer County region. We used the trip generation rates from the previous SPRTA.

- 12) We prepared a model script and input files for use in performing model runs for the analysis periods and modes.
- 13) The land use file from Step 6, the road network files from Step 9, and the model scripts from Step 12 were then combined to produce the draft base year model.

3.0 TRAVEL BEHAVIOR ASSUMPTIONS

3.1 Trip Purposes

The SPRTA traffic model splits trips into six types depending on the trip purpose consistent with the previous SPRTA model. These trip types are:

- Home-Based Work (HBW) Trips – These are trips where the traveler’s home is at one end (origin or destination), and the traveler’s customary workplace is at the other.
- Home-Based Shopping (HBS) Trips - These are trips where the traveler’s home is at one end (origin or destination), and the other end is a shopping place.
- Home-Based School (HBSch) Trips - These are trips where the traveler’s home is at one end (origin or destination), and the other end is a school place.
- Home-Based Other (HBO) Trips - These are trips where the traveler’s home is at one end (origin or destination), and the other end is someplace other than the traveler’s customary workplace, shopping, or schools. A trip from the traveler’s home to a friend’s home would be an HBO trip.
- Work-to-Other (W-O) Trips – These are trips where the traveler’s workplace is one end (origin or destination), and the other end is someplace other than the traveler’s home.
- Other-to-Other (O-O) Trips – These are trips where the traveler’s home and workplace are neither the origin nor the destination. Examples of these trips are trip chains among retail destinations.

3.2 Time of Day Factors

The time of day factors used in the 2019 SPRTA Traffic Model are shown in Exhibit 2. The starting point of the factors for both the AM and PM peak hours are carry-overs from the 2013 model. These factors were adjusted during the model calibration to fit better with 2019 traffic counts. All factors are within the normal range for the types of trips involved.

Exhibit 2: Time of Day Factors

| Trip Purpose | AM Peak Hour | | PM Peak Hour | |
|--------------|--------------|-----------|--------------|-----------|
| | Departing | Returning | Departing | Returning |
| HBW | 11.52 | 0.48 | 1.17 | 12.40 |
| HBS | 1.15 | 0.38 | 2.76 | 4.66 |
| HBSch | 16.32 | 12.48 | 0.95 | 1.06 |
| HBO | 3.84 | 0.96 | 2.76 | 4.66 |
| W-O | 3.36 | 1.15 | 2.54 | 4.24 |
| O-O | 1.34 | 1.34 | 3.50 | 3.50 |

3.3 Trip Generation Rates

The trip generation rates used in the model are shown in Exhibit 3, while Exhibit 4 shows the distribution percentage of these rates for each trip purpose. The trip generation rates were retained from the 2013 model and are similar to the rates found in the ITE Trip Generation Manual and other sources. Note that two extra land use categories (S2 and S1) were added in case of an expansion during the model development or later use.

3.4 Vehicle-Miles Traveled

As a result of SB-743, it is expected that many model applications will involve a calculation of a project's effects on vehicle-miles traveled (VMT). In the SPRTA 2021 Model, VMT is calculated in the script in two components, which are then combined into a total VMT calculation at the end of the model run. The two components are:

- **Regional VMT:** For the road links in the six-county SACOG region, VMT is calculated by multiplying the number of vehicles on each link by the length of the link, and then summing to produce the regional total. Note that trips that do not enter or leave Placer County are pre-loaded onto the network and remain the same for all model runs for a given model year. This eliminates any spurious changes to regional VMT that might otherwise arise in successive model runs. The differences in VMT between model runs are only the one attributable to changes in the land uses or network, or both, in Placer County.
- **External VMT:** Trips between Placer County and places outside the SACOG region include miles traveled within the region and additional miles outside the region. The miles traveled within the region are captured through the link-by-link calculation described in the previous bullet point. For the miles traveled outside the region, data from Replica was used to compute the weighted average distance outside the SACOG region for each gateway TAZ. Exhibit 5 shows the external gateways in the SPRTA model, and Exhibit 6 shows the computation of average external distance from the model gateway to the places outside of the SACOG region. These average external distances are coded to AVGTRVLDST field of the model network. The model uses this field, instead of the model default link distance, to calculate external VMT. The resulting daily VMT is added in the loaded daily network as well as summarized in a text report file, VMT_Summary.txt.

Exhibit 3: Trip Generation Rates

| Land Use Description | Label in Model | UNIT | Production | | | | | | Attraction | | | | | | Daily Total |
|--------------------------|----------------|---------|------------|------|-------|------|-------|-------|------------|------|-------|-------|-------|-------|-------------|
| | | | HBW | HBS | HBSch | HBO | W_O | O_O | HBW | HBS | HBSch | HBO | W_O | O_O | |
| Single-Family DU | SFDU | DU | 2.16 | 1.44 | 0.54 | 3.06 | | 0.54 | | | | 0.81 | | 0.45 | 9.0 |
| Multi-Family DU | MFDU | DU | 1.76 | 1.11 | 0.13 | 2.28 | | 0.33 | | | | 0.59 | | 0.33 | 6.5 |
| Adult Residential DU | ARDU | DU | 0.17 | 0.63 | | 1.32 | | 0.20 | | | | 0.79 | | 0.20 | 3.3 |
| Retail | RET | KSF | | | | | 3.15 | 5.95 | 2.45 | 8.75 | | 7.70 | 1.05 | 5.95 | 35.0 |
| Mall | MALL | KSF | | | | | 2.34 | 4.42 | 1.82 | 6.50 | | 5.72 | 0.78 | 4.42 | 26.0 |
| Office | OFF | KSF | | | | | 1.59 | 1.42 | 6.71 | | | 3.20 | 3.36 | 1.42 | 17.7 |
| Industrial | IND | KSF | | | | | 0.91 | 0.61 | 2.89 | | | 0.91 | 1.67 | 0.61 | 7.6 |
| High Technical Institute | HTI | KSF | | | | | 1.26 | 0.84 | 3.99 | | | 1.26 | 2.31 | 0.84 | 10.5 |
| Community Commercial | CC | KSF | | | | | 11.90 | 19.83 | 14.54 | | | 54.20 | 11.90 | 19.83 | 132.2 |
| Church | CHURCH | KSF | | | | | 0.84 | 1.40 | 1.02 | | | 3.81 | 0.84 | 1.40 | 9.3 |
| Lodge | LODGE | KSF | | | | | 1.71 | 2.85 | 2.09 | | | 7.79 | 1.71 | 2.85 | 19.0 |
| Medical | MED | KSF | | | | | 3.43 | 4.51 | 7.22 | | | 13.00 | 3.43 | 4.51 | 36.1 |
| Hospital | HOSP | KSF | | | | | 1.67 | 2.20 | 3.52 | | | 6.34 | 1.67 | 2.20 | 17.6 |
| Convalescent Hospital | CONV | KSF | | | | | 0.48 | 0.63 | 1.00 | | | 1.80 | 0.48 | 0.63 | 5.0 |
| Hotel | HOTEL | Rooms | 0.34 | 0.56 | | 0.90 | 0.45 | 0.50 | 0.62 | | | 1.46 | 0.28 | 0.50 | 5.6 |
| PQP Low | PQPL | KSF | | | | | 0.81 | 1.35 | 0.99 | | | 3.69 | 0.81 | 1.35 | 9.0 |
| PQP High | PQPH | KSF | | | | | 2.25 | 3.75 | 2.75 | | | 10.25 | 2.25 | 3.75 | 25.0 |
| School | SCHOOL | Student | | | | | 0.02 | 0.02 | 0.04 | | 0.88 | | 0.02 | 0.02 | 1.0 |
| Golf Course | GOLF | Acres | | | | | 0.75 | 0.83 | 0.42 | | | 5.40 | 0.08 | 0.83 | 8.3 |
| Park | PARK | Acres | | | | | 0.20 | 0.22 | 0.11 | | | 1.43 | 0.02 | 0.22 | 2.2 |
| Cemetery | CEM | Acres | | | | | 0.38 | 0.42 | 0.21 | | | 2.73 | 0.04 | 0.42 | 4.2 |
| Fairground | FAIR | Acres | | | | | 0.14 | 0.16 | 0.08 | | | 1.03 | 0.02 | 0.16 | 1.59 |
| University/College | UNIV | Student | | | | | 0.17 | 0.04 | 0.13 | | | 0.69 | 0.34 | 0.04 | 1.4 |
| Special Generator | Special | Trip | | | | | 0.09 | 0.17 | 0.07 | 0.25 | | 0.22 | 0.03 | 0.17 | 1.0 |
| Spare 1 | S1 | none | | | | | | | | | | | | | |

Exhibit 4: Distribution of Trip Generation Rates

| Land Use Description | Label in Model | UNIT | Production | | | | | | Attraction | | | | | | Daily Total |
|--------------------------|----------------|---------|------------|-----|-------|-----|------|-------|------------|-----|-------|-------|------|-------|-------------|
| | | | HBW | HBS | HBSch | HBO | W_O | O_O | HBW | HBS | HBSch | HBO | W_O | O_O | |
| Single-Family DU | SFDU | DU | 24% | 16% | 6% | 34% | | 6% | | | | 9% | | 5% | 100.0% |
| Multi-Family DU | MFDU | DU | 27% | 17% | 2% | 35% | | 5% | | | | 9% | | 5% | 100.0% |
| Adult Residential DU | ARDU | DU | 5% | 19% | | 40% | | 6% | | | | 24% | | 6% | 100.0% |
| Retail | RET | KSF | | | | | 9% | 17% | 7% | 25% | | 22% | 3% | 17% | 100.0% |
| Mall | MALL | KSF | | | | | 9% | 17% | 7% | 25% | | 22% | 3% | 17% | 100.0% |
| Office | OFF | KSF | | | | | 9% | 8% | 37.9% | | | 18.1% | 19% | 8% | 100.0% |
| Industrial | IND | KSF | | | | | 12% | 8% | 38% | | | 12% | 22% | 8% | 100.0% |
| High Technical Institute | HTI | KSF | | | | | 12% | 8% | 38% | | | 12% | 22% | 8% | 100.0% |
| Community Commercial | CC | KSF | | | | | 9% | 15% | 11% | | | 41% | 9% | 15% | 100.0% |
| Church | CHURCH | KSF | | | | | 9% | 15% | 11% | | | 41% | 9% | 15% | 100.0% |
| Lodge | LODGE | KSF | | | | | 9% | 15% | 11% | | | 41% | 9% | 15% | 100.0% |
| Medical | MED | KSF | | | | | 9.5% | 12.5% | 20% | | | 36% | 9.5% | 12.5% | 100.0% |
| Hospital | HOSP | KSF | | | | | 9.5% | 12.5% | 20% | | | 36% | 9.5% | 12.5% | 100.0% |
| Convalescent Hospital | CONV | KSF | | | | | 9.5% | 12.5% | 20% | | | 36% | 9.5% | 12.5% | 100.0% |
| Hotel | HOTEL | Rooms | 6% | 10% | | 16% | 8% | 9% | 11% | | | 26% | 5% | 9% | 100.0% |
| PQP Low | PQPL | KSF | | | | | 9% | 15% | 11% | | | 41% | 9% | 15% | 100.0% |
| PQP High | PQPH | KSF | | | | | 9% | 15% | 11% | | | 41% | 9% | 15% | 100.0% |
| School | SCHOOL | Student | | | | | 2% | 2% | 4% | | 88% | | 2% | 2% | 100.0% |
| Golf Course | GOLF | Acres | | | | | 9% | 10% | 5% | | | 65% | 1% | 10% | 100.0% |
| Park | PARK | Acres | | | | | 9% | 10% | 5% | | | 65% | 1% | 10% | 100.0% |
| Cemetery | CEM | Acres | | | | | 9% | 10% | 5% | | | 65% | 1% | 10% | 100.0% |
| Fairground | FAIR | Acres | | | | | 9% | 10% | 5% | | | 65% | 1% | 10% | 100.0% |
| University/College | UNIV | Student | | | | | 12% | 3% | 9% | | | 49% | 24% | 3% | 100.0% |
| Special Generator | Special | Trip | | | | | 9% | 17% | 7% | 25% | | 22% | 3% | 17% | 100.0% |
| Spare 1 | S1 | none | | | | | | | | | | | | | |

Exhibit 5: External Gateways

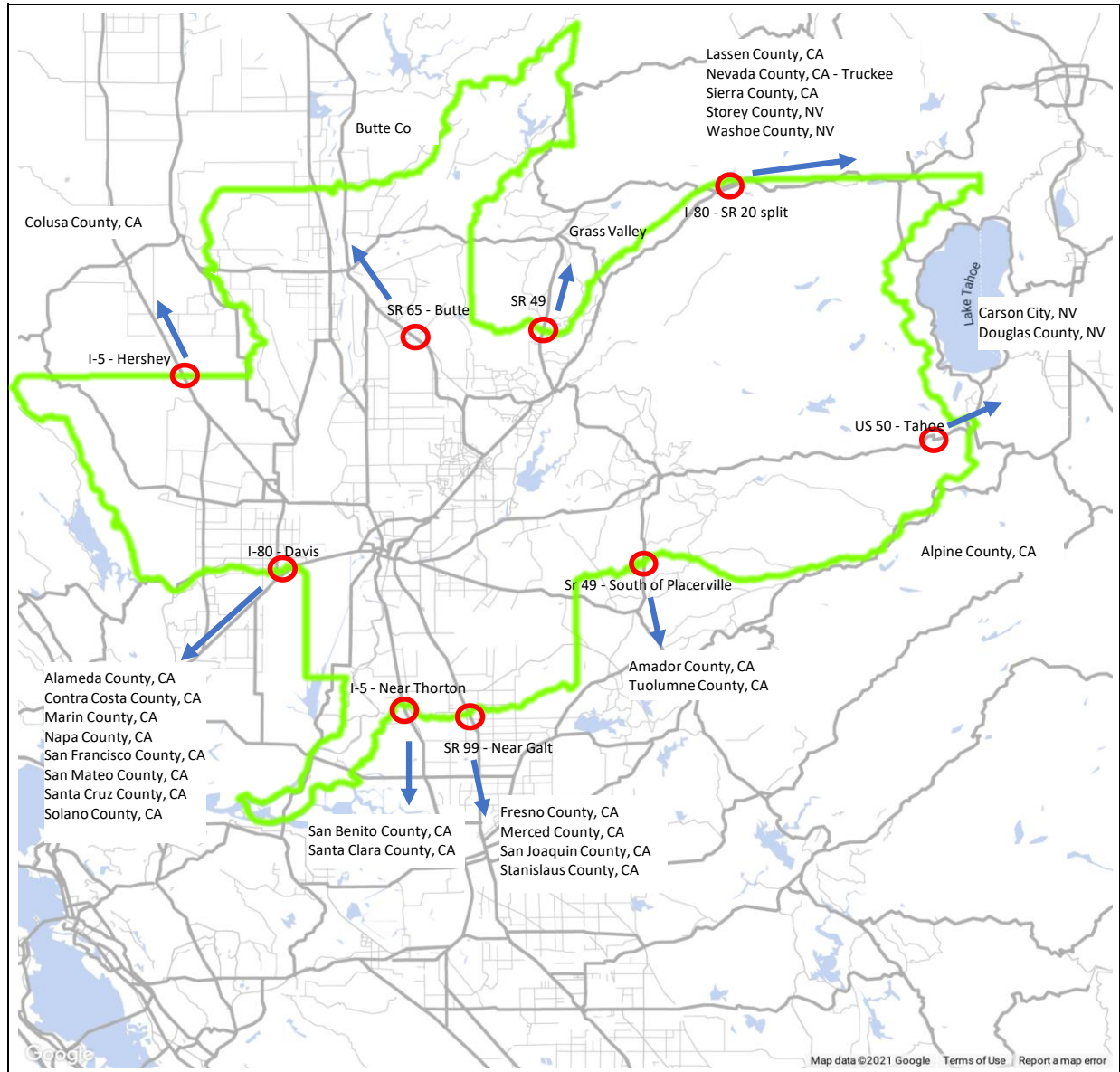


Exhibit 6: Average External Miles by Gateway

| Gateway | County | Volume | Distance (Miles) | Average Distance from Gateway |
|------------------------------|---------------------------------|--------|------------------|-------------------------------|
| I-5 - near Thornton | San Benito County, CA | 19 | 127.7 | 97.8 |
| | Santa Clara County, CA | 3,786 | 97.7 | |
| I-80 - Davis | Alameda County, CA | 6,305 | 71.8 | 52.1 |
| | Contra Costa County, CA | 3,843 | 49.8 | |
| | Marin County, CA | 86 | 59.8 | |
| | Napa County, CA | 1,502 | 38.8 | |
| | San Francisco County, CA | 2,298 | 64.8 | |
| | San Mateo County, CA | 2,626 | 83.8 | |
| | Santa Cruz County, CA | 44 | 113.8 | |
| | Sonoma County, CA | 134 | 76.8 | |
| I-80 - SR 20 Split | Lassen County, CA | 73 | 129.3 | 42.3 |
| | Nevada County, CA - Truckee | 11,879 | 29.3 | |
| | Sierra County, CA | 293 | 52.3 | |
| | Storey County, NV | 198 | 65.3 | |
| | Washoe County, NV | 11,708 | 54.3 | |
| SR 49 - Grass Valley | Nevada County, CA- Grass Valley | 29,714 | 16 | 16.0 |
| I-5 - Near Hershey | Colusa County, CA | 722 | 18 | 18.0 |
| SR 49 - South of Placerville | Amador County, CA | 2,111 | 15 | 16.5 |
| | Tuolumne County, CA | 62 | 66 | |
| SR 99 - Near Galt | Fresno County, CA | 54 | 140.8 | 40.6 |
| | Merced County, CA | 1,989 | 85.8 | |
| | San Joaquin County, CA | 6,756 | 22.8 | |
| | Stanislaus County, CA | 1,706 | 54.8 | |
| SR 65 - Butte | Butte County, CA | 3,454 | 50.9 | 50.9 |
| US 50 - Tahoe | Carson City, NV | 846 | 45.8 | 43.2 |
| | Douglas County, NV | 978 | 40.8 | |
| | Alpine County, CA | 90 | 45.2 | |

4.0 EXISTING LAND USE AND NETWORK ASSUMPTIONS

4.1 Road Network

4.1.1 Master Road Network

The starting point for preparing the 2019 SPRTA model network was the SACSIM network files. As the SACSIM19 model was recently developed, it contains a relatively recent base year model network as well as future improvements. The Placer County area was then detailed out using aerial photography in Google Earth Pro, the network from the previous version of the SPRTA model, and the local knowledge.

The master network concept was applied to the 2019 SPRTA Model network, meaning that the network contains links representing both existing and future roads. The user can enable and disable links depending on what scenario they would like to test. Due to the unavailability of the SACSIM master network at the time that the SPRTA model was being developed, WSP created a SACSIM master network file by combining the network file for each modeling year prior to detailing out the Placer County area.

For the area outside of the Placer County area, the SACSIM links (combinations of A node and B node) were kept the same to facilitate data transfer between the SACSIM and SPRTA model network. The links in Yuba City and Yuba County area were turned off, similar to the 2013 SPRTA model network.

4.1.2 Road Network Database

As a master network file, the road network attributes contain core network inputs for both base year and future year. It also includes an attribute field (i.e., FLG19 for 2019) to flag which links should be turned on or off (zero for turn-off and one for turn-on).

4.1.3 Road Network Preload

As is typical of windowed models like the previous SPRTA model, trips on the links outside of the Placer County were estimated by assigning SACSIM Origin-Destination (O-D) matrices while trips within the Placer County were generated and assigned by the Placer County land use. The major advantage of the windowed model approach is that the model will be sensitive to the changes in regional traffic in response to the roadway improvements either within or outside of the core modeling area. Assigning regional O-Ds have been commonly practiced, and it served its purpose. This approach, however, has a weakness with regard to VMT being very unstable. With a small change in the model, trips outside the core modeling area find an alternative path with a slightly better travel time, even though it is a much longer path. Unreliable VMT outputs were not an issue with previous versions of the SPRTA model but has become one with the enactment of SB-743.

To overcome this problem, all trips between TAZs outside the SPRTA area and its vicinity have been pre-loaded onto the network. The pre-loaded volumes were taken from SACSIM. Pre-loading these trips ensures that the effect that they have on congested speeds, and therefore route choice, is fully taken into account for trips between the SPRTA region and other parts of the SACOG region.

4.2 Base Year Land Use

The updated SPRTA model has 2019 as its Base Year, meaning that the land uses and traffic counts used for calibration represent 2019 (i.e. pre-COVID-19) conditions. SACSIM19 had 2016 as its base year, which meant that land developments for the 2016-to-2019 period needed to be added to the land uses in the SACSIM model. Member agencies provided recent parcel point data. These parcel data were then compared with SACSIM data to avoid duplication. In the case of Lincoln, we also had the current project lists from the past several years. We then checked these data sources against aerial photos to determine which projects had been completed.

Exhibit 8 summarizes the Base Year land use by SPRTA fee district. The district boundaries are shown in Exhibit 7.

Exhibit 7: SPRTA Fee Districts

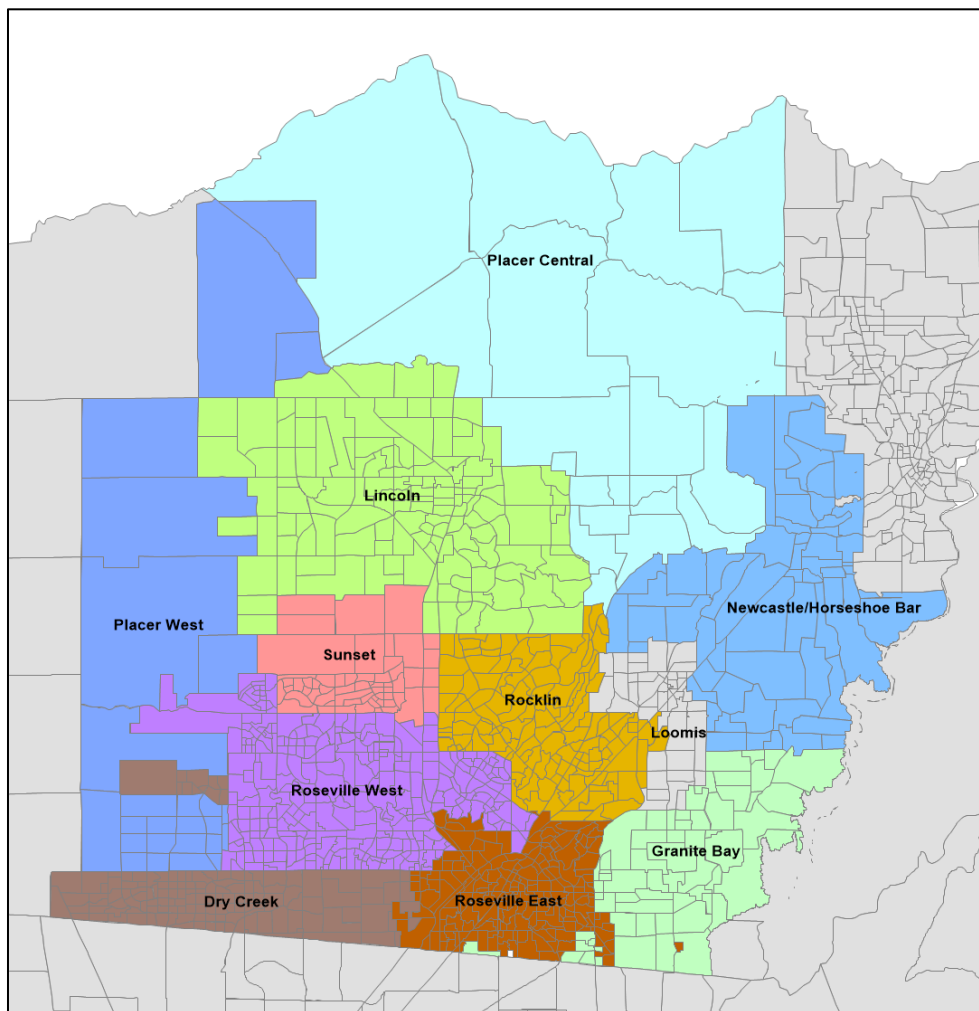


Exhibit 8: Base Year Land Use by SPRTA District

| 2019 Land Use by SPRTA Fee District | | | | | | | | | | | | | |
|-------------------------------------|--|----------|-----------|-------------|---------|-------------------------|----------------|-------------|---------|----------------|----------------|--------|--------|
| SPRTA Model Land Use Code | Land Use Category | Unit | Dry Creek | Granite Bay | Lincoln | Newcastle/Horseshoe Bar | Placer Central | Placer West | Rocklin | Roseville West | Roseville East | Sunset | Total |
| SFDU | Single Family Dwelling | DU | 1,847 | 7,553 | 11,522 | 4,993 | 2,804 | 613 | 19,504 | 22,067 | 17,006 | 9 | 87,918 |
| MFDU | Apartment | DU | 4 | 311 | 1,357 | 402 | 241 | 114 | 6,079 | 6,567 | 4,838 | 0 | 19,913 |
| ARDU | Senior Adult Housing-Detached | DU | 0 | 40 | 6,759 | 0 | 0 | 0 | 246 | 3,788 | 620 | 0 | 11,453 |
| RET | Shopping Center | 1,000 SF | 1 | 778 | 1,316 | 170 | 15 | 10 | 2,996 | 4,675 | 5,109 | 4 | 15,073 |
| MALL | Mail | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,737 | 0 | 829 | 2,566 |
| OFF | Office | 1,000 SF | 37 | 374 | 345 | 86 | 0 | 17 | 1,453 | 2,172 | 4,321 | 148 | 8,952 |
| IND | Industrial Park | 1,000 SF | 264 | 168 | 1,643 | 706 | 135 | 15 | 3,429 | 4,960 | 2,937 | 3,181 | 17,437 |
| HTI | Light Industrial | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,706 | 0 | 0 | 2,706 |
| CC | Community Commercial | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHURCH | Church | 1,000 SF | 31 | 232 | 133 | 30 | 2 | 4 | 274 | 305 | 456 | 16 | 1,484 |
| LODGE | Club | 1,000 SF | 0 | 0 | 186 | 15 | 12 | 0 | 19 | 17 | 33 | 0 | 282 |
| MED | Medical/Dental Office | 1,000 SF | 0 | 136 | 0 | 0 | 0 | 0 | 262 | 51 | 2,549 | 0 | 2,998 |
| HOSP | Hospital | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,438 | 0 | 1,438 |
| CONV | Convalescent Hospital | 1,000 SF | 0 | 20 | 252 | 0 | 6 | 0 | 609 | 75 | 446 | 0 | 1,407 |
| HOTEL | Hotel | Room | 0 | 0 | 68 | 0 | 0 | 0 | 500 | 603 | 1,123 | 297 | 2,590 |
| PQPL | Fire Station, Museum, Water Treatment | 1,000 SF | 40 | 54 | 50 | 9 | 26 | 0 | 12 | 34 | 99 | 0 | 325 |
| PQPH | DMV, Post Office, Library, Police, Government Building | 1,000 SF | 0 | 6 | 91 | 30 | 0 | 0 | 25 | 194 | 325 | 0 | 670 |
| SCHOOL | K-12 School | student | 1,295 | 3,998 | 6,807 | 771 | 0 | 67 | 12,124 | 11,332 | 8,943 | 0 | 45,337 |
| GOLF | Golf Course | Hole | 166 | 163 | 861 | 0 | 169 | 0 | 364 | 505 | 307 | 0 | 2,534 |
| PARK | City Park | Acre | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CEM | Cemetery | Acre | 2 | 0 | 11 | 80 | 21 | 0 | 28 | 0 | 20 | 0 | 161 |
| FAIR | Fairgrounds | Acre | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 0 | 29 |
| UNIV | University/College | student | 0 | 0 | 0 | 0 | 0 | 0 | 16,300 | 0 | 300 | 46 | 16,646 |

5.0 MODEL VALIDATION

5.1 Purpose of Validation

Model validation is the process of assessing a model's ability to generate reasonable traffic forecasts. Validation is used to detect errors so that the model's inputs can be checked and adjusted (calibrated). Validation provides evidence that the model is sufficiently accurate to provide a reasonable basis for decision making and so provides a level of comfort for planners, policymakers, the general public, and others that are not acquainted with the details of the model.

5.2 Validation Criteria

Model validation can be performed to varying degrees of depth depending on the model's intended use and the availability of survey data. The best available data is in the form of traffic counts, which allow for validation checks of link-level traffic forecasts. Since this is the key output for the purposes of identifying needed road improvements, the model should be sufficiently accurate for the intended purpose if it passes the validation tests at this level.

The California Transportation Commission (CTC) published guidelines for model calibration as part of its *2017 Regional Transportation Plan Guidelines for Metropolitan Planning Organizations*. The guidelines give three thresholds for validity, namely:

- At least 75 percent of the roadway links should be within the Caltrans maximum desirable deviation, which ranges from approximately 15 to 60 percent depending on total volume (the larger the volume, the less deviation is permitted).
- The correlation coefficient between the traffic counts and the estimated traffic volumes should be greater than 88 percent.
- The percent Root Mean Square Error (RSME) should be less than 30%.

In addition to the CTC acceptance criteria, two other widely-used criteria were applied, namely:

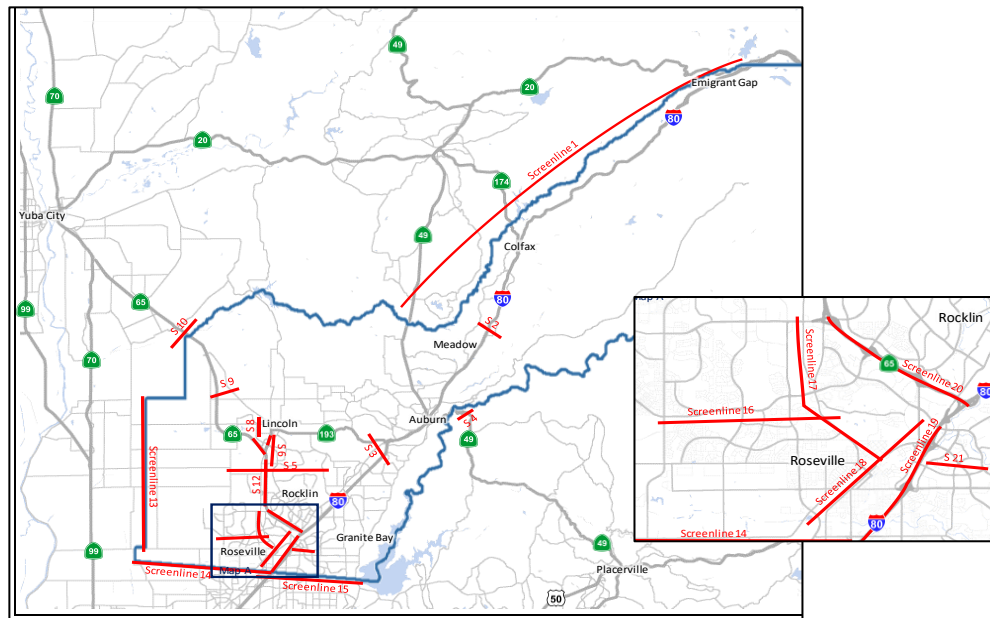
- All screenlines between major catchment areas should be within Caltrans' maximum desirable deviation, which ranges from approximately 15 to 60 percent depending on total volume (the larger the volume, the less deviation is permitted). The allowable deviation accounts for the fact that traffic volumes on any given roadway vary from day to day, and so traffic counts taken on any given day may be higher or lower than the average daily traffic.
- The two-way sum of the volumes on all roadway links for which counts are available should be within 10 percent of the counts.

Besides checking these numerical validation targets, we also performed visual checks of the assigned volumes to determine if traffic was erroneously being assigned to minor routes that bypassed the count locations. No such problems were found; the model correctly assigned the heaviest traffic volumes to the streets with higher functional classifications (i.e. arterials higher than collectors, collectors higher than local roads). Caltrans validation guidelines are explicitly applicable only to daily model results. However, we also checked the peak hour models against the same guidelines for informational purposes.

5.3 Traffic Counts

The project team had a consensus to use pre-COVID traffic counts to calibrate the SPRTA model. Exhibit 9 displays the screenline locations. The member agencies provided their roadway counts where available. The City of Roseville collects intersection turning movement counts 24/7 at all signalized intersections using loop detectors. We downloaded them from their website for the validation locations. We also obtained PeMS counts for Caltrans facilities, and the remaining necessary locations were obtained from StreetLight Data.

Exhibit 9: Screenline Locations



5.4 Validation Results

To be useable for determining the need for improvements at specific locations, it is not enough that the model can forecast aggregate flows well; it must also provide reasonable forecasts of traffic at key points along major roadways. The accuracy of the model was assessed through link-level validation tests against traffic counts taken at 76 locations throughout fee districts in Placer County (see Exhibit 9).

Exhibit 10 summarizes the results of the link-level validation tests. The model meets the CTC validation criteria for all three forecast periods (daily, AM peak hour, and PM peak hour). Exhibit 11, Exhibit 12, and Exhibit 13 are scatter diagrams comparing the model's volumes to the traffic counts for individual locations for the daily, AM peak hour, and PM peak hour, respectively (see Appendix for details). The allowable deviation is shaded in the figure. These figures show a good match of forecasts to counts with no systematic bias towards over- or under-predicting traffic. The model was within the maximum acceptable deviation in all cases, which indicates that the model provides reasonable estimates of total traffic flows between different parts of Placer County.

Exhibit 10: Link-Level Validation Results

| Validation Criterion | Threshold for Acceptance | Daily | AM Peak Hour | PM Peak Hour |
|---|--------------------------|--------|--|--------------|
| Screenline Percent Within Caltrans Maximum Deviation | 100% | 100% ✓ | This criterion only applies to daily volumes | |
| Count Sites Percent Within Caltrans Maximum Deviation | At Least 75% | 86% ✓ | 75% ✓ | 83% ✓ |
| Model/Count Ratio | Within 10% | 4% ✓ | 1% ✓ | -1% ✓ |
| Percent Root Mean Square Error | Less than 30% | 19% ✓ | 29% ✓ | 26% ✓ |
| Coefficient of Determination | At Least 77% | 94% ✓ | 86% ✓ | 87% ✓ |
| Correlation Coefficient | At Least 88% | 97% ✓ | 93% ✓ | 93% ✓ |

Exhibit 11: Modeled Volumes versus Traffic Counts (Daily)

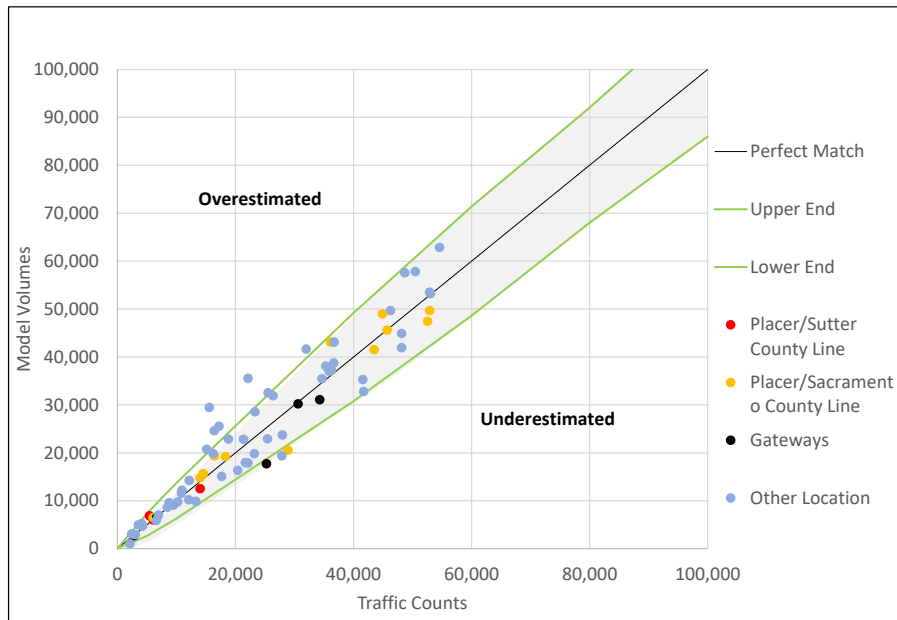


Exhibit 12: Modeled Volumes versus Traffic Counts (AM Peak Hour)

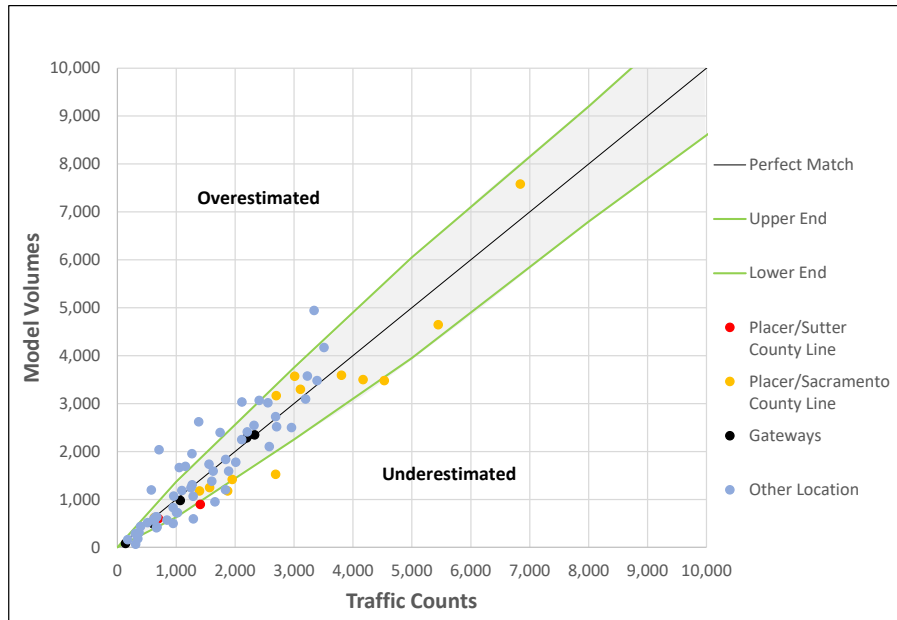
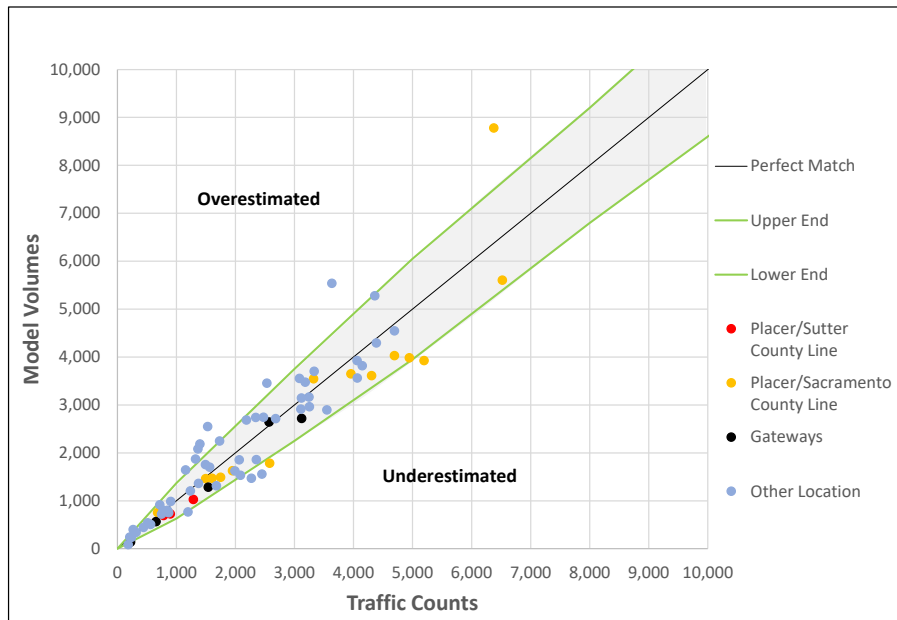


Exhibit 13: Modeled Volumes versus Traffic Counts (PM Peak Hour)



6.0 2040 LAND USE AND NETWORK ASSUMPTIONS

This chapter describes the assumptions used for versions of the model representing future years.

6.1 Road Projects

The road network used in the model is based on the 2040 network for SACSIM19. It incorporates all of the network improvements in SACOG's latest Regional Transportation Plan, whether these are located in Placer County or elsewhere in the region.

6.2 Land Development

The 2040 land use file is based on the 2040 land use file in SACSIM19. Two 2040 land use files were developed:

Sustainable Communities Strategy (SCS) Land Uses: This file incorporates the assumptions for new growth that appear in SACOG's latest SCS. This set of assumptions is suitable for use in EIR traffic studies. A summary of the 2040 land uses by SPRTA fee district is shown in Exhibit 14. Exhibit 15 and Exhibit 16 show the assumed growth from 2019 to 2040 for this scenario.

SPRTA Land Uses: The SPRTA program is designed to ensure that various planned developments pay their fair share towards the cost of needed roadway infrastructure. This land use file incorporates the developments that SPRTA is based on, including:

- Build-out of Fiddymont Ranch Specific Plan Amendment #3 - Roseville West
- Build-out of West Park Rezone – Roseville West
- Build-out of Sierra Vista SP – Roseville West
- Build-out of Creekview Specific Plan – Roseville West
- Build-out of Regional University – Dry Creek
- Build-out of Bickford Ranch – Placer Central
- Build-out of Riolo Vineyards – Dry Creek
- Build-out of Morgan Knowles – Dry Creek
- Placer Vineyards - Phase 1 – Dry Creek
- City of Lincoln - Villages 1, 5, and 7
- 3,399 University students at William Jessup University
- 22,500 University students at Sierra College
- Reasons Farm Business Park
- Placer Ranch SP (version 3.1), including a branch campus of Sac State
- Amoruso Ranch SP

A summary of the 2040 land uses by SPRTA fee district is shown in Exhibit 17. Exhibit 18 and Exhibit 19 show the assumed growth from 2019 to 2040 for this scenario.

Both land use files include developments that occurred in the 2019 to 2021 period.

6.3 Changes to Through Trips

The growth rate in through trips in the SACSIM19 model was calculated and then applied to the 2019 through trips in the SPRTA model to produce the 2040 through trips.

Exhibit 14: 2040 Land Uses for the Sustainable Communities Strategy Scenario

| 2040 Sustainable Communities Strategy Land Use by SPRTA Fee District | | | | | | | | | | | | | |
|--|--|----------|-----------|-------------|---------|-------------------------|----------------|-------------|---------|----------------|----------------|--------|---------|
| SPRTA Model Land Use Code | Land Use Category | Unit | Dry Creek | Granite Bay | Lincoln | Newcastle/Horseshoe Bar | Placer Central | Placer West | Rocklin | Roseville West | Roseville East | Sunset | Total |
| SFDU | Single Family Dwelling | DU | 7,691 | 7,665 | 19,232 | 5,471 | 4,769 | 949 | 22,684 | 34,602 | 17,435 | 818 | 121,316 |
| MFDU | Apartment | DU | 918 | 629 | 2,007 | 897 | 266 | 114 | 10,861 | 9,277 | 7,152 | 982 | 33,103 |
| ARDU | Senior Adult Housing-Detached | DU | 0 | 40 | 6,759 | 0 | 0 | 0 | 246 | 3,788 | 620 | 0 | 11,453 |
| RET | Shopping Center | 1,000 SF | 496 | 938 | 3,627 | 232 | 36 | 10 | 3,800 | 7,666 | 6,396 | 2,495 | 25,696 |
| MALL | Mall | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,737 | 0 | 0 | 1,737 |
| OFF | Office | 1,000 SF | 266 | 415 | 433 | 86 | 0 | 17 | 2,000 | 3,708 | 4,864 | 1,558 | 13,347 |
| IND | Industrial Park | 1,000 SF | 690 | 168 | 3,459 | 872 | 135 | 15 | 7,449 | 8,882 | 4,056 | 5,315 | 31,039 |
| HTI | Light Industrial | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,906 | 0 | 0 | 2,906 |
| CC | Community Commercial | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHURCH | Church | 1,000 SF | 432 | 237 | 273 | 49 | 6 | 12 | 293 | 709 | 529 | 19 | 2,559 |
| LODGE | Club | 1,000 SF | 0 | 0 | 186 | 15 | 12 | 0 | 19 | 17 | 33 | 0 | 282 |
| MED | Medical/Dental Office | 1,000 SF | 0 | 136 | 0 | 0 | 0 | 0 | 262 | 51 | 2,612 | 0 | 3,061 |
| HOSP | Hospital | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,601 | 0 | 1,601 |
| CONV | Convalescent Hospital | 1,000 SF | 0 | 20 | 252 | 0 | 6 | 0 | 609 | 75 | 438 | 0 | 1,399 |
| HOTEL | Hotel | Room | 0 | 0 | 68 | 0 | 0 | 0 | 530 | 889 | 1,376 | 650 | 3,512 |
| PQPL | Fire Station, Museum, Water Treatment | 1,000 SF | 65 | 89 | 83 | 9 | 26 | 0 | 29 | 471 | 166 | 0 | 938 |
| PQPH | DMV, Post Office, Library, Police, Government Building | 1,000 SF | 0 | 6 | 91 | 30 | 0 | 0 | 25 | 194 | 350 | 0 | 695 |
| SCHOOL | K-12 School | student | 5,121 | 5,228 | 11,852 | 1,294 | 0 | 67 | 15,769 | 22,253 | 11,255 | 0 | 72,839 |
| GOLF | Golf Course | Hole | 166 | 163 | 861 | 0 | 169 | 0 | 364 | 505 | 307 | 0 | 2,534 |
| PARK | City Park | Acre | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CEM | Cemetary | Acre | 2 | 0 | 11 | 80 | 21 | 0 | 28 | 0 | 20 | 0 | 161 |
| FAIR | Fairgrounds | Acre | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 0 | 29 |
| UNIV | University/College | student | 0 | 0 | 0 | 0 | 0 | 0 | 14,142 | 0 | 300 | 2,104 | 16,546 |

Exhibit 15: 2019-to-2040 Growth for the Sustainable Communities Strategy Scenario

| | | | Forecast of Growth by Land Use for 2040 Sustainable Communities Strategy Scenario | | | | | | | | | | |
|---------------------------|--|----------|---|-------------|---------|-------------------------|----------------|-------------|---------|----------------|----------------|--------|--------|
| SPRTA Model Land Use Code | Land Use Category | Unit | Dry Creek | Granite Bay | Lincoln | Newcastle/Horseshoe Bar | Placer Central | Placer West | Rocklin | Roseville West | Roseville East | Sunset | Total |
| SFDU | Single Family Dwelling | DU | 5,844 | 112 | 7,710 | 478 | 1,965 | 336 | 3,180 | 12,535 | 429 | 809 | 33,398 |
| MFDU | Apartment | DU | 914 | 318 | 650 | 495 | 25 | 0 | 4,782 | 2,710 | 2,314 | 982 | 13,190 |
| ARDU | Senior Adult Housing-Detached | DU | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RET | Shopping Center | 1,000 SF | 494 | 160 | 2,311 | 62 | 22 | 0 | 804 | 2,991 | 1,287 | 2,491 | 10,623 |
| MALL | Mall | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -829 | -829 |
| OFF | Office | 1,000 SF | 229 | 41 | 88 | 0 | 0 | 0 | 547 | 1,536 | 543 | 1,411 | 4,396 |
| IND | Industrial Park | 1,000 SF | 426 | 0 | 1,816 | 166 | 0 | 0 | 4,021 | 3,922 | 1,118 | 2,134 | 13,602 |
| HTI | Light Industrial | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 200 | 0 | 0 | 200 |
| CC | Community Commercial | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHURCH | Church | 1,000 SF | 401 | 5 | 140 | 19 | 4 | 8 | 19 | 404 | 73 | 3 | 1,075 |
| LODGE | Club | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MED | Medical/Dental Office | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 63 | 0 | 63 |
| HOSP | Hospital | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 163 | 0 | 163 |
| CONV | Convalescent Hospital | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -9 | 0 | -9 |
| HOTEL | Hotel | Room | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 286 | 253 | 353 | 922 |
| PQPL | Fire Station, Museum, Water Treatment | 1,000 SF | 25 | 35 | 33 | 0 | 0 | 0 | 17 | 437 | 67 | 0 | 612 |
| PQPH | DMV, Post Office, Library, Police, Government Building | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 26 |
| SCHOOL | K-12 School | student | 3,826 | 1,230 | 5,045 | 523 | 0 | 0 | 3,645 | 10,921 | 2,312 | 0 | 27,502 |
| GOLF | Golf Course | Hole | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PARK | City Park | Acre | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CEM | Cemetery | Acre | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FAIR | Fairgrounds | Acre | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| UNIV | University/College | student | 0 | 0 | 0 | 0 | 0 | 0 | -2,158 | 0 | 0 | 2,058 | -100 |

Exhibit 16: Residential (left) and Non-Residential (right) Growth in the SCS Scenario

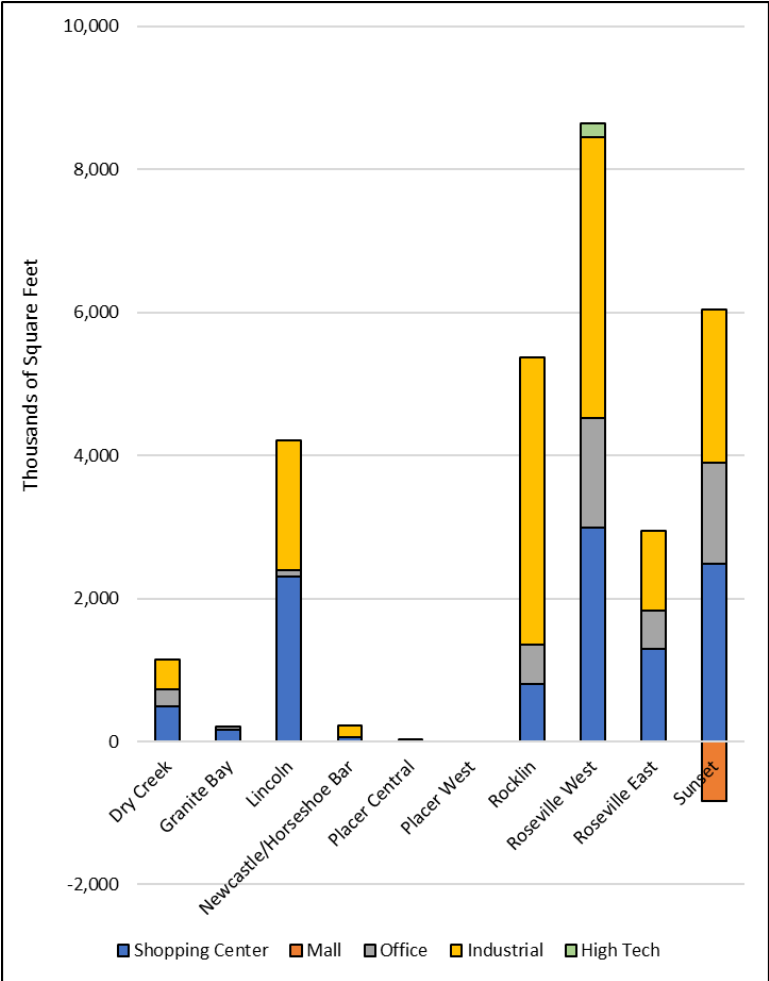
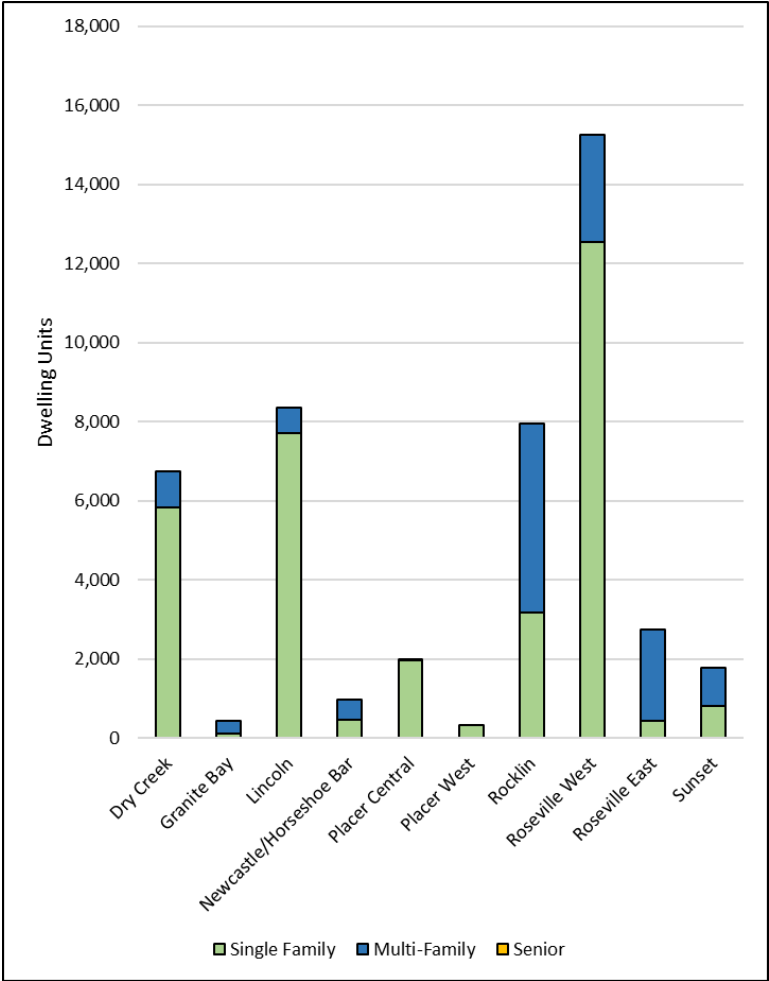


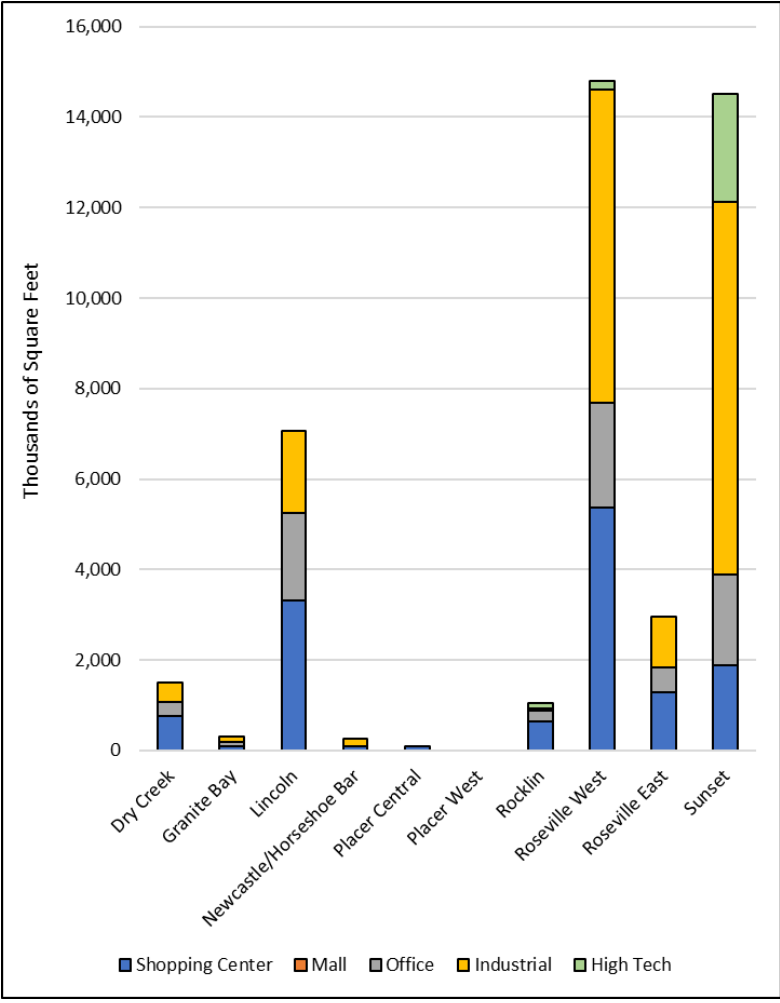
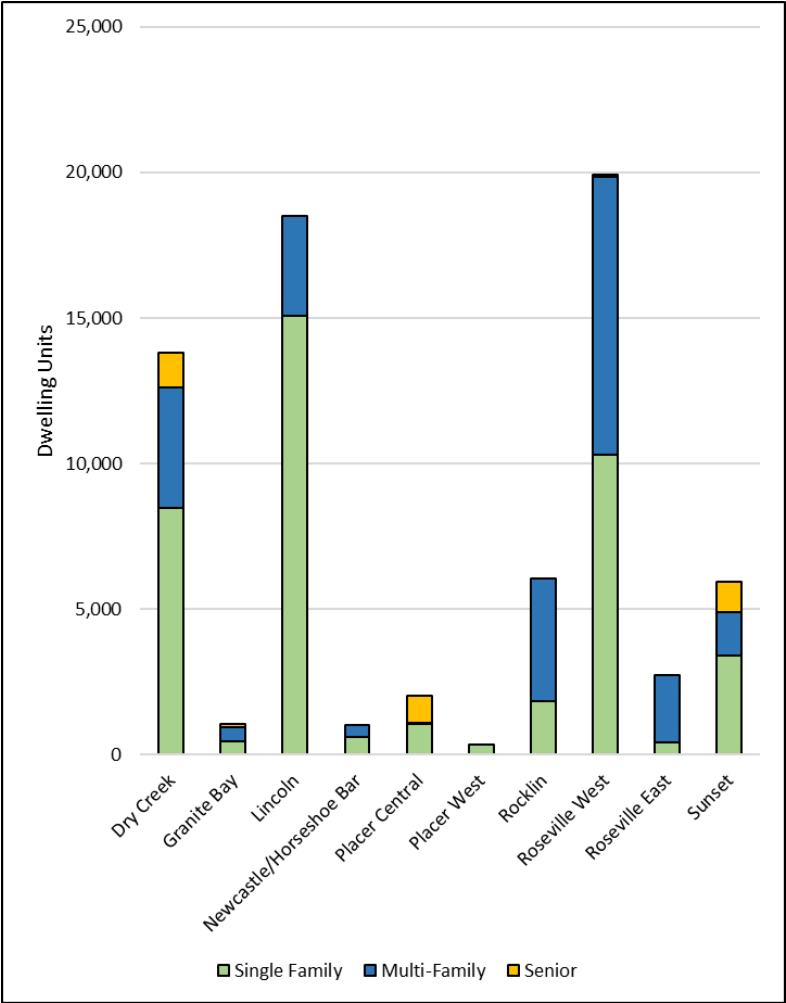
Exhibit 17: 2040 Land Uses for the SPRTA Buildout Scenario

| SPRTA Model Land Use Code | Land Use Category | Unit | 2040 SPRTA Buildout Land Use by SPRTA Fee District | | | | | | | | | | Total |
|---------------------------|--|----------|--|-------------|---------|-------------------------|----------------|-------------|---------|----------------|----------------|--------|---------|
| | | | Dry Creek | Granite Bay | Lincoln | Newcastle/Horseshoe Bar | Placer Central | Placer West | Rocklin | Roseville West | Roseville East | Sunset | |
| SFDU | Single Family Dwelling | DU | 10,337 | 8,015 | 26,581 | 5,614 | 3,860 | 949 | 21,359 | 32,376 | 17,435 | 3,404 | 129,930 |
| MFDU | Apartment | DU | 4,141 | 780 | 4,784 | 800 | 262 | 114 | 10,265 | 16,109 | 7,152 | 1,504 | 45,911 |
| ARDU | Senior Adult Housing-Detached | DU | 1,192 | 185 | 6,759 | 0 | 950 | 0 | 246 | 3,871 | 620 | 1,050 | 14,873 |
| RET | Shopping Center | 1,000 SF | 752 | 871 | 4,643 | 253 | 102 | 10 | 3,630 | 10,040 | 6,396 | 1,895 | 28,593 |
| MALL | Mall | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,737 | 0 | 829 | 2,566 |
| OFF | Office | 1,000 SF | 363 | 468 | 2,267 | 86 | 0 | 17 | 1,700 | 4,502 | 4,864 | 2,146 | 16,413 |
| IND | Industrial Park | 1,000 SF | 686 | 278 | 3,459 | 884 | 135 | 15 | 3,464 | 11,867 | 4,056 | 11,422 | 36,265 |
| HTI | Light Industrial | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 142 | 2,906 | 0 | 2,372 | 5,420 |
| CC | Community Commercial | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHURCH | Church | 1,000 SF | 277 | 254 | 273 | 49 | 6 | 12 | 316 | 709 | 529 | 0 | 2,425 |
| LODGE | Club | 1,000 SF | 0 | 0 | 186 | 15 | 12 | 0 | 19 | 17 | 33 | 0 | 281 |
| MED | Medical/Dental Office | 1,000 SF | 0 | 165 | 0 | 16 | 0 | 0 | 465 | 51 | 2,612 | 0 | 3,309 |
| HOSP | Hospital | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 320 | 0 | 1,601 | 0 | 1,921 |
| CONV | Convalescent Hospital | 1,000 SF | 0 | 20 | 252 | 0 | 6 | 0 | 609 | 75 | 438 | 0 | 1,399 |
| HOTEL | Hotel | Room | 0 | 0 | 68 | 0 | 0 | 0 | 821 | 889 | 1,376 | 650 | 3,803 |
| PQPL | Fire Station, Museum, Water Treatment | 1,000 SF | 422 | 89 | 83 | 9 | 26 | 0 | 17 | 474 | 166 | 12 | 1,298 |
| PQPH | DMV, Post Office, Library, Police, Government Building | 1,000 SF | 0 | 6 | 120 | 30 | 0 | 0 | 25 | 194 | 350 | 400 | 1,125 |
| SCHOOL | K-12 School | student | 6,887 | 4,390 | 16,979 | 1,294 | 0 | 67 | 13,467 | 22,501 | 11,255 | 2,050 | 78,890 |
| GOLF | Golf Course | Hole | 166 | 163 | 861 | 0 | 169 | 0 | 364 | 505 | 307 | 0 | 2,534 |
| PARK | City Park | Acre | 51 | 12 | 0 | 0 | 65 | 0 | 0 | 387 | 0 | 70 | 585 |
| CEM | Cemetery | Acre | 5 | 0 | 11 | 80 | 21 | 0 | 29 | 0 | 20 | 0 | 165 |
| FAIR | Fairgrounds | Acre | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 0 | 29 |
| UNIV | University/College | student | 6,000 | 0 | 0 | 0 | 0 | 0 | 23,800 | 0 | 300 | 25,000 | 55,100 |

Exhibit 18: 2019-to-2040 Growth for the SPRTA Buildout Scenario

| Forecast of Growth by Land Use for 2040 SPRTA Buildout Scenario | | | | | | | | | | | | | |
|---|--|----------|-----------|-------------|---------|-------------------------|----------------|-------------|---------|----------------|----------------|--------|--------|
| SPRTA Model Land Use Code | Land Use Category | Unit | Dry Creek | Granite Bay | Lincoln | Newcastle/Horseshoe Bar | Placer Central | Placer West | Rocklin | Roseville West | Roseville East | Sunset | Total |
| SFDU | Single Family Dwelling | DU | 8,490 | 462 | 15,059 | 621 | 1,056 | 336 | 1,855 | 10,309 | 429 | 3,395 | 42,012 |
| MFDU | Apartment | DU | 4,137 | 469 | 3,427 | 398 | 21 | 0 | 4,186 | 9,542 | 2,314 | 1,504 | 25,998 |
| ARDU | Senior Adult Housing-Detached | DU | 1,192 | 145 | 0 | 0 | 950 | 0 | 0 | 83 | 0 | 1,050 | 3,420 |
| RET | Shopping Center | 1,000 SF | 751 | 93 | 3,327 | 84 | 88 | 0 | 634 | 5,365 | 1,287 | 1,891 | 13,520 |
| MALL | Mall | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| OFF | Office | 1,000 SF | 326 | 94 | 1,922 | 0 | 0 | 0 | 247 | 2,330 | 543 | 1,999 | 7,462 |
| IND | Industrial Park | 1,000 SF | 422 | 111 | 1,816 | 179 | 0 | 0 | 35 | 6,907 | 1,118 | 8,241 | 18,828 |
| HTI | Light Industrial | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 142 | 200 | 0 | 2,372 | 2,714 |
| CC | Community Commercial | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHURCH | Church | 1,000 SF | 246 | 22 | 140 | 19 | 4 | 8 | 41 | 404 | 73 | -16 | 941 |
| LODGE | Club | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MED | Medical/Dental Office | 1,000 SF | 0 | 30 | 0 | 16 | 0 | 0 | 203 | 0 | 63 | 0 | 311 |
| HOSP | Hospital | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 320 | 0 | 163 | 0 | 483 |
| CONV | Convalescent Hospital | 1,000 SF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -9 | 0 | -9 |
| HOTEL | Hotel | Room | 0 | 0 | 0 | 0 | 0 | 0 | 321 | 286 | 253 | 353 | 1,213 |
| PQPL | Fire Station, Museum, Water Treatment | 1,000 SF | 382 | 35 | 33 | 0 | 0 | 0 | 5 | 440 | 67 | 12 | 973 |
| PQPH | DMV, Post Office, Library, Police, Government Building | 1,000 SF | 0 | 0 | 29 | 0 | 0 | 0 | 1 | 0 | 25 | 400 | 455 |
| SCHOOL | K-12 School | student | 5,592 | 392 | 10,172 | 523 | 0 | 0 | 1,343 | 11,169 | 2,312 | 2,050 | 33,553 |
| GOLF | Golf Course | Hole | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PARK | City Park | Acre | 51 | 12 | 0 | 0 | 65 | 0 | 0 | 387 | 0 | 70 | 585 |
| CEM | Cemetery | Acre | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| FAIR | Fairgrounds | Acre | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| UNIV | University/College | student | 6,000 | 0 | 0 | 0 | 0 | 0 | 7,500 | 0 | 0 | 24,954 | 38,454 |

Exhibit 19: Residential (left) and Non-Residential (right) Growth in the SPRTA Buildout



Appendix Validation Results

Check of Daily Volumes

| Screenline | Roadway | Segment | Model Volume | Traffic Count | Model / Count | Maximum Deviation | Within Deviation | Model - Count | Difference Squared |
|---------------------|----------------------------|---|------------------|------------------|---------------|--|------------------|---------------|--------------------|
| S01 | SR 20 (Grass Valley) | Placer/Nevada County Line | 2,691 | 2,770 | 0.97 | 0.60 | Yes | -79 | 6,241 |
| | SR 174 (Grass Valley) | Placer/Nevada County Line | 6,508 | 6,653 | 0.98 | 0.43 | Yes | -145 | 21,025 |
| | SR 49 North (Grass Valley) | Placer/Nevada County Line | 30,817 | 34,245 | 0.90 | 0.24 | Yes | -3,428 | 11,751,184 |
| S02 | I-80E (N of Auburn) | At Applegate | 22,765 | 21,342 | 1.07 | 0.27 | Yes | 1,423 | 2,025,498 |
| | I-80W (N of Auburn) | At Applegate | 22,801 | 18,763 | 1.22 | 0.29 | Yes | 4,038 | 16,309,213 |
| S03 | SR 193 | W of I-80 | 5,833 | 6,570 | 0.89 | 0.43 | Yes | -737 | 543,169 |
| | I-80W (S of Newcastle) | W of SR 193 | 57,907 | 50,454 | 1.15 | 0.21 | Yes | 7,453 | 55,545,222 |
| | I-80E (S of Newcastle) | W of SR 193 | 57,707 | 48,670 | 1.19 | 0.21 | Yes | 9,037 | 81,670,984 |
| S04 | SR 49 | Placer/EI Dorado County Line | 9,059 | 8,848 | 1.02 | 0.39 | Yes | 211 | 44,521 |
| S05 | Joiner Pkwy | South of Twelve Bridges Rd | 9,831 | 10,192 | 0.96 | 0.37 | Yes | -361 | 130,321 |
| | SR 65 NB (Whitney Ranch) | Within the Whitney Ranch interchange | 36,879 | 35,833 | 1.03 | 0.24 | Yes | 1,046 | 1,094,534 |
| | SR 65 SB (Whitney Ranch) | North of Whitney Ranch interchange | 38,706 | 36,632 | 1.06 | 0.24 | Yes | 2,074 | 4,302,306 |
| | Industrial Ave | North of Athens Ave | 14,229 | 12,159 | 1.17 | 0.33 | Yes | 2,070 | 4,284,900 |
| | Fiddymnt Rd | North of Athens Ave | 5,143 | 4,072 | 1.26 | 0.60 | Yes | 1,071 | 1,147,041 |
| Sierra College Blvd | North of King Dr | 9,902 | 13,266 | 0.75 | 0.32 | Yes | -3,364 | 11,316,496 | |
| S06 | Joiner Pkwy | West of Del Webb Blvd (East of Lincoln Overcross) | 11,558 | 10,837 | 1.07 | 0.36 | Yes | 721 | 519,841 |
| | Ferrari Ranch Rd. | West of Ingram Pkwy | 10,247 | 12,089 | 0.85 | 0.33 | Yes | -1,842 | 3,392,964 |
| | 1st St | East of Lincon Blvd | 3,110 | 2,377 | 1.31 | 0.60 | Yes | 733 | 537,289 |
| S07 | Ferrari Ranch Rd | West of Lincoln Blvd | 9,722 | 8,751 | 1.11 | 0.39 | Yes | 971 | 942,841 |
| | Joiner Pkwy | Lincoln Blvd Overcross | 12,191 | 10,913 | 1.12 | 0.36 | Yes | 1,278 | 1,633,284 |
| S08 | Nicolas Rd | East of Joiner Pkwy | 7,115 | 6,926 | 1.03 | 0.43 | Yes | 189 | 35,721 |
| | 5th St | East of Joiner Pkwy | 1,009 | 2,111 | 0.48 | 0.60 | Yes | -1,102 | 1,214,404 |
| | 3rd St | East of Joiner Pkwy | 3,003 | 2,995 | 1.00 | 0.60 | Yes | 8 | 64 |
| | 1st St | East of Joiner Pkwy | 5,008 | 3,518 | 1.42 | 0.60 | Yes | 1,490 | 2,220,100 |
| S09 | SR 65 | North of Wise Rd | 22,895 | 25,408 | 0.90 | 0.26 | Yes | -2,513 | 6,315,169 |
| | Old Hwy 65 | North of Wise Rd | 8,526 | 8,437 | 1.01 | 0.40 | Yes | 89 | 7,921 |
| S10 | SR 65 (Wheatland) | Placer/Yuba County Line | 29,983 | 30,589 | 0.98 | 0.25 | Yes | -606 | 367,236 |
| S11 | Lincoln Blvd | North of SR 65 | 28,525 | 23,280 | 1.23 | 0.27 | Yes | 5,245 | 27,510,025 |
| | Ferrari Ranch Rd | North of SR 65 | 25,639 | 17,203 | 1.49 | 0.30 | No | 8,436 | 71,166,096 |
| S12 | Twelve Bridges | East of SR 65 | 16,285 | 20,354 | 0.80 | 0.28 | Yes | -4,069 | 16,556,761 |
| | Whitney Ranch Rd | East of SR 65 | 8,924 | 9,500 | 0.94 | 0.38 | Yes | -576 | 331,776 |
| | Sunset Blvd | East of SR 65 | 19,884 | 23,197 | 0.86 | 0.27 | Yes | -3,313 | 10,975,969 |
| S13 | Nicolas Rd | Placer/Sutter County Line | 6,746 | 5,423 | 1.24 | 0.46 | Yes | 1,323 | 1,750,329 |
| | Sunset Blvd | Placer/Sutter County Line | 5,981 | 6,054 | 0.99 | 0.44 | Yes | -73 | 5,329 |
| | Baseline Rd | Placer/Sutter County Line | 12,543 | 13,988 | 0.90 | 0.32 | Yes | -1,445 | 2,088,025 |
| S14 | Watt Ave | Placer/Sacramento County Line | 14,683 | 13,954 | 1.05 | 0.32 | Yes | 729 | 531,441 |
| | Walergra Rd | Placer/Sacramento County Line | 20,329 | 28,866 | 0.70 | 0.26 | No | -8,537 | 72,880,369 |
| | Antelope Rd | Placer/Sacramento County Line | 15,089 | 14,544 | 1.04 | 0.31 | Yes | 545 | 297,025 |
| | Roseville Rd | Placer/Sacramento County Line | 19,072 | 18,288 | 1.04 | 0.29 | Yes | 784 | 614,656 |
| | Auburn Blvd | Placer/Sacramento County Line | 42,885 | 36,069 | 1.19 | 0.24 | Yes | 6,816 | 46,457,856 |
| | I-80 EB (Citrus Heights) | Placer/Sacramento County Line | 105,643 | 92,428 | 1.14 | 0.14 | No | 13,215 | 174,648,559 |
| | I-80 WB (Citrus Heights) | Placer/Sacramento County Line | 99,908 | 94,913 | 1.05 | 0.14 | Yes | 4,995 | 24,948,693 |
| S15 | Foothill Blvd | North of Cirby Way | 49,552 | 52,916 | 0.94 | 0.20 | Yes | -3,364 | 11,316,496 |
| | Riverside Ave | South of Cirby Way | 45,373 | 45,649 | 0.99 | 0.22 | Yes | -276 | 76,176 |
| | Sunrise Blvd | Placer/Sacramento County Line | 41,177 | 43,491 | 0.95 | 0.22 | Yes | -2,314 | 5,354,596 |
| | Cirby Wy | Placer/Sacramento County Line | 19,245 | 16,410 | 1.17 | 0.30 | Yes | 2,835 | 8,037,225 |
| | Hazel Ave | Placer/Sacramento County Line | 47,500 | 52,531 | 0.90 | 0.20 | Yes | -5,031 | 25,310,961 |
| | Barton Rd | Placer/Sacramento County Line | 6,122 | 6,025 | 1.02 | 0.44 | Yes | 97 | 9,409 |
| | Folsom Auburn Rd | Placer/Sacramento County Line | 48,535 | 44,900 | 1.08 | 0.22 | Yes | 3,635 | 13,213,225 |
| S16 | Fiddymnt Rd | South of Pleasant Grove Blvd | 37,308 | 36,253 | 1.03 | 0.24 | Yes | 1,055 | 1,112,884 |
| | Woodcreek Oaks Blvd | South of Pleasant Grove Blvd | 18,889 | 16,218 | 1.16 | 0.30 | Yes | 2,671 | 7,136,378 |
| | Country Club Dr | South of Pleasant Grove Blvd | 5,111 | 4,204 | 1.22 | 0.60 | Yes | 907 | 822,770 |
| | Foothills Blvd | South of McAnally Dr | 35,874 | 34,634 | 1.04 | 0.24 | Yes | 1,240 | 1,537,931 |
| | Washington Blvd | South of Diamond Oaks Rd | 18,080 | 21,652 | 0.84 | 0.27 | Yes | -3,572 | 12,761,565 |
| S17 | BlueOaks Blvd | East of Foothills Rd | 53,765 | 52,865 | 1.02 | 0.20 | Yes | 900 | 809,640 |
| | Pleasant Grove Blvd | West of Washington Blvd | 45,473 | 48,121 | 0.94 | 0.21 | Yes | -2,648 | 7,012,963 |
| | Junction Blvd | West of Washington Blvd | 20,529 | 15,101 | 1.36 | 0.31 | No | 5,428 | 29,458,842 |
| | Atlantic St | West of Center St | 17,814 | 22,095 | 0.81 | 0.27 | Yes | -4,281 | 18,323,536 |
| S18 | Foothills Blvd | South of Denio LP | 49,552 | 46,249 | 1.07 | 0.22 | Yes | 3,303 | 10,906,726 |
| | Washington Blvd | Northwest of Oak St | 41,532 | 31,973 | 1.30 | 0.25 | No | 9,559 | 91,368,108 |
| | Galleria Blvd | South of Berry St. | 31,867 | 26,342 | 1.21 | 0.26 | Yes | 5,525 | 30,530,045 |
| S19 | Roseville Pkwy | West of Taylor Rd | 62,594 | 54,544 | 1.15 | 0.20 | Yes | 8,050 | 64,806,793 |
| | Atlantic St | I-80 Overcrossing | 35,616 | 22,100 | 1.61 | 0.27 | No | 13,516 | 182,689,465 |
| | Lead Hill Blvd | I-80 Overcrossing | 32,535 | 25,516 | 1.28 | 0.26 | No | 7,019 | 49,268,233 |
| | Douglas Blvd | I-80 Overcrossing | 35,205 | 41,542 | 0.85 | 0.23 | Yes | -6,337 | 40,161,794 |
| | Cirby Wy | West of Orlando Ave | 23,597 | 27,940 | 0.84 | 0.26 | Yes | -4,343 | 18,859,912 |
| Riverside Ave | I-80 Overcrossing | 42,942 | 36,711 | 1.17 | 0.24 | Yes | 6,231 | 38,819,546 | |
| S20 | Taylor Rd | North of Roseville Parkway | 15,023 | 17,633 | 0.85 | 0.30 | Yes | -2,610 | 6,814,188 |
| | Galleria Blvd | SR 65 Overcrossing | 52,963 | 52,991 | 1.00 | 0.20 | Yes | -28 | 795 |
| | Pleasant Grove Blvd | SR 65 Overcrossing | 41,850 | 48,109 | 0.87 | 0.21 | Yes | -6,259 | 39,170,074 |
| | Blue Oaks Blvd | East of Washington Ave | 32,836 | 41,710 | 0.79 | 0.23 | Yes | -8,874 | 78,743,143 |
| S21 | Sunrise Blvd | South of Auto Mall Dr | 24,705 | 16,387 | 1.51 | 0.30 | No | 8,318 | 69,185,797 |
| | Eureka Rd | South East of Rocky Ridge Rd | 29,359 | 15,551 | 1.89 | 0.31 | No | 13,808 | 190,647,977 |
| | Rocky Ridge Rd | South West of Eureka Rd | 19,314 | 27,821 | 0.69 | 0.26 | No | -8,507 | 72,366,780 |
| | Roseville Pkwy | North of Lead Hill Rd | 37,568 | 35,249 | 1.07 | 0.24 | Yes | 2,319 | 5,376,524 |
| I-80 East (Reno) | East of SR 20 | 17,630 | 25,242 | 0.70 | 0.26 | No | -7,612 | 57,942,544 | |
| Subtotal | | | 2,034,316 | 1,960,156 | | Model/Count Ratio = 1.04 | | | |
| | | | | | | Percent Within Caltrans Maximum Deviation = 86% | > 75% | | |
| | | | | | | Percent Root Mean Square Error = 19% | < 30% | | |
| | | | | | | Coefficient of Determination (R²) = 0.94 | > 0.77 | | |
| | | | | | | Correlation Coefficient = 0.97 | > 0.88 | | |

Check of AM Peak Hour Volumes

| Screenline | Roadway | Segment | Model Volume | Traffic Count | Model / Count | Maximum Deviation | Within Deviation | Model - Count | Difference Squared |
|------------------|----------------------------|---|----------------|----------------|--|-------------------|------------------|---------------|--------------------|
| S01 | SR 20 (Grass Valley) | Placer/Nevada County Line | 79 | 137 | 0.58 | 0.60 | Yes | -58 | 3,364 |
| | SR 174 (Grass Valley) | Placer/Nevada County Line | 485 | 611 | 0.79 | 0.44 | Yes | -126 | 15,876 |
| | SR 49 North (Grass Valley) | Placer/Nevada County Line | 2,325 | 2,331 | 1.00 | 0.27 | Yes | -6 | 36 |
| S02 | I-80E (N of Auburn) | At Applegate | 1,193 | 1,093 | 1.09 | 0.36 | Yes | 100 | 9,933 |
| | I-80W (N of Auburn) | At Applegate | 1,675 | 1,050 | 1.59 | 0.36 | No | 625 | 390,042 |
| S03 | SR 193 | W of I-80 | 409 | 664 | 0.62 | 0.43 | Yes | -255 | 65,025 |
| | I-80W (S of Newcastle) | W of SR 193 | 5,028 | 3,339 | 1.51 | 0.24 | No | 1,689 | 2,851,595 |
| | I-80E (S of Newcastle) | W of SR 193 | 3,085 | 2,555 | 1.21 | 0.26 | Yes | 530 | 281,253 |
| S04 | SR 49 | Placer/EI Dorado County Line | 631 | 670 | 0.94 | 0.43 | Yes | -39 | 1,521 |
| S05 | Joiner Pkwy | South of Twelve Bridges Rd | 666 | 1,289 | 0.52 | 0.33 | No | -623 | 388,129 |
| | SR 65 NB (Whitney Ranch) | Within the Whitney Ranch interchange | 1,830 | 1,839 | 1.00 | 0.29 | Yes | -9 | 74 |
| | SR 65 SB (Whitney Ranch) | North of Whitney Ranch interchange | 3,106 | 3,194 | 0.97 | 0.25 | Yes | -88 | 7,709 |
| | Industrial Ave | North of Athens Ave | 718 | 1,019 | 0.70 | 0.37 | Yes | -301 | 90,601 |
| | Fiddymnt Rd | North of Athens Ave | 313 | 368 | 0.85 | 0.60 | Yes | -55 | 3,025 |
| | Sierra College Blvd | North of King Dr | 576 | 841 | 0.68 | 0.40 | Yes | -265 | 70,225 |
| S06 | Joiner Pkwy | West of Del Webb Blvd (East of Lincoln Overcross) | 655 | 651 | 1.01 | 0.43 | Yes | 4 | 16 |
| | Ferrari Ranch Rd. | West of Ingram Pkwy | 442 | 672 | 0.66 | 0.43 | Yes | -230 | 52,900 |
| | 1st St | East of Lincon Blvd | 158 | 177 | 0.89 | 0.60 | Yes | -19 | 361 |
| S07 | Ferrari Ranch Rd | West of Lincoln Blvd | 568 | 512 | 1.11 | 0.47 | Yes | 56 | 3,136 |
| | Joiner Pkwy | Lincoln Blvd Overcross | 622 | 621 | 1.00 | 0.44 | Yes | 1 | 1 |
| S08 | Nicolas Rd | East of Joiner Pkwy | 550 | 946 | 0.58 | 0.38 | No | -396 | 156,816 |
| | 5th St | East of Joiner Pkwy | 69 | 310 | 0.22 | 0.60 | No | -241 | 58,081 |
| | 3rd St | East of Joiner Pkwy | 195 | 347 | 0.56 | 0.60 | Yes | -152 | 23,104 |
| | 1st St | East of Joiner Pkwy | 297 | 302 | 0.98 | 0.60 | Yes | -5 | 25 |
| S09 | SR 65 | North of Wise Rd | 1,769 | 2,011 | 0.88 | 0.28 | Yes | -242 | 58,564 |
| | Old Hwy 65 | North of Wise Rd | 556 | 625 | 0.89 | 0.44 | Yes | -69 | 4,761 |
| S10 | SR 65 (Wheatland) | Placer/Yuba County Line | 2,262 | 2,196 | 1.03 | 0.27 | Yes | 66 | 4,356 |
| S11 | Lincoln Blvd | North of SR 65 | 1,738 | 1,554 | 1.12 | 0.31 | Yes | 184 | 33,856 |
| | Ferrari Ranch Rd | North of SR 65 | 1,645 | 1,625 | 1.01 | 0.30 | Yes | 20 | 400 |
| S12 | Twelve Bridges | East of SR 65 | 959 | 1,658 | 0.58 | 0.30 | No | -699 | 488,601 |
| | Whitney Ranch Rd | East of SR 65 | 734 | 1,004 | 0.73 | 0.37 | Yes | -270 | 72,900 |
| | Sunset Blvd | East of SR 65 | 1,229 | 1,835 | 0.67 | 0.29 | No | -606 | 367,236 |
| S13 | Nicolas Rd | Placer/Sutter County Line | 522 | 612 | 0.85 | 0.44 | Yes | -90 | 8,100 |
| | Sunset Blvd | Placer/Sutter County Line | 586 | 698 | 0.84 | 0.43 | Yes | -112 | 12,544 |
| | Baseline Rd | Placer/Sutter County Line | 886 | 1,408 | 0.63 | 0.31 | No | -522 | 272,484 |
| S14 | Watt Ave | Placer/Sacramento County Line | 1,168 | 1,872 | 0.62 | 0.29 | No | -704 | 495,616 |
| | Walergra Rd | Placer/Sacramento County Line | 1,603 | 2,685 | 0.56 | 0.26 | No | -1,182 | 1,397,124 |
| | Antelope Rd | Placer/Sacramento County Line | 1,157 | 1,395 | 0.83 | 0.32 | Yes | -238 | 56,644 |
| | Roseville Rd | Placer/Sacramento County Line | 1,405 | 1,949 | 0.72 | 0.28 | Yes | -544 | 295,936 |
| | Auburn Blvd | Placer/Sacramento County Line | 3,124 | 2,696 | 1.16 | 0.26 | Yes | 428 | 183,184 |
| | I-80 EB (Citrus Heights) | Placer/Sacramento County Line | 4,608 | 5,446 | 0.85 | 0.20 | Yes | -838 | 702,803 |
| | I-80 WB (Citrus Heights) | Placer/Sacramento County Line | 7,565 | 6,838 | 1.11 | 0.17 | Yes | 727 | 528,529 |
| S15 | Foothill Blvd | North of Cirby Way | 3,487 | 4,530 | 0.77 | 0.22 | No | -1,043 | 1,087,849 |
| | Riverside Ave | South of Cirby Way | 3,529 | 3,008 | 1.17 | 0.25 | Yes | 521 | 271,441 |
| | Sunrise Blvd | Placer/Sacramento County Line | 3,297 | 3,107 | 1.06 | 0.25 | Yes | 190 | 36,100 |
| | Cirby Wy | Placer/Sacramento County Line | 1,231 | 1,565 | 0.79 | 0.31 | Yes | -334 | 111,556 |
| | Hazel Ave | Placer/Sacramento County Line | 3,468 | 4,171 | 0.83 | 0.23 | Yes | -703 | 494,209 |
| | Barton Rd | Placer/Sacramento County Line | 617 | 628 | 0.98 | 0.44 | Yes | -11 | 121 |
| | Folsom Auburn Rd | Placer/Sacramento County Line | 3,557 | 3,802 | 0.94 | 0.23 | Yes | -245 | 60,025 |
| | Fiddymnt Rd | South of Pleasant Grove Blvd | 2,566 | 2,957 | 0.87 | 0.26 | Yes | -391 | 152,568 |
| S16 | Woodcreek Oaks Blvd | South of Pleasant Grove Blvd | 1,359 | 1,270 | 1.07 | 0.33 | Yes | 89 | 7,850 |
| | Country Club Dr | South of Pleasant Grove Blvd | 464 | 395 | 1.17 | 0.60 | Yes | 69 | 4,733 |
| | Foothills Blvd | South of McAnally Dr | 2,316 | 2,110 | 1.10 | 0.27 | Yes | 206 | 42,573 |
| | Washington Blvd | South of Diamond Oaks Rd | 1,284 | 1,248 | 1.03 | 0.33 | Yes | 36 | 1,330 |
| S17 | BlueOaks Blvd | East of Foothills Rd | 3,624 | 3,224 | 1.12 | 0.24 | Yes | 400 | 160,000 |
| | Pleasant Grove Blvd | West of Washington Blvd | 2,802 | 2,688 | 1.04 | 0.26 | Yes | 114 | 13,087 |
| | Junction Blvd | West of Washington Blvd | 1,102 | 956 | 1.15 | 0.38 | Yes | 146 | 21,452 |
| | Atlantic St | West of Center St | 1,147 | 1,288 | 0.89 | 0.33 | Yes | -141 | 19,787 |
| | Foothills Blvd | South of Denio LP | 3,487 | 3,390 | 1.03 | 0.24 | Yes | 97 | 9,383 |
| S18 | Washington Blvd | Northwest of Oak St | 2,553 | 2,702 | 0.94 | 0.26 | Yes | -149 | 22,082 |
| | Galleria Blvd | South of Berry St. | 1,962 | 1,267 | 1.55 | 0.33 | No | 695 | 483,488 |
| S19 | Roseville Pkwy | West of Taylor Rd | 4,185 | 3,509 | 1.19 | 0.24 | Yes | 676 | 457,066 |
| | Atlantic St | I-80 Overcrossing | 2,662 | 1,381 | 1.93 | 0.32 | No | 1,281 | 1,641,644 |
| | Lead Hill Blvd | I-80 Overcrossing | 1,710 | 1,155 | 1.48 | 0.34 | No | 555 | 308,247 |
| | Douglas Blvd | I-80 Overcrossing | 2,435 | 2,205 | 1.10 | 0.27 | Yes | 230 | 52,777 |
| | Cirby Wy | West of Orlando Ave | 1,605 | 1,888 | 0.85 | 0.29 | Yes | -283 | 79,938 |
| Riverside Ave | I-80 Overcrossing | 3,028 | 2,114 | 1.43 | 0.27 | No | 914 | 835,274 | |
| S20 | Taylor Rd | North of Roseville Parkway | 836 | 947 | 0.88 | 0.38 | Yes | -111 | 12,410 |
| | Galleria Blvd | SR 65 Overcrossing | 3,070 | 2,408 | 1.28 | 0.26 | No | 662 | 438,597 |
| | Pleasant Grove Blvd | SR 65 Overcrossing | 2,450 | 1,744 | 1.40 | 0.30 | No | 706 | 498,248 |
| | Blue Oaks Blvd | East of Washington Ave | 2,179 | 2,580 | 0.84 | 0.26 | Yes | -401 | 160,534 |
| S21 | Sunrise Blvd | South of Auto Mall Dr | 1,202 | 575 | 2.09 | 0.45 | No | 627 | 392,878 |
| | Eureka Rd | South East of Rocky Ridge Rd | 2,045 | 706 | 2.90 | 0.42 | No | 1,339 | 1,792,385 |
| | Rocky Ridge Rd | South West of Eureka Rd | 1,382 | 1,602 | 0.86 | 0.30 | Yes | -220 | 48,371 |
| | Roseville Pkwy | North of Lead Hill Rd | 2,549 | 2,319 | 1.10 | 0.27 | Yes | 230 | 52,900 |
| I-80 East (Reno) | East of SR 20 | 973 | 1,066 | 0.91 | 0.36 | Yes | -93 | 8,649 | |
| | | | 135,254 | 134,148 | Model/Count Ratio = 1.01 | | | | |
| | | | | | Percent Within Caltrans Maximum Deviation = 75% | | > 75% | | |
| | | | | | Percent Root Mean Square Error = 29% | | < 30% | | |
| | | | | | Coefficient of Determination (R²) = 0.86 | | > 0.77 | | |
| | | | | | Correlation Coefficient = 0.93 | | > 0.88 | | |

Check of PM Peak Hour Volumes

| Screenline | Roadway | Segment | Model Volume | Traffic Count | Model / Count | Maximum Deviation | Within Deviation | Model - Count | Difference Squared |
|------------------|----------------------------|---|--|----------------|---------------------------------|-------------------|------------------|---------------|--------------------|
| S01 | SR 20 (Grass Valley) | Placer/Nevada County Line | 140 | 221 | 0.63 | 0.60 | Yes | -81 | 6,561 |
| | SR 174 (Grass Valley) | Placer/Nevada County Line | 560 | 655 | 0.85 | 0.43 | Yes | -95 | 9,025 |
| | SR 49 North (Grass Valley) | Placer/Nevada County Line | 2,696 | 3,120 | 0.86 | 0.25 | Yes | -424 | 179,776 |
| S02 | I-80E (N of Auburn) | At Applegate | 2,072 | 1,364 | 1.52 | 0.32 | No | 708 | 500,698 |
| | I-80W (N of Auburn) | At Applegate | 1,635 | 1,153 | 1.42 | 0.34 | No | 482 | 231,874 |
| S03 | SR 193 | W of I-80 | 502 | 564 | 0.89 | 0.45 | Yes | -62 | 3,844 |
| | I-80W (S of Newcastle) | W of SR 193 | 3,696 | 3,332 | 1.11 | 0.24 | Yes | 364 | 132,205 |
| | I-80E (S of Newcastle) | W of SR 193 | 5,537 | 3,633 | 1.52 | 0.24 | No | 1,904 | 3,624,708 |
| S04 | SR 49 | Placer/EI Dorado County Line | 791 | 845 | 0.94 | 0.40 | Yes | -54 | 2,916 |
| S05 | Joiner Pkwy | South of Twelve Bridges Rd | 754 | 819 | 0.92 | 0.40 | Yes | -65 | 4,225 |
| | SR 65 NB (Whitney Ranch) | Within the Whitney Ranch interchange | 3,475 | 3,180 | 1.09 | 0.25 | Yes | 295 | 86,828 |
| | SR 65 SB (Whitney Ranch) | North of Whitney Ranch interchange | 2,733 | 2,343 | 1.17 | 0.27 | Yes | 390 | 151,840 |
| | Industrial Ave | North of Athens Ave | 1,193 | 1,235 | 0.97 | 0.33 | Yes | -42 | 1,764 |
| | Fiddymnt Rd | North of Athens Ave | 447 | 443 | 1.01 | 0.60 | Yes | 4 | 16 |
| S06 | Sierra College Blvd | North of King Dr | 774 | 1,196 | 0.65 | 0.34 | No | -422 | 178,084 |
| S07 | Joiner Pkwy | West of Del Webb Blvd (East of Lincoln Overcross) | 909 | 718 | 1.27 | 0.42 | Yes | 191 | 36,481 |
| | Ferrari Ranch Rd. | West of Ingram Pkwy | 773 | 852 | 0.91 | 0.39 | Yes | -79 | 6,241 |
| | 1st St | East of Lincon Blvd | 242 | 208 | 1.16 | 0.60 | Yes | 34 | 1,156 |
| S08 | Ferrari Ranch Rd | West of Lincoln Blvd | 797 | 774 | 1.03 | 0.41 | Yes | 23 | 529 |
| | Joiner Pkwy | Lincoln Blvd Overcross | 979 | 902 | 1.09 | 0.38 | Yes | 77 | 5,929 |
| S09 | Nicolas Rd | East of Joiner Pkwy | 527 | 512 | 1.03 | 0.47 | Yes | 15 | 225 |
| | 5th St | East of Joiner Pkwy | 85 | 183 | 0.46 | 0.60 | Yes | -98 | 9,604 |
| | 3rd St | East of Joiner Pkwy | 239 | 239 | 1.00 | 0.60 | Yes | 0 | 0 |
| | 1st St | East of Joiner Pkwy | 398 | 265 | 1.50 | 0.60 | Yes | 133 | 17,689 |
| S10 | SR 65 | North of Wise Rd | 1,832 | 2,062 | 0.89 | 0.28 | Yes | -230 | 52,900 |
| | Old Hwy 65 | North of Wise Rd | 742 | 869 | 0.85 | 0.39 | Yes | -127 | 16,129 |
| S11 | SR 65 (Wheatland) | Placer/Yuba County Line | 2,623 | 2,568 | 1.02 | 0.26 | Yes | 55 | 3,025 |
| S12 | Licolen Blvd | North of SR 65 | 2,237 | 1,730 | 1.29 | 0.30 | Yes | 507 | 257,049 |
| | Ferrari Ranch Rd | North of SR 65 | 2,178 | 1,397 | 1.56 | 0.32 | No | 781 | 609,961 |
| S13 | Twelve Bridges | East of SR 65 | 1,346 | 1,375 | 0.98 | 0.32 | Yes | -29 | 841 |
| | Whitney Ranch Rd | East of SR 65 | 692 | 748 | 0.93 | 0.42 | Yes | -56 | 3,136 |
| | Sunset Blvd | East of SR 65 | 1,618 | 1,991 | 0.81 | 0.28 | Yes | -373 | 139,129 |
| S14 | Nicolas Rd | Placer/Sutter County Line | 682 | 783 | 0.87 | 0.41 | Yes | -101 | 10,201 |
| | Sunset Blvd | Placer/Sutter County Line | 738 | 896 | 0.82 | 0.39 | Yes | -158 | 24,964 |
| | Baseline Rd | Placer/Sutter County Line | 1,035 | 1,287 | 0.80 | 0.33 | Yes | -252 | 63,504 |
| | Watt Ave | Placer/Sacramento County Line | 1,446 | 1,496 | 0.97 | 0.31 | Yes | -50 | 2,500 |
| | Walergra Rd | Placer/Sacramento County Line | 1,766 | 2,578 | 0.69 | 0.26 | No | -812 | 659,344 |
| S15 | Antelope Rd | Placer/Sacramento County Line | 1,458 | 1,747 | 0.83 | 0.30 | Yes | -289 | 83,521 |
| | Roseville Rd | Placer/Sacramento County Line | 1,610 | 1,949 | 0.83 | 0.28 | Yes | -339 | 114,921 |
| | Auburn Blvd | Placer/Sacramento County Line | 3,536 | 3,324 | 1.06 | 0.24 | Yes | 212 | 44,944 |
| | I-80 EB (Citrus Heights) | Placer/Sacramento County Line | 8,759 | 6,373 | 1.37 | 0.18 | No | 2,386 | 5,691,405 |
| | I-80 WB (Citrus Heights) | Placer/Sacramento County Line | 5,571 | 6,518 | 0.85 | 0.18 | Yes | -947 | 897,440 |
| | Foothill Blvd | North of Cirby Way | 3,906 | 5,192 | 0.75 | 0.20 | No | -1,286 | 1,653,796 |
| S16 | Riverside Ave | South of Cirby Way | 3,611 | 4,306 | 0.84 | 0.22 | Yes | -695 | 483,025 |
| | Sunrise Blvd | Placer/Sacramento County Line | 3,600 | 3,956 | 0.91 | 0.23 | Yes | -356 | 126,736 |
| | Cirby Wy | Placer/Sacramento County Line | 1,455 | 1,601 | 0.91 | 0.30 | Yes | -146 | 21,316 |
| | Hazel Ave | Placer/Sacramento County Line | 3,997 | 4,943 | 0.81 | 0.21 | Yes | -946 | 894,916 |
| | Barton Rd | Placer/Sacramento County Line | 763 | 680 | 1.12 | 0.43 | Yes | 83 | 6,889 |
| | Folsom Auburn Rd | Placer/Sacramento County Line | 3,964 | 4,692 | 0.84 | 0.22 | Yes | -728 | 529,984 |
| | Fiddymnt Rd | South of Pleasant Grove Blvd | 3,130 | 3,245 | 0.96 | 0.24 | Yes | -115 | 13,133 |
| S17 | Woodcreek Oaks Blvd | South of Pleasant Grove Blvd | 1,649 | 1,563 | 1.06 | 0.31 | Yes | 86 | 7,430 |
| | Country Club Dr | South of Pleasant Grove Blvd | 359 | 317 | 1.13 | 0.60 | Yes | 42 | 1,786 |
| | Foothills Blvd | South of McAnally Dr | 2,977 | 3,252 | 0.92 | 0.24 | Yes | -275 | 75,882 |
| | Washington Blvd | South of Diamond Oaks Rd | 1,527 | 2,084 | 0.73 | 0.28 | Yes | -557 | 310,026 |
| S18 | BlueOaks Blvd | East of Foothills Rd | 4,557 | 4,692 | 0.97 | 0.22 | Yes | -135 | 18,153 |
| | Pleasant Grove Blvd | West of Washington Blvd | 3,825 | 4,146 | 0.92 | 0.23 | Yes | -321 | 103,084 |
| | Junction Blvd | West of Washington Blvd | 1,719 | 1,492 | 1.15 | 0.31 | Yes | 227 | 51,680 |
| S19 | Atlantic St | West of Center St | 1,444 | 2,270 | 0.64 | 0.27 | No | -826 | 682,056 |
| | Foothills Blvd | South of Denio LP | 3,906 | 4,059 | 0.96 | 0.23 | Yes | -153 | 23,409 |
| S20 | Washington Blvd | Northwest of Oak St | 3,437 | 2,532 | 1.36 | 0.26 | No | 905 | 819,508 |
| | Galleria Blvd | South of Berry St. | 2,711 | 2,473 | 1.10 | 0.26 | Yes | 238 | 56,581 |
| | Roseville Pkwy | West of Taylor Rd | 5,258 | 4,358 | 1.21 | 0.22 | Yes | 900 | 809,520 |
| | Atlantic St | I-80 Overcrossing | 2,657 | 2,186 | 1.22 | 0.27 | Yes | 471 | 222,281 |
| | Lead Hill Blvd | I-80 Overcrossing | 2,699 | 2,679 | 1.01 | 0.26 | Yes | 20 | 403 |
| S21 | Douglas Blvd | I-80 Overcrossing | 2,881 | 3,106 | 0.93 | 0.25 | Yes | -225 | 50,595 |
| | Cirby Wy | West of Orlando Ave | 1,830 | 2,353 | 0.78 | 0.27 | Yes | -523 | 273,808 |
| | Riverside Ave | I-80 Overcrossing | 3,547 | 3,084 | 1.15 | 0.25 | Yes | 463 | 213,999 |
| S22 | Taylor Rd | North of Roseville Parkway | 1,299 | 1,676 | 0.78 | 0.30 | Yes | -377 | 141,928 |
| | Galleria Blvd | SR 65 Overcrossing | 4,247 | 4,384 | 0.97 | 0.22 | Yes | -137 | 18,860 |
| | Pleasant Grove Blvd | SR 65 Overcrossing | 3,520 | 4,064 | 0.87 | 0.23 | Yes | -544 | 295,646 |
| | Blue Oaks Blvd | East of Washington Ave | 2,877 | 3,548 | 0.81 | 0.24 | Yes | -671 | 449,615 |
| S23 | Sunrise Blvd | South of Auto Mall Dr | 1,898 | 1,324 | 1.43 | 0.32 | No | 574 | 329,170 |
| | Eureka Rd | South East of Rocky Ridge Rd | 2,524 | 1,527 | 1.65 | 0.31 | No | 997 | 994,275 |
| | Rocky Ridge Rd | South West of Eureka Rd | 1,552 | 2,448 | 0.63 | 0.26 | No | -896 | 802,458 |
| | Roseville Pkwy | North of Lead Hill Rd | 3,097 | 3,116 | 0.99 | 0.25 | Yes | -19 | 376 |
| I-80 East (Reno) | East of SR 20 | 1,276 | 1,538 | 0.83 | 0.31 | Yes | -262 | 68,644 | |
| | | | 165,522 | 167,334 | Model/Count Ratio = 0.99 | | | | |
| | | | Percent Within Caltrans Maximum Deviation = 83% > 75% | | | | | | |
| | | | Percent Root Mean Square Error = 26% < 30% | | | | | | |
| | | | Coefficient of Determination (R²) = 0.87 > 0.77 | | | | | | |
| | | | Correlation Coefficient = 0.93 > 0.88 | | | | | | |