

SAN BERNARDINO COUNTY TRANSPORTATION ANALYSIS MODEL – SBTAM

MODEL DEVELOPMENT AND VALIDATION Report and User's Guide



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EXECUTIVE SUMMARY

The San Bernardino County Transportation Analysis Model (SBTAM) is a Subregional travel demand model, developed to be generally consistent with the Southern California Association of Government (SCAG) Version 5 (V5) model with the addition of model updates. SBTAM is intended to support SANBAG, Caltrans and local jurisdictions' needs for future transportation planning and environmental phases of projects including, but not limited to, freeway segments, interchanges, grade separations, arterial improvement projects, and support circulation elements for General Plan Updates, Nexus Studies and SB-375 scenario testing.

ES.1 FOCUSED VERSION OF THE SCAG REGIONAL MODEL

SBTAM is a focused version of the SCAG TransCAD Version 5 (V5) trip-based regional travel demand model. Its structure is consistent with the SCAG V5 model while employing a more refined traffic analysis zone (TAZ) system in San Bernardino County and a more aggregate zone structure outside of the county. SBTAM was developed through application of the SCAG Subregional Model Development Tool (SMDT). SBTAM replaces the RIVSAN model and expands the modeling capabilities in the Mountain/Desert subareas of San Bernardino County.

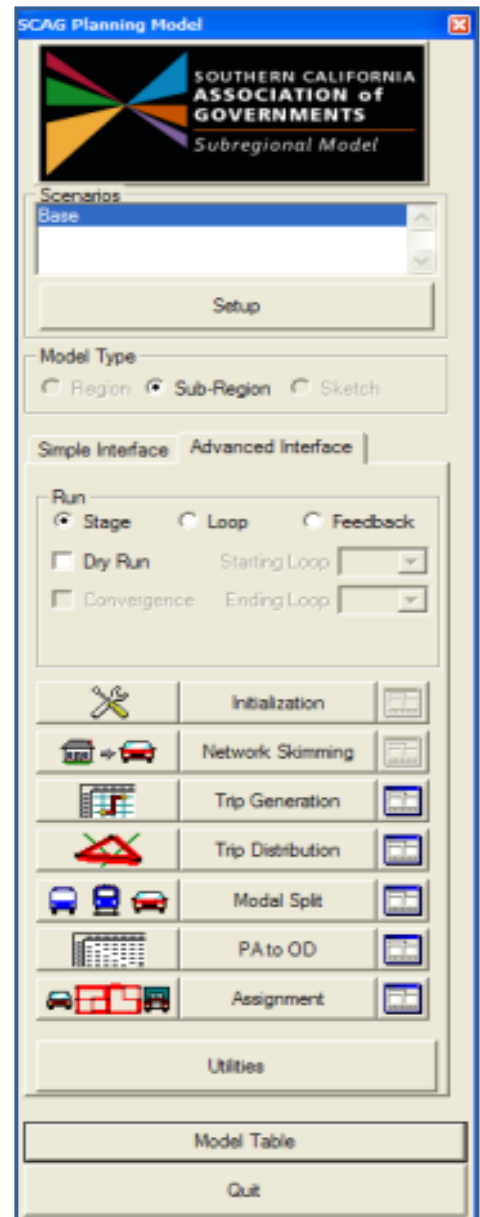
Modeling Process

SBTAM follows the same four-step modeling process as the SCAG model, i.e., trip generation, trip distribution, mode choice and assignment, enhanced by an auto ownership model and a time-of-day model. In addition, the external trip, airport trip and truck trip models are also incorporated into SBTAM, consistent with the SCAG model.

SBTAM incorporates the SCAG V6 auto ownership model and V6 HBW trip productions model. In addition, the sub-models used to stratify households by income and size are replaced with a more detailed household stratification, based on SCAG population synthesis. In the SCAG V6 model, households in each TAZ are stratified across five attributes: income, size, workers, type of dwelling unit, and age of head of household.

Tiered Zone Structure

The SCAG regional and subregional models use a tiered traffic analysis zone structure to enhance the accuracy of the micro-level





land use and smart growth analysis. The tiered zone structure consists of three levels, Tier 1 through Tier 3. The Tier 3 zone system provides the most detailed zone information at the local level. The Tier 2 zone structure is an aggregation of the Tier 3 zones, based on the Census block group structure; it is currently employed by the SCAG V6 model. The Tier 1 zone structure is currently employed in the SCAG V5 model and selected components of the V6 model. The Tier 1 zone structure is similar to the zone system used in the development of the 2008 SCAG RTP.

SBTAM adopts this tiered zone system to include a refined zone structure within the subregion with an aggregated zone structure external to the San Bernardino subregion. TAZs within San Bernardino County are Tier 3 zones, which provide the most detailed zone information. The areas external to San Bernardino County and within an approximate 5-10 mile buffer to San Bernardino County consist of Tier 2 zones. Beyond this Tier 2 buffer area is the Tier 1 area, with the farthest outlying areas aggregated to Combined Statistical Areas (CSAs). Note that special generators (such as airports) are not aggregated to the CSA system but maintain Tier 1 structure, regardless of their distance from the San Bernardino County boundary.

Model Development

Using SCAG V5 model with additional regional model updates as the basic platform, SBTAM was developed through the application of SMDT based on the guidelines outlined in the *Users' Guide for the SCAG Subregional Planning Model in TransCAD 5.0* (Caliper Corporation, June 2010).

The SMDT includes the preliminary datasets and processes required to convert from the SCAG regional model to a subregional model between specified zone structures while maintaining a consistent modeling process. The major functions that the SMDT performs as part of the regional to subregional conversion are:

- Automatic disaggregation and aggregation of TAZ attributes, or direct incorporation of subregional agency input data
- Automatic disaggregation and aggregation of matrix inputs
- Automatic conversion of the input network and creation of new centroid connectors, or incorporation of predefined networks (e.g., predefined centroid connectors)
- Additional intra-region assignment procedure due to TAZ aggregation external to the subregion

ES.2 SBTAM VALIDATION

SBTAM, as obtained through application of the SMDT, was compared to Year 2008 travel conditions for validation purposes. Average trip distances estimated by SBTAM were inconsistent with the observed average trip distance at the county level, specifically for trips produced in San Bernardino County. As a result, the trip distribution model was recalibrated at the county level and the resulting average distances are much closer to the observed data and to the average distances from the SCAG regional model.



Similar to the trip distribution model, the initial mode choice model results showed that the mode shares estimated from SBTAM did not align with the SCAG regional model forecasts; in particular, non-motorized and transit mode shares for trips to/from San Bernardino County were significantly higher in SBTAM than the mode shares forecast by the SCAG regional model. This was due to the more refined zone structure in San Bernardino County, which the model perceived as improved non-motorized mode and transit mode accessibility. To resolve this issue, a post-processing procedure was incorporated to adjust the mode shares between transit/non-motorized modes and auto modes focusing on San Bernardino County, based upon the mode share pattern estimated by the SCAG V5 regional model used to develop SBTAM. The resulting mode shares among travel modes are consistent between SBTAM and the SCAG regional model for trips produced from or attracted to San Bernardino County.

For validation purposes the difference between model-estimated traffic volumes and ground counts are evaluated against the maximum allowable deviation prescribed by Federal Highway Administration (FHWA) and National Cooperative Highway Research Program (NCHRP) 255 guidelines. All screenlines fall within acceptable local and industry standards as prescribed by NCHRP 255 guidelines.

Vehicle miles travelled (VMT) from SBTAM has been compared against the VMT reported from the Highway Performance Monitoring System (HPMS) and the SCAG V5 model. SBTAM forecasts 55,336,000 VMT on an average weekday in 2008 within San Bernardino County and 417,630,000 VMT region-wide. The VMT estimated from SBTAM within San Bernardino County is 4.1% lower than HPMS and 2.9% lower than the SCAG regional model, while the region-wide VMT is 1.6% lower than HPMS and 1.3% lower than SCAG regional model. The percentage difference between the Caltrans VMT and SBTAM model VMT is within 5%, the maximum desired threshold defined by SANBAG.



1.0 INTRODUCTION

The San Bernardino Transportation Analysis Model (SBTAM) has been developed as a subregional model based on the Southern California Association of Governments (SCAG) Regional TransCAD Model, focusing on San Bernardino County. This model has been further validated against Year 2008. The validation process and the results are documented in this report.

1.1 BACKGROUND

Since the 1980s, the Riverside-San Bernardino Comprehensive Transportation Plan (RIVSAN) model, a derivative of the SCAG Regional Model, has been used as the subregional travel demand forecasting model for both Riverside and San Bernardino Counties. Based on a TRANPLAN software platform, the model has been updated several times, but until 2009 has retained the same essential model structure from the early 1990s.

The most recently used modeling tools for the San Bernardino Valley and the High Desert areas include: the EMME/2-based model used for the E Street sbX Bus Rapid Transit project, Long Range Transit Plan (LRTP) for the San Bernardino Valley, the Redlands Rail project, and the I-10 HOV project; the East Valley Travel Demand Model used for focused-area planning in the East Valley; and the Victor Valley Area Transportation Study (VVATS) model used for planning in the Victor Valley. Various versions of the SCAG regional model have also been used for specific applications, such as the toll-based version used for the Express Lane Feasibility Studies. Although each of these models was originally derived from an earlier version of the SCAG regional model, the approach has been fragmented over the years due to the need for modeling tools tailored to specific applications.

1.2 PURPOSE

Consolidating all future modeling efforts into one model was highly desirable, as well as to maintaining consistency throughout the County and with the remainder of the SCAG region. To take advantage of the advanced functionalities that have been incorporated into the SCAG regional model, the San Bernardino Associated Governments (SANBAG) initiated the development of a new countywide travel demand forecasting model based upon the most recent SCAG regional model.

The purpose of this model is to support SANBAG, Caltrans and local jurisdictions' needs for future transportation planning and environmental phases of projects including, but not limited to, freeway segments, interchanges, grade separations, arterial improvement projects, and support circulation elements for General Plan Updates, Nexus Studies and SB-375 scenario testing.

1.3 TECHNICAL ADVISORY COMMITTEE AND REVIEW PROCESS

SANBAG is the key agency responsible for the development of the SBTAM. To ensure that the new countywide model would address the needs and concerns of stakeholder agencies and be consistent with and conform to the regional model, the agency's project partners are involved in the model



development process, including SCAG, Caltrans and the County's local jurisdictions. SBTAM Technical Advisory Committee meetings comprised of staff from SCAG, Caltrans and local agencies were held to monitor project progress and obtain input from stakeholder agencies.

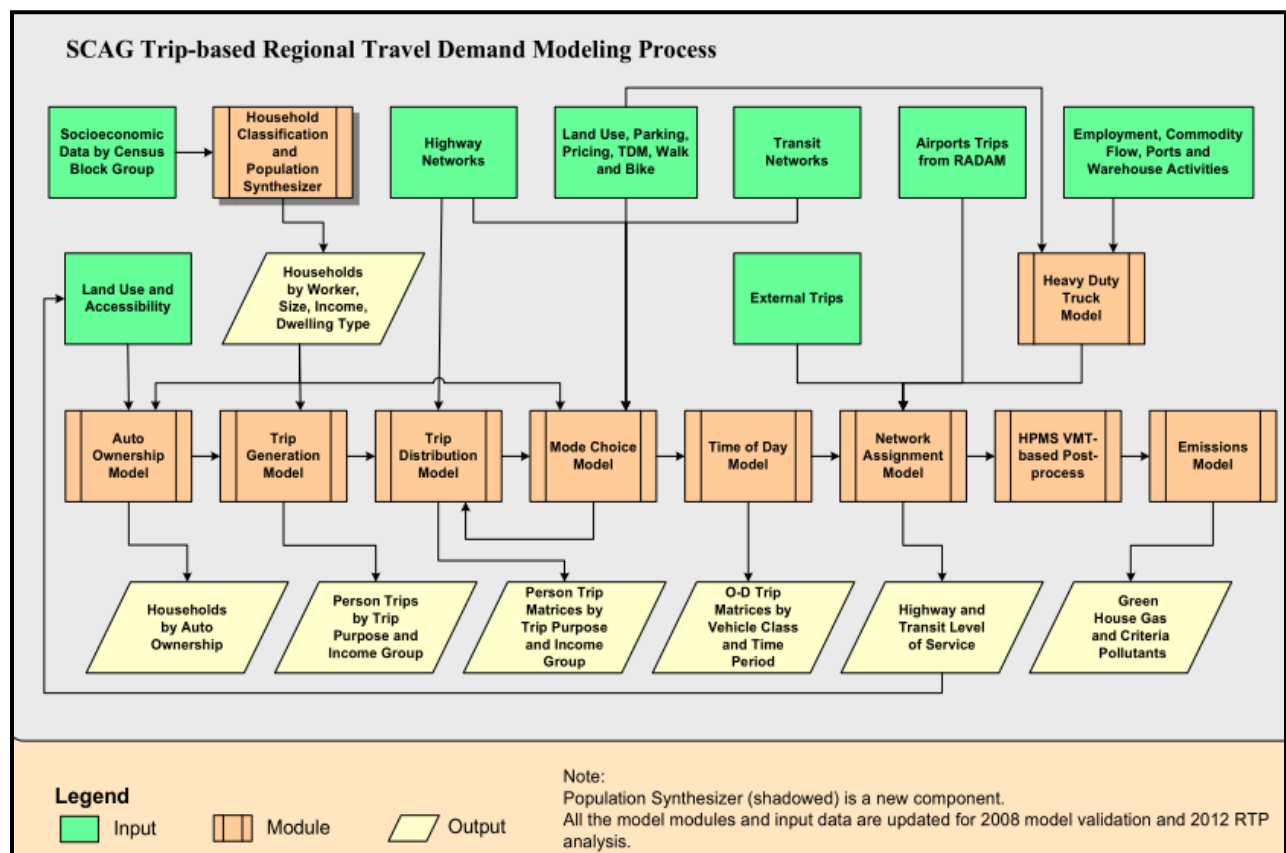
2.0 TECHNICAL APPROACH

The SBTAM structure is based on the TransCAD SCAG Version 5 (V5) Regional Model while employing a refined Traffic Analysis Zone (TAZ) system prepared by SANBAG. SBTAM was developed following SCAG's recent completion of its Subregional Model Development Tool (SMDT). The refined version of SBTAM replaces previous countywide models and expands the modeling capabilities in the Mountain/Desert subareas of San Bernardino County.

2.1 MODEL STRUCTURE

Built upon the SCAG trip-based regional travel demand model, SBTAM follows the same structure as the SCAG model, as presented in **Figure 2.1**. SBTAM follows the four-step modeling process, i.e. trip generation, trip distribution, mode choice and assignment with enhancements including the revised SCAG V6 auto ownership model and time-of-day model. The external trip, airport trip and heavy-duty truck trip models are also included, consistent with the SCAG model.

Figure 2.1 SCAG Trip-Based Regional Travel Demand Modeling Process



The SCAG regional model migrated from Version 5 (V5) to Version 6 (V6) between 2008 and 2011, concurrent with the development of SBTAM. The V5 to V6 migration involved a series of model updates for various model components. This migration to V6 was to support the development and evaluation of the 2012 Southern California Regional Transportation Plan (RTP). The new modeling capabilities introduced as part of the V6 update not only address the need for evaluating a wide variety of projects and transportation policies, but also allow for the evaluation of the types of land use and transportation policies that are called for by California's greenhouse gas emission reduction legislation, Senate Bill (SB) 375, and meet or exceed the requirements stipulated by the 2010 RTP Guidelines.

As the V6 model was not complete prior to initiation of SBTAM development and the SMDT was developed based on V5, the SCAG base model for SBTAM was V5. However, to take advantage of the new features and the flexibility to conduct various policies analyses while still maintaining reasonable and validated model output, the following updates that were incorporated into the SCAG V6 model were incorporated in SBTAM as they had been completed prior to initiation of SBTAM development:

- *Auto Ownership Model*
The model was re-estimated to increase sensitivity to transit, non-motorized accessibility and land use form. The updated model is sensitive to a mixed employment, household and intersection density indicator, non-motorized accessibility, relative transit accessibility, and multi-family dwelling unit type. These variables enhance the capability of the model to analyze a variety of smart growth strategies.
- *Home-Based Work (HBW) Trip Productions Model*
The household classification variables used in the HBW trip production model are updated to include household income (replacing household size), in addition to number of workers, and age of the head of household. The trip production rates were re-estimated based on the 2001 Post-Census Household Survey.
- *Household Joint Distribution*
The Iterative Proportional Fitting (IPF) procedure used to develop the household joint distribution has been removed in favor of the household joint distribution tables generated directly from the SCAG Population Synthesizer. To support the updated auto ownership and HBW trip productions model, the household classification was expanded to include household income, size, number of workers, type of dwelling unit, and age of head of household. Separate classifications of households by age and presence of students are also generated to support the home-based school and college trip models.

The SCAG V5 model with the updates identified above is the base model from which SBTAM was developed. It is referred as the base SCAG V5 model throughout this document, to differentiate this model from the SCAG V5 model and the V6 model. Unless otherwise noted, all SCAG model results presented in the following chapters are from this base model.

2.2 MODELING AREA

The modeling area of the subregional model is consistent with the SCAG regional model area, which covers the following six counties in their entirety:

- Imperial County
- Los Angeles County
- Orange County
- Riverside County
- San Bernardino County
- Ventura County

Although SBTAM includes all six counties in the SCAG modeling region, the model development and validation for SBTAM focus on San Bernardino County, which includes two subareas, referred to as the Valley and Mountain/Desert subareas. The Valley is generally defined as the area within the County south of the I-15/I-215 junction and the Mountain/Desert area north of the junction. In addition to the unincorporated County land, there are 15 cities that comprise the Valley subarea and 16 cities that comprise the Mountain/Desert subarea. Table 2.1 lists the Cities by subarea.

Table 2.1 List of Cities Comprising the Valley and Mountain/Desert Subareas

| Area | Cities | | Area | Cities/Communities | |
|--------|---------------|----------------|-----------------|--------------------|------------------|
| Valley | Chino | Ontario | Mountain/Desert | Adelanto | Joshua Tree |
| | Chino Hills | Rancho | | Apple Valley | Needles |
| | Colton | Redlands | | Barstow | Running Springs |
| | Fontana | Rialto | | Big Bear Lake | Twentynine Palms |
| | Grand Terrace | San Bernardino | | Crestline | Victorville |
| | Highland | Upland | | Hesperia | Wrightwood |
| | Loma Linda | Yucaipa | | Lake Arrowhead | Yermo |
| | Montclair | | | Lucerne Valley | Yucca Valley |

Source: SBTAM

2.3 SBTAM TIERED ZONE SYSTEM

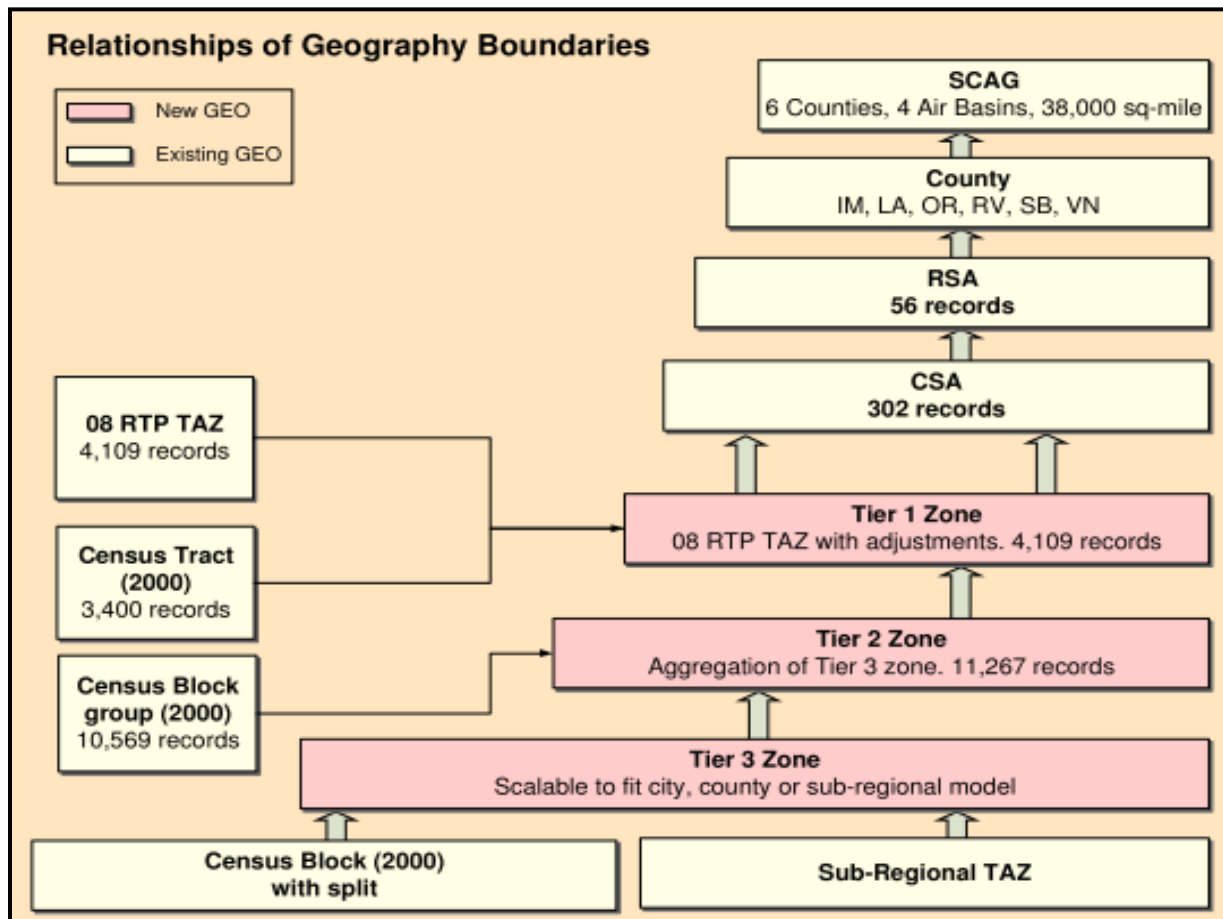
The SCAG regional and subregional models use a tiered traffic analysis zone structure to enhance the precision of the micro-level land use and smart growth analysis. As depicted in **Figure 2.2**, the tiered zone structure consists of three levels, Tier 1 through Tier 3. The Tier 3 zone system provides the most detailed zonal information. The Tier 2 zone structure is an aggregation of the Tier 3 zones based on the Census block group structure and is currently employed by the SCAG V6 model. The Tier 1 zone structure is currently employed in the SCAG V5 model and select components of the V6 model. The Tier 1 zone structure is the zone system used in the development of the 2008 SCAG RTP.

SBTAM adopts the tiered zone system so that a refined zone structure can be used within the subregion while a much more aggregated zone structure can be employed external to the San Bernardino subregion. **Figure 2.3** presents the tiered zonal structure for the entire SBTAM modeling area. TAZs within San Bernardino County are Tier 3 zones, which provide the most detailed zone information. The areas external to San Bernardino County and within an approximate 5-10 mile buffer to the San Bernardino County border consist of Tier 2 zones. Beyond this buffer Tier 2 area is the Tier 1 area, with the farthest outlying areas aggregated to Combined Statistical Areas (CSAs). Note that special generators

noted below are not aggregated to CSA but rather maintain the Tier 1 structure, regardless of their distance from San Bernardino County.

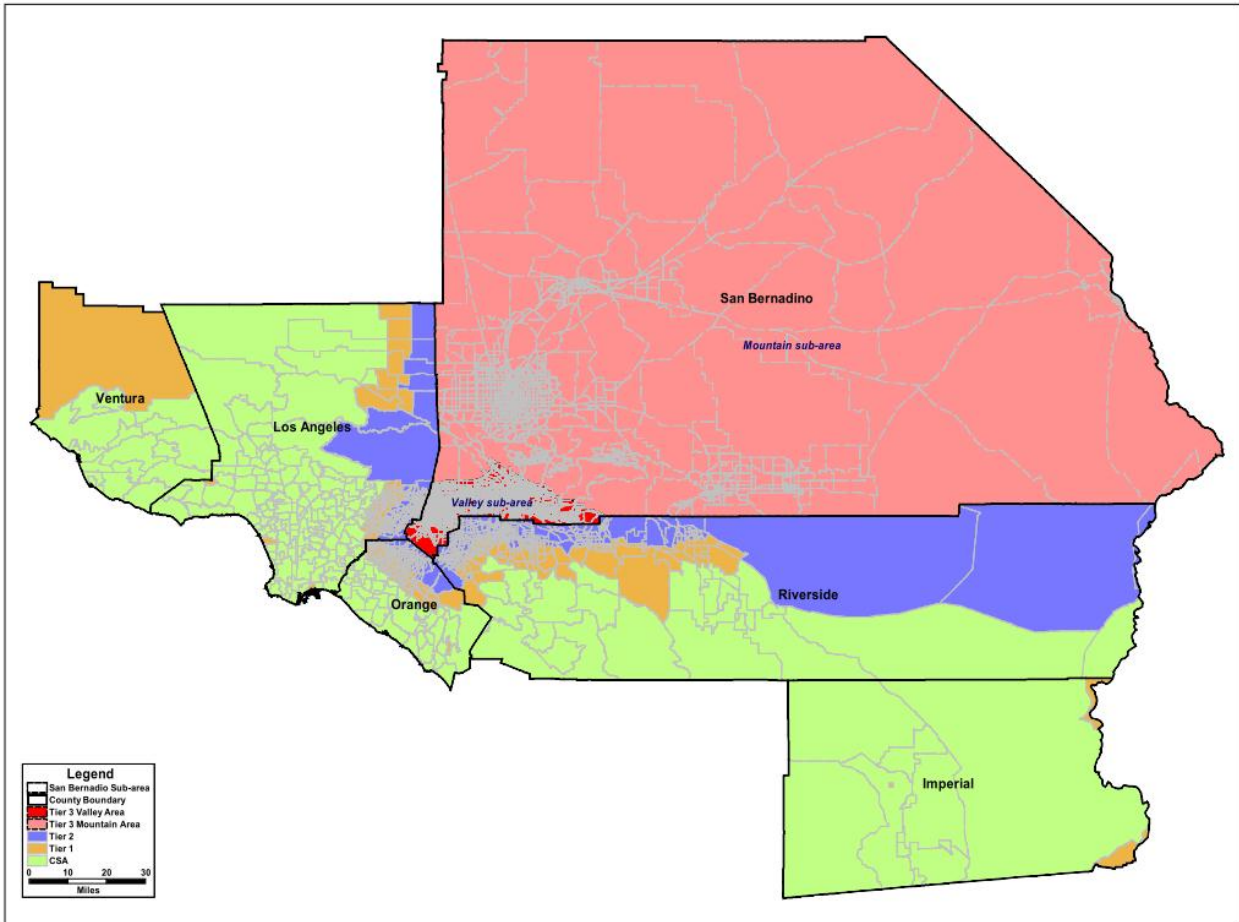
- Los Padres National Forest, Ventura County
- Las Virgenes Canyon Open Space Preserve, Los Angeles County
- Los Angeles International Airport, Los Angeles County
- Port of Long Beach, Los Angeles County
- Thomas F. Riley Wilderness Park, Orange County
- Circle K. Westmorland City Park, Imperial County
- Imperial National Wildlife Refuge, Imperial County
- Senator Wash, Imperial Reservoir, Imperial County

Figure 2.2 SCAG Tier Zone Relationship



Source: SCAG Regional Travel Model Enhancement Program

Figure 2.3 SBTAM Model Tiered Zone Structure



Source: SBTAM

The SCAG V5 Model is comprised of 4,192 Tier 1 zones, 402 of which are within San Bernardino County. In addition, 14 cordon stations and three airport zones in the SCAG regional model are in San Bernardino County. In SBTAM, these 402 SCAG zones in San Bernardino County are disaggregated to 2,521 Tier 3 zones, 1,480 of which are in the Valley Subarea and 1,041 in the Mountain/Desert Subarea, indicating a much more detailed zone structure in San Bernardino County in SBTAM compared to the SCAG model. The three airport zones from the SCAG model maintain their SCAG configurations. Of these three airports, Ontario Airport and San Bernardino Airport are located in the Valley Subarea, while the Southern California Logistics Airport (SCLA) is located in the Mountain/Desert Subarea.

The SBTAM region is comprised of 3,691 zones. These zones follow the tiered structure based upon the subregional model development procedures from SCAG. The zonal breakdown in the tiered zone structure within SBTAM is outlined in **Table 2.2**. The detailed zone numbering system used in the SBTAM tiered zone structure is described in **Appendix A**.

Table 2.2 SBTAM Tiered Zone Structure

| Zone Structure | # of Zones |
|-----------------|--------------|
| Tier 3 | 2,521 |
| Valley | 1,480 |
| Mountain/Desert | 1,041 |
| Tier 2 | 604 |
| Tier 1 | 337 |
| CSA | 229 |
| External Zone | 40 |
| Seaport | 31 |
| Airport | 12 |
| Total | 3,774 |

Source: SBTAM

2.4 SBTAM DEVELOPMENT

Using SCAG V5 model with the addition of model updates as the basic platform, SBTAM was developed through the application of the SMDT, following the guidelines outlined in the *Users’ Guide for the SCAG Subregional Planning Model in TransCAD 5.0* (Caliper Corporation, June 2010).

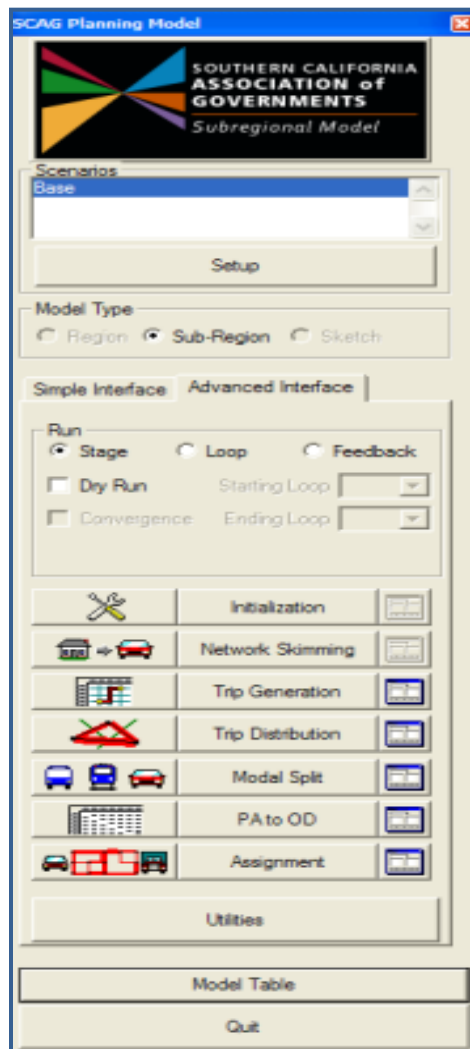
The SMDT includes the preliminary datasets and processes required to convert from the SCAG regional model to a subregional model between specified zone structures while maintaining a consistent modeling process. The major difference between a subregional model and a regional model is the zone structure. A subregional model has a more refined zone structure in the subregion and aggregated zone external to the subregion. The major functions that the SMDT performs during the conversion and development of SBTAM include:

- TAZ-related attribute conversion
The SMDT automatically disaggregates and aggregates socioeconomic data or other TAZ related information, such as population, employment and household data. It also allows overriding the regional socioeconomic data with estimates prepared expressly for the subregion.
- Matrix conversion
The SMDT automatically disaggregates and aggregates matrix inputs to maintain the zone structure used in the model, i.e., external trip tables, etc.
- Network conversion
The SMDT automatically converts highway and transit networks and creates new centroids and centroid connectors based on the new zone structure. It also allows using predefined centroids and centroid connectors.
- Intra-region assignment
External to the subregion, where the zone structure follows CSAs, the assigned volume and VMT will be reduced in a normal assignment procedure due to the much larger zone size. However, the subregion model compensates by performing an intra-region assignment within CSA between Tier 1

zones. The assignment flow results are used as a preload for the regular subregion assignment to maintain the relative congestion level in the CSA area.

SBTAM was developed in TransCAD and applied through a Graphical User Interface (GUI) consistent with the SCAG regional modeling process, as presented in **Figure 2.4**. SBTAM is validated against SCAG base year data (2008) using a set of screenlines appropriate for the model covering both the Valley and Mountain/Desert subareas. The detailed validation process and results are included in the following sections.

Figure 2.4 SBTAM Graphic User Interface



2.5 SBTAM VALIDATION

SBTAM is validated based on the observed data and the base SCAG V5 model results, as the base SCAG V5 model is considered fully validated. The observed data includes traffic counts and data summarized from the 2001 Post-Census Household Survey. The model run results from SBTAM are compared comprehensively against the base SCAG V5 model and the following observed data to ensure the consistency of forecasting ability between SBTAM and SCAG model:

- Comparison of major socioeconomic variables between SBTAM and the base SCAG V5 model at the county level
- Comparison of trip productions and attractions between SBTAM and the base SCAG V5 model at the county level
- Comparison of average trip distance between SBTAM and the base SCAG V5 model, and the observed trip distance from the household survey at the county level. The observed trip distance is calculated based upon the trip tables developed from the household survey and the highway distance from SBTAM.
- Comparison of the shares for trips produced from and attracted to San Bernardino County between SBTAM and the base SCAG V5 model for home-based work purpose and all-purposes combined
- Comparison of mode shares between SBTAM and the base SCAG V5 model by purpose and for all-purposes combined
- Comparison of forecast screenline traffic volumes to traffic count volumes
- Comparison of vehicle miles traveled between SBTAM, HPMS and the base SCAG V5 model

If the SBTAM results were found to be inconsistent with the survey data and the base SCAG V5 model results, action was taken to adjust SBTAM parameters or procedures, including the recalibration of the individual module and the implementation of the post-processing procedures. The detailed validation process is described in the following chapters.

3.0 SOCIOECONOMIC DATA

As a major input to the travel forecasting model, socioeconomic (SED) data describes both demographic and economic characteristics of the modeling region by TAZ. SBTAM maintains all the SED data used in the SCAG V5 model, while the data within San Bernardino County are replaced with the data provided by SANBAG.

3.1 DEVELOPMENT OF SOCIOECONOMIC DATA

The SCAG SED input data for year 2008 consists of various marginal and joint distributions of population and households for each TAZ. A total of 62 SED variables and 7 joint distributions of two or more variables are developed as model inputs. Those variables include population, households, school enrollments, household income, workers, and employment, among others.

The SMDT can automatically aggregate or disaggregate SED from the base SCAG V5 model to the SBTAM tiered zone structure. The aggregation is the direct sum of SCAG zone SED to an SBTAM zone that consists of those SCAG zones, while disaggregation splits the SCAG zone SED to the SBTAM zones that compose this SCAG zone based on either the ratios of areas or predefined ratios input into SBTAM through application of an SED override function.

Through application of the SANBAG GIS-based growth model, SANBAG has forecast socioeconomic data (SED) at the Tier 3 zone level for San Bernardino County for the 2008 and 2035 model years based upon SCAG's Tier 2 zone level SED. Development of San Bernardino County growth forecasts is performed in close coordination with local jurisdictions and SCAG. The SCAG Tiered zone structure ensures that the tiers nest cleanly within sub tiers. For instance, Tier 3 zones aggregate to Tier 2 zones which aggregate to Tier 1 zones and as a result, data at the Tier 3 level can be aggregated to Tier 1 and Tier 2 if necessary.

For the 2008 existing SED, SANBAG applies their GIS-based growth model to distribute the existing SED from the Tier 2 zone level, as developed by SCAG for the preparation of RTP 2008, to the Tier 3 zone level for SBTAM. The existing land use inventory was created at a parcel level and derived from the analysis of 2008 aerial photo information, combined with street-level photography and field surveys, where necessary. Using the existing land use dataset as a basis, the GIS model estimates four SED variables: households in single family (SF) dwelling units, households in multi-family (MF) dwelling units, retail employment, and non-retail employment. The Tier 2 total households were split proportionally into SF and MF households for Tier 3 zones, based on dwelling unit densities and acreages in the existing land use database. Likewise, Tier 2 total employment was split proportionally into retail and non-retail employment for the Tier 3 zones based on employment densities and acreages. Furthermore, Tier 3 total population was estimated by applying the average person/household ratios from each of the "parent" Tier 2 zones to the corresponding Tier 3 zones. The student populations for both K-12 and college are assigned directly to Tier 3 zones based on a school dataset available from the County of San Bernardino GIS department, which results in some slight deviations from the SCAG Tier 2 student populations. The San Bernardino County student populations are generally understood to be more accurate than those in the original SCAG Tier 2 dataset.

The Tier 3 “core variables” generated by SANBAG are then applied through SCAG’s Subregional Model Development Tool to populate the entire set of SED variables for San Bernardino County through application of an override procedure. The remaining SED variables for San Bernardino County are estimated by applying the ratio of corresponding core variables from the SANBAG dataset to the SCAG model data. For example, the split of the number of households by household size follows the ratio of the total number of households for every TAZ within San Bernardino County. **Table 3.1** presents the estimation of the SED for San Bernardino County.

SBTAM has been set up to automatically to utilize disaggregated SCAG Tier 3 data to run the SBTAM trip generation routines. However, this can be overridden through by the creation of an ‘override_dem.bin’ TransCAD file that must be placed under the ‘...\user\’ directory. If this file is present, the data included in this file will be used as the base data for the San Bernardino County Tier 3 zones. It is important to note that adjustments of the ‘override_dem.bin’ file can result in internal computation errors if the file is not created properly. For instance, if the population/household ratio of a zone changes drastically from the base model and the ratio greatly exceeds a typical value in the range of 3.0, internal computations can be skewed. Incorporation of revised land use into SBTAM should be managed carefully and various quality control checks incorporated into applications that require SED revisions to the base SBTAM data.

The resulting Tier 3 data (data included in the ‘override_dem.bin’ file) includes the following variables:

- Population
- Households
- Single Family Households
- Multi-Family Households
- Retail Employment
- Non-Retail Employment
- School Enrollment (K through 12)
- College Enrollment

SANBAG applied a threshold of greater than or equal to 10 units per acre to define Multi-Family Households, and less than 10 units per acre as Single Family Households based on existing land use and land use plans. Retail employment constitutes all employment at retail stores, shopping centers, gas stations, and entertainment venues such as movie theaters. Non-Retail employment primarily includes industrial activity, offices, business parks, transportation, government, and other jobs in the service sector.

For future growth projections, the GIS-based growth model assumes vacant, developable land and potential redevelopment areas as locations where growth is forecast to occur. The current city-level general plans are analyzed to determine how much growth could potentially occur in these areas. The general plan data (land use type together with density factors) are collected from each jurisdiction and merged into a county-wide dataset with efforts to keep each jurisdiction’s classifications as consistent as possible and to maintain the same density levels (often a range) as used by each jurisdiction for its residential land use categories. The growth model then forecasts SED growth as the increase from 2008



to 2035 while remaining consistent with city and county-level projections. The growth forecast for each jurisdiction between 2008 and 2035 serves as a control total for each city which is then distributed by the GIS model to Tier 3 zones. Control totals are defined for county spheres of influence, for selected additional unincorporated areas, as well as for the cities themselves.

SANBAG and SCAG have an agreement that SANBAG will maintain responsibility to forecast the distribution of growth for San Bernardino County, due to its direct planning work with local agencies and stronger understanding of the growth trends in the county. The growth projections for 2035 are designed to be consistent with SCAG city level forecasts, previously established through a collaborative process involving SCAG, local jurisdictions, and SANBAG. Once SANBAG develops the Tier 3 SED, SCAG then aggregates the Tier 3 growth to its Tier 2 zones as needed for modeling purposes. Tier 3 growth for the core variables are then added to the Tier 3 2008 data to derive 2035 SED.

The detailed SED variables are defined in **Appendix B**.

3.2 SOCIOECONOMIC DATA SUMMARY

Table 3.2 summarizes the core SED variables in SBTAM model and the difference to the SCAG data. As shown in this table, the values of the socioeconomic core variables are consistent between SBTAM and SCAG model data, except the data for San Bernardino County. This is because the regional socioeconomic data for San Bernardino County were replaced with data provided by the SANBAG.

Table 3.1 Generation of SBTAM Socioeconomic Variables in San Bernardino County

| Socioeconomic Variables | Method |
|--|--|
| Population Variables | |
| Population | SANBAG Local Input |
| Residential Population | Estimated by Population ratio |
| Group Quarter Population (non-Institutional) | Estimated by Population ratio |
| Population by Age | Estimated by Population ratio |
| Households Variables | |
| Total HH | SANBAG Local Input |
| HH by Type of Dwelling Unit | SANBAG Local Input |
| HH by HH Size | Estimated by Household ratio |
| HH by Age of HH Head | Estimated by Household ratio |
| HH by Number of Workers | Estimated by Household ratio |
| HH by HH Income | Estimated by Household ratio |
| School Enrollment Variables | |
| K12 | SANBAG Local Input |
| College | SANBAG Local Input |
| Employment Variables | |
| Total Employment | Estimated by (Retail + Non-Retail) ratio |
| Employment by Wage | Estimated by (Retail + Non-Retail) ratio |
| Agriculture & Mining Employment | Estimated by Non-Retail ratio |
| Construction Employment | Estimated by Non-Retail ratio |
| Manufacturing Employment | Estimated by Non-Retail ratio |
| Wholesale Trade Employment | Estimated by Non-Retail ratio |
| Retail Trade Employment | SANBAG Local Input |
| Transportation, Warehousing and Utility Employment | Estimated by Non-Retail ratio |
| Information Employment | Estimated by Non-Retail ratio |
| Financial Activity Employment | Estimated by Non-Retail ratio |
| Professional and Business Services Employment | Estimated by Non-Retail ratio |
| Education and Health Services Employment | Estimated by Non-Retail ratio |
| Art/Entertainment Employment | Estimated by Non-Retail ratio |
| Other Service Employment | Estimated by Non-Retail ratio |
| Public Administration Employment | Estimated by Non-Retail ratio |
| Median Household Income Variables | |
| Median Income | No Split |
| Median Income by Income Category | No Split |
| Median Household Income Variables | |
| Total Workers | Estimated by Population ratio |
| Workers by Earnings | Estimated by Population ratio |

Source: SBTAM



Table 3.2 SBTAM Socioeconomic Data Summary by County

| County | Population | | | Household | | | | | | Employment | | | Enrollment | |
|--|-------------------|-------------------|------------------|------------------|------------------|------------------|----------------|------------------|-------------|----------------|------------------|------------------|------------------|---------------------|
| | Residents | Total | Resident Workers | Below 25k | 25k - 50k | 50k-100k | 100k Over | Total | HH Size | Retail | Non-Retail | Total | K-12 | College/ University |
| Imperial | 149,905 | 161,607 | 65,845 | 22,365 | 12,137 | 9,693 | 2,216 | 46,411 | 3.23 | 8,163 | 53,341 | 61,504 | 37,962 | 11,234 |
| Los Angeles | 9,587,367 | 9,766,948 | 3,987,341 | 1,046,370 | 887,655 | 835,448 | 407,498 | 3,176,969 | 3.02 | 443,961 | 3,892,080 | 4,336,041 | 1,991,198 | 730,381 |
| Orange | 2,934,626 | 2,978,605 | 1,443,716 | 210,272 | 251,818 | 314,801 | 197,092 | 973,984 | 3.01 | 165,781 | 1,458,280 | 1,624,061 | 575,658 | 230,736 |
| Riverside | 2,006,410 | 2,041,726 | 798,560 | 195,224 | 186,981 | 192,429 | 70,555 | 645,188 | 3.11 | 90,731 | 573,259 | 663,990 | 434,335 | 107,644 |
| San Bernardino | 1,956,361 | 1,990,316 | 749,548 | 177,184 | 179,306 | 177,398 | 54,915 | 588,802 | 3.32 | 89,651 | 610,982 | 700,633 | 461,986 | 78,546 |
| Ventura | 783,218 | 797,107 | 366,968 | 55,362 | 64,274 | 88,501 | 49,114 | 257,251 | 3.04 | 40,488 | 307,189 | 347,677 | 164,848 | 52,495 |
| Total | 17,417,887 | 17,736,309 | 7,411,977 | 1,706,777 | 1,582,170 | 1,618,270 | 781,390 | 5,688,605 | 3.06 | 838,775 | 6,895,131 | 7,733,906 | 3,665,987 | 1,211,036 |
| Percent Difference from SCAG Model Data | | | | | | | | | | | | | | |
| Imperial | 0.0% | 0.0% | 0.0% | 0.6% | -0.5% | -0.8% | -0.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Los Angeles | 0.0% | 0.0% | 0.0% | -0.1% | 0.0% | 0.0% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Orange | 0.0% | 0.0% | 0.0% | 0.3% | 0.1% | -0.1% | -0.4% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Riverside | 0.0% | 0.0% | 0.0% | 0.1% | 0.1% | -0.1% | -0.2% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| San Bernardino | 0.6% | -0.3% | 0.5% | 0.2% | -0.2% | -0.1% | 0.5% | 0.0% | 0.6% | 0.0% | 0.0% | 0.0% | 1.7% | -42.0% |
| Ventura | 0.0% | 0.0% | 0.0% | 0.3% | -0.1% | -0.1% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Total | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.1% | 0.0% | 0.0% | 0.0% | 0.2% | -4.5% |

Source: SBTAM

4.0 TRANSPORTATION NETWORKS

The SBTAM Year 2008 highway and transit networks are built upon the base SCAG V5 model 2008 highway and transit networks. Prior to the development of SBTAM, the SCAG network was thoroughly examined to ensure the consistency with the existing roadway conditions within San Bernardino County. During the model development, new centroid connectors were created in the San Bernardino County based on the pre-defined Tier 3 zone structure. As centroid connectors should represent internal streets within communities and driveways for to access commercial and other developments, an extensive review of the network was performed focusing on centroid connectors in the San Bernardino County to confirm network coding, connectivity and correlation with the traffic analysis zones for network loading representation.

Consistent with SCAG model, the SBTAM highway network was coded using the TransCAD Transportation Planning Software. TransCAD uses a GIS-based network approach to ensure geographic accuracy and provide enhanced editing capabilities. The Year 2008 highway network includes detailed coding of the region's freeway system (e.g., mixed-flow lane, auxiliary lane, HOV lane, toll lane, and truck lane), arterials, major collectors and some minor collectors. To simulate roadside parking restrictions and other lane restrictions throughout the day, separate networks were developed for each of the following four modeling time periods:

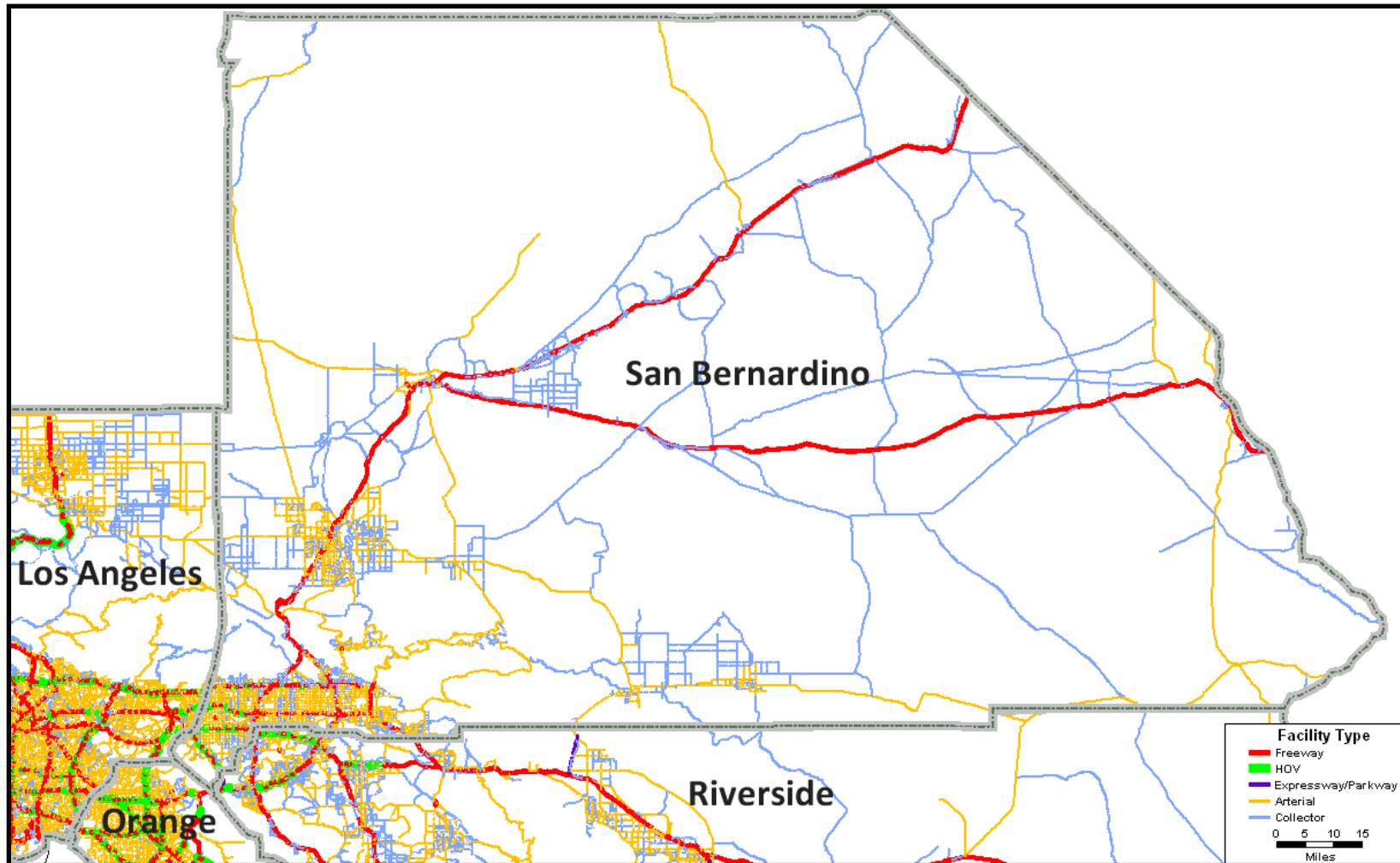
- A.M. peak period (6:00 A.M. to 9:00 A.M.)
- P.M. peak period (3:00 P.M. to 7:00 P.M.)
- Mid-day period (9:00 A.M. to 3:00 P.M.)
- Night period (7:00 P.M. to 6:00 A.M.)

4.1 FACILITY TYPE

Facility types defined in the SCAG highway network are generally consistent with the Federal functional highway classification system. The major categories of the facility types are defined below with the complete facility type listing included in **Appendix C. Figure 4-1** depicts the Year 2008 highway network by facility type focusing on San Bernardino County.

- Facility Type 10 – Freeway
- Facility Type 20 – HOV
- Facility Type 30 – Expressway/Parkway
- Facility Type 40 – Principal Arterial
- Facility Type 50 – Minor Arterial
- Facility Type 60 – Major Collector
- Facility Type 70 – Minor Collector
- Facility Type 80 – Ramp
- Facility Type 90 – Truck Lane
- Facility Type 100 – Centroid Connector

Figure 4.1 Year 2008 San Bernardino County Highway Network



4.2 AREA TYPE

The area type (AT) defined in the highway networks was prepared based on development density (population and employment density) and land use characteristics.

- Area Type 1 – Core
- Area Type 2 – Central Business District
- Area Type 3 – Urban Business District
- Area Type 4 – Urban
- Area Type 5 – Suburban
- Area Type 6 – Rural
- Area Type 7 – Mountain

4.3 FREE FLOW SPEEDS AND CAPACITIES

Similar to the SCAG network, free-flow speed and capacity are assigned to each link in the SBTAM networks during the Initialization procedure based upon the link's facility type, area type and posted speed as defined in the speed/capacity lookup tables. The detailed free-flow speed and capacity setup for different facility types can be found in *SCAG 2003 Model Validation and Summary*. The speed and capacity lookup tables in SBTAM are consistent with the SCAG regional model tables and are included in **Appendix D**.

4.4 TOLL ROADS

The SBTAM 2008 network includes all existing toll facilities. As depicted in **Figure 4.2**, the all existing Toll facilities are located in Orange County and include the SR-91 Express Lanes and the San Joaquin, Eastern and Foothill Toll Corridors managed by the Transportation Corridor Agency (TCA).

4.5 TRANSIT NETWORK

Similar to the SBTAM highway networks the Year 2008 transit network in SBTAM is directly converted from the base SCAG V5 model. The transit network covers the entire 6-county region, with approximately 1,600 transit routes for more than 40 transit carriers.

Through common geography and link attributes, these transit networks are related to the highway networks to maintain consistency in level-of-service estimation. For Year 2008, transit services in the modeling region are grouped into six transit modes as noted in **Table 4.1**, according to their service characteristics and fare structures. Additional modes, such as High Speed Rail and special shuttle services, will be added to future year transit networks. The Year 2008 transit network covers only the fixed-route transit services. Transit routes are characterized by attributes such as route ID, route name, peak headway, off-peak headway, transit carrier, route distance, direction, fare and transit mode. Stops are also placed along the route with information such as route ID, stop coordinates, milepost, and corresponding highway node ID. For rail transit, station-to-station rail time, rail station information, and Metrolink's fare zones are also coded in the network.

Figure 4.2 Toll Facility in 2008 SBTAM Highway Network

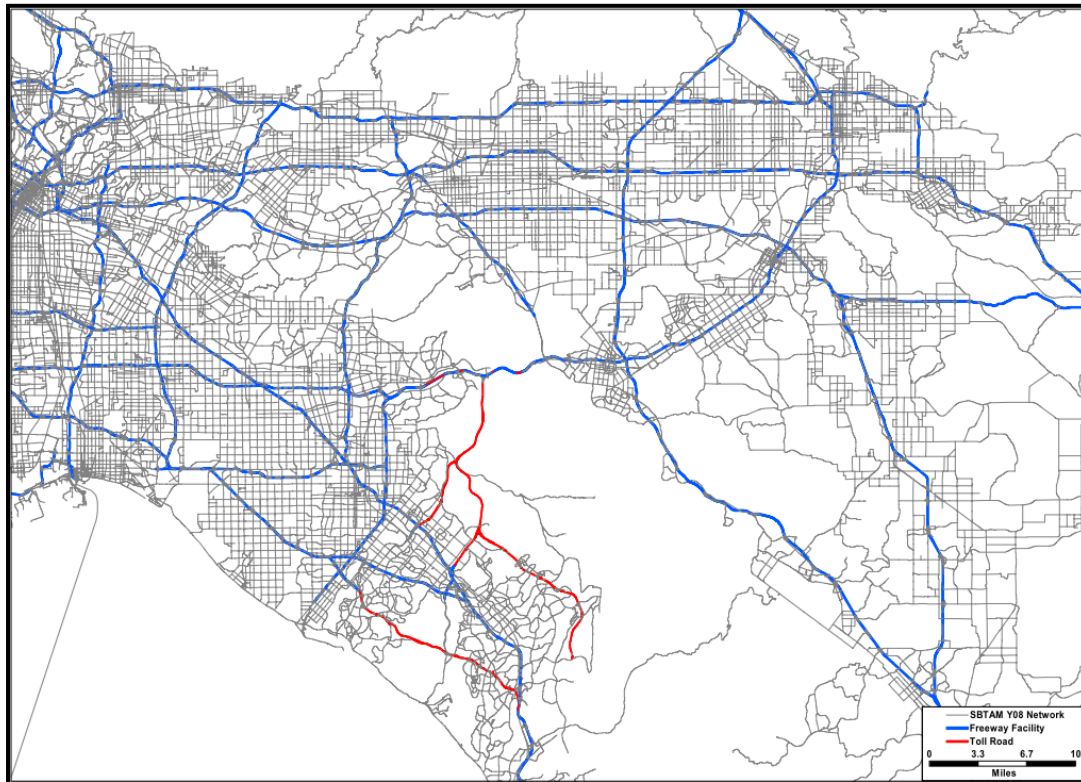


Table 4.1 Transit Mode Classification

| Mode ID | Mode Name | Description |
|---------|-----------|---------------|
| 10 | 1CR | Commuter Rail |
| 13 | 2LR | Urban Rail |
| 14 | 3EX | Express Bus |
| 22 | 4RB | Rapid Bus |
| 11 | 5LB | Local Bus |
| 30 | 6TW | Transitway |

Source: SBTAM

5.0 TRIP GENERATION

Trip generation is the process of estimating daily person trips for an average weekday generated by households within each TAZ. The year 2008 model contains a series of models to estimate trip productions and trip attractions by trip type, and these models remain consistent with the SCAG regional model for the tiered subregional zonal structure.

5.1 MODEL DESCRIPTION

The SBTAM trip generation model estimates trip productions and trip attractions by TAZ and follows the same methodology and approach as the base SCAG V5 model. A detailed description of the trip generation model can be found in the *SCAG Year 2003 Model Validation and Summary report*.

SBTAM contains 9 trip purposes and 14 trip types. Total trips produced by TAZ were estimated for each of the following trip purposes/trip types:

1. Home-based Work

There are six trip types of the home-based work (HBW) trip purpose: three types of "direct" HBW trips and three types of "strategic" HBW trips. "Direct" HBW trips are trips between home and work, without any intermediate stops. The trip generation model estimates these trips separately for each of three different personal income (earnings by worker) categories:

- "Direct" home-based work trips (HBWD1), Low Income (less than \$25,000)
- "Direct" home-based work trips (HBWD2), Medium Income (\$25,000 to \$49,999)
- "Direct" home-based work trips (HBWD3), High Income (\$50,000 or greater)

"Strategic" (HBWD1) trips are trips between home and work that include one or more intermediate stops, such as to drop-off or pick-up a passenger, to drop-off or pick-up a child at school, or for other reasons. The trip generation model estimates strategic home-based work trips separately for each of three income categories:

- "Strategic" home-based work trips (HBWS1), Low Income
- "Strategic" home-based work trips (HBWS2), Medium Income
- "Strategic" home-based work trips (HBWS3), High Income

2. Home-based School

Home-based school (HBSC) trips include all student trips with an at-home activity at one end of the trip and a K-12 (kindergarten through 12th grade) school activity at the other end.

3. Home-based College and University

Home-based college and university (HBCU) trips include all trips made by persons over the age of 18 with an at-home activity at one end of a trip and a college or university activity at the other end.

4. Home-based Shopping

Home-based shopping (HBSH) trips include all person trips made with a home activity at one end of a trip and a shopping activity at the other end.

5. Home-based Social-recreational

Home-based social-recreational (HBSR) trips include all person trips made with a home activity at one end of a trip and a visiting or recreational activity at the other end.

6. Home-based Serving-passenger

Home-based serving-passenger (HBSP) trips include all person trips made with a home activity at one end of a trip and a passenger serving activity, such as driving someone somewhere, at the other end. Trips that serve passengers while on the way to or from work are classified as home based work strategic trips rather than serve passenger trips because they are part of a work trip chain.

7. Home-based Other

Home-based other (HBO) trips include all other home-based (with a home activity at one end of the trip) trips that are not already accounted for by any of the home-based trips categories described above.

8. Work-based Other

Work-based other (WBO) trips are non home-based trips where at least one end of a trip is from/to a work location. An example of such a trip would be running an errand during lunch hour from one's place of employment.

9. Other-based Other

Other-based other (OBO) trips are all other trips that do not begin or end at a trip-maker's home or place of work.

Several modules are included in trip generation including the auto ownership model and trip production and attraction models which are consistent with the base SCAG V5 model. As described in Chapter 2, the major difference between the base SCAG V5 model and SCAG V5 model are in trip generation, more specifically, the auto ownership model and home-based work trip production model.



5.2 TRIP GENERATION RESULTS

The comparison of trip productions and attractions between base SCAG V5 model and SBTAM are summarized by time period and trip purpose in **Table 5.1** and **Table 5.2**. As presented in the tables, trip productions and attractions between SBTAM and SCAG have minimal deviation, except for the peak and off-peak period productions and attractions for home-based college/university trips in San Bernardino County. This is generally due to the lower college enrollment estimated by SANBAG for San Bernardino County.



Table 5.1 SCAG and SBTAM Trip Production Comparison

| County | HBWD1 | HBWD2 | HBWD3 | HBWS1 | HBWS2 | HBWS3 | HBSC | HBCU | HBSH | HBSR | HBO | HBSP | WBO | OBO | TOTAL |
|----------------------------------|------------------|------------------|------------------|----------------|----------------|----------------|------------------|----------------|------------------|------------------|------------------|------------------|------------------|------------------|-------------------|
| Peak Period Production | | | | | | | | | | | | | | | |
| SCAG Trip Production | | | | | | | | | | | | | | | |
| Imperial | 21,363 | 11,956 | 4,906 | 7,512 | 4,324 | 1,815 | 37,198 | 2,943 | 17,644 | 11,851 | 26,439 | 43,834 | 10,714 | 46,602 | 249,100 |
| Los Angeles | 1,355,818 | 1,076,372 | 641,476 | 381,905 | 318,122 | 200,206 | 1,951,176 | 217,393 | 1,158,317 | 941,149 | 2,101,482 | 2,645,249 | 1,087,955 | 3,396,877 | 17,473,497 |
| Orange | 423,658 | 391,404 | 292,905 | 120,878 | 117,304 | 93,178 | 564,095 | 74,626 | 357,462 | 294,514 | 674,988 | 789,618 | 389,588 | 1,207,493 | 5,791,711 |
| Riverside | 254,691 | 221,831 | 119,340 | 74,671 | 68,301 | 38,473 | 425,608 | 28,291 | 244,226 | 197,837 | 448,778 | 568,436 | 157,918 | 625,916 | 3,474,317 |
| San Bernardino | 235,934 | 225,604 | 108,857 | 67,784 | 67,715 | 34,148 | 445,110 | 38,064 | 230,047 | 190,933 | 431,492 | 562,362 | 159,263 | 601,908 | 3,399,221 |
| Ventura | 101,961 | 99,478 | 73,376 | 30,011 | 30,328 | 23,271 | 161,538 | 16,364 | 95,849 | 78,505 | 180,933 | 210,474 | 78,594 | 274,783 | 1,455,466 |
| Total | 2,393,427 | 2,026,645 | 1,240,860 | 682,761 | 606,094 | 391,091 | 3,584,725 | 377,680 | 2,103,545 | 1,714,789 | 3,864,110 | 4,819,973 | 1,884,032 | 6,153,579 | 31,843,312 |
| SBTAM Trip Production | | | | | | | | | | | | | | | |
| Imperial | 21,041 | 11,879 | 4,922 | 7,389 | 4,375 | 1,899 | 37,200 | 2,971 | 17,635 | 11,780 | 26,293 | 43,804 | 10,715 | 46,855 | 248,758 |
| Los Angeles | 1,343,704 | 1,030,987 | 600,836 | 378,882 | 304,054 | 187,367 | 1,951,204 | 210,140 | 1,167,635 | 949,998 | 2,126,789 | 2,664,346 | 1,087,954 | 3,415,178 | 17,419,073 |
| Orange | 418,202 | 389,715 | 299,580 | 119,441 | 116,838 | 95,103 | 564,098 | 71,890 | 357,609 | 294,370 | 675,898 | 789,744 | 389,588 | 1,214,000 | 5,796,076 |
| Riverside | 249,841 | 226,299 | 118,958 | 73,170 | 69,773 | 38,396 | 425,602 | 27,409 | 243,533 | 196,924 | 447,033 | 567,896 | 157,914 | 629,295 | 3,472,044 |
| San Bernardino | 235,325 | 225,265 | 108,736 | 67,551 | 67,573 | 34,112 | 452,704 | 32,331 | 229,280 | 190,037 | 429,476 | 565,286 | 159,249 | 605,208 | 3,402,133 |
| Ventura | 106,748 | 97,427 | 71,521 | 31,726 | 29,662 | 22,541 | 161,539 | 15,762 | 95,780 | 78,390 | 180,745 | 210,150 | 78,588 | 276,261 | 1,456,839 |
| Total | 2,374,861 | 1,981,571 | 1,204,554 | 678,158 | 592,275 | 379,417 | 3,592,347 | 360,504 | 2,111,472 | 1,721,499 | 3,886,234 | 4,841,226 | 1,884,008 | 6,186,797 | 31,794,923 |
| % Difference - Production | | | | | | | | | | | | | | | |
| Imperial | -1.5% | -0.6% | 0.3% | -1.6% | 1.2% | 4.6% | 0.0% | 1.0% | -0.1% | -0.6% | -0.5% | -0.1% | 0.0% | 0.5% | -0.1% |
| Los Angeles | -0.9% | -4.2% | -6.3% | -0.8% | -4.4% | -6.4% | 0.0% | -3.3% | 0.8% | 0.9% | 1.2% | 0.7% | 0.0% | 0.5% | -0.3% |
| Orange | -1.3% | -0.4% | 2.3% | -1.2% | -0.4% | 2.1% | 0.0% | -3.7% | 0.0% | 0.0% | 0.1% | 0.0% | 0.0% | 0.5% | 0.1% |
| Riverside | -1.9% | 2.0% | -0.3% | -2.0% | 2.2% | -0.2% | 0.0% | -3.1% | -0.3% | -0.5% | -0.4% | -0.1% | 0.0% | 0.5% | -0.1% |
| San Bernardino | -0.3% | -0.1% | -0.1% | -0.3% | -0.2% | -0.1% | 1.7% | -15.1% | -0.3% | -0.5% | -0.5% | 0.5% | 0.0% | 0.5% | 0.1% |
| Ventura | 4.7% | -2.1% | -2.5% | 5.7% | -2.2% | -3.1% | 0.0% | -3.7% | -0.1% | -0.1% | -0.1% | -0.2% | 0.0% | 0.5% | 0.1% |
| Total | -0.8% | -2.2% | -2.9% | -0.7% | -2.3% | -3.0% | 0.2% | -4.5% | 0.4% | 0.4% | 0.6% | 0.4% | 0.0% | 0.5% | -0.2% |



Table 5.1 SCAG and SBTAM Trip Production Comparison (Continued)

| County | HBWD1 | HBWD2 | HBWD3 | HBWS1 | HBWS2 | HBWS3 | HBSC | HBCU | HBSH | HBSR | HBO | HBSP | WBO | OBO | TOTAL |
|-----------------------------------|-----------|-----------|---------|---------|---------|---------|-----------|---------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| Off-Peak Period Production | | | | | | | | | | | | | | | |
| SCAG Trip Production | | | | | | | | | | | | | | | |
| Imperial | 9,234 | 5,283 | 2,226 | 4,551 | 2,621 | 1,095 | 13,140 | 2,412 | 26,007 | 23,514 | 34,733 | 23,635 | 9,303 | 60,539 | 218,292 |
| Los Angeles | 687,183 | 545,442 | 325,006 | 231,698 | 192,985 | 121,461 | 689,124 | 179,070 | 1,707,385 | 1,696,275 | 2,623,113 | 1,426,268 | 944,472 | 4,412,841 | 15,782,325 |
| Orange | 213,701 | 197,321 | 147,437 | 73,332 | 71,178 | 56,529 | 199,224 | 61,448 | 526,917 | 532,930 | 844,202 | 425,749 | 338,206 | 1,568,621 | 5,256,796 |
| Riverside | 127,195 | 110,676 | 59,344 | 45,312 | 41,435 | 23,327 | 150,318 | 23,277 | 359,985 | 359,602 | 562,572 | 306,495 | 137,092 | 813,113 | 3,119,744 |
| San Bernardino | 119,407 | 114,248 | 55,141 | 41,121 | 41,074 | 20,722 | 157,205 | 31,348 | 339,107 | 344,490 | 538,883 | 303,203 | 138,256 | 781,924 | 3,026,129 |
| Ventura | 50,776 | 49,609 | 36,725 | 18,217 | 18,408 | 14,121 | 57,050 | 13,479 | 141,280 | 142,952 | 226,994 | 113,487 | 68,215 | 356,967 | 1,308,278 |
| Total | 1,207,495 | 1,022,578 | 625,879 | 414,232 | 367,701 | 237,255 | 1,266,061 | 311,035 | 3,100,681 | 3,099,764 | 4,830,497 | 2,598,837 | 1,635,544 | 7,994,005 | 28,711,564 |
| SBTAM Trip Production | | | | | | | | | | | | | | | |
| Imperial | 9,021 | 5,101 | 2,126 | 4,482 | 2,655 | 1,150 | 13,140 | 2,437 | 25,993 | 23,460 | 34,603 | 23,618 | 9,303 | 60,870 | 217,958 |
| Los Angeles | 680,980 | 522,138 | 304,289 | 229,861 | 184,451 | 113,670 | 689,128 | 173,078 | 1,721,111 | 1,712,292 | 2,654,776 | 1,436,555 | 944,467 | 4,436,598 | 15,803,394 |
| Orange | 210,928 | 196,347 | 150,714 | 72,461 | 70,890 | 57,698 | 199,222 | 59,198 | 527,116 | 532,837 | 845,462 | 425,808 | 338,212 | 1,577,087 | 5,263,980 |
| Riverside | 124,812 | 112,765 | 59,066 | 44,399 | 42,317 | 23,293 | 150,318 | 22,549 | 358,977 | 358,058 | 560,481 | 306,197 | 137,092 | 817,480 | 3,117,804 |
| San Bernardino | 119,138 | 114,135 | 55,102 | 41,000 | 40,994 | 20,686 | 159,885 | 26,652 | 337,956 | 342,803 | 536,339 | 304,781 | 138,248 | 786,195 | 3,023,913 |
| Ventura | 53,054 | 48,550 | 35,840 | 19,246 | 17,995 | 13,676 | 57,050 | 12,971 | 141,183 | 142,777 | 226,788 | 113,306 | 68,223 | 358,887 | 1,309,546 |
| Total | 1,197,934 | 999,036 | 607,136 | 411,448 | 359,302 | 230,173 | 1,268,743 | 296,884 | 3,112,336 | 3,112,227 | 4,858,449 | 2,610,265 | 1,635,545 | 8,037,117 | 28,736,596 |
| % Difference - Production | | | | | | | | | | | | | | | |
| Imperial | -2.3% | -3.5% | -4.5% | -1.5% | 1.3% | 5.0% | 0.0% | 1.0% | -0.1% | -0.2% | -0.4% | -0.1% | 0.0% | 0.5% | -0.2% |
| Los Angeles | -0.9% | -4.3% | -6.4% | -0.8% | -4.4% | -6.4% | 0.0% | -3.3% | 0.8% | 0.9% | 1.2% | 0.7% | 0.0% | 0.5% | 0.1% |
| Orange | -1.3% | -0.5% | 2.2% | -1.2% | -0.4% | 2.1% | 0.0% | -3.7% | 0.0% | 0.0% | 0.1% | 0.0% | 0.0% | 0.5% | 0.1% |
| Riverside | -1.9% | 1.9% | -0.5% | -2.0% | 2.1% | -0.1% | 0.0% | -3.1% | -0.3% | -0.4% | -0.4% | -0.1% | 0.0% | 0.5% | -0.1% |
| San Bernardino | -0.2% | -0.1% | -0.1% | -0.3% | -0.2% | -0.2% | 1.7% | -15.0% | -0.3% | -0.5% | -0.5% | 0.5% | 0.0% | 0.5% | -0.1% |
| Ventura | 4.5% | -2.1% | -2.4% | 5.7% | -2.2% | -3.1% | 0.0% | -3.8% | -0.1% | -0.1% | -0.1% | -0.2% | 0.0% | 0.5% | 0.1% |
| Total | -0.8% | -2.3% | -3.0% | -0.7% | -2.3% | -3.0% | 0.2% | -4.5% | 0.4% | 0.4% | 0.6% | 0.4% | 0.0% | 0.5% | 0.1% |



Table 5.1 SCAG and SBTAM Trip Production Comparison (Continued)

| County | HBWD1 | HBWD2 | HBWD3 | HBWS1 | HBWS2 | HBWS3 | HBSC | HBCU | HBSH | HBSR | HBO | HBSP | WBO | OBO | TOTAL |
|----------------------------------|------------------|------------------|------------------|------------------|----------------|----------------|------------------|----------------|------------------|------------------|------------------|------------------|------------------|-------------------|-------------------|
| Daily Production | | | | | | | | | | | | | | | |
| SCAG Trip Production | | | | | | | | | | | | | | | |
| Imperial | 30,597 | 17,239 | 7,131 | 12,063 | 6,944 | 2,910 | 50,338 | 5,355 | 43,651 | 35,366 | 61,172 | 67,469 | 20,017 | 107,141 | 467,393 |
| Los Angeles | 2,043,001 | 1,621,813 | 966,483 | 613,604 | 511,107 | 321,667 | 2,640,300 | 396,463 | 2,865,702 | 2,637,424 | 4,724,594 | 4,071,517 | 2,032,427 | 7,809,718 | 33,255,821 |
| Orange | 637,359 | 588,725 | 440,342 | 194,210 | 188,482 | 149,707 | 763,319 | 136,074 | 884,379 | 827,444 | 1,519,190 | 1,215,367 | 727,794 | 2,776,114 | 11,048,507 |
| Riverside | 381,886 | 332,507 | 178,684 | 119,983 | 109,737 | 61,800 | 575,926 | 51,568 | 604,211 | 557,439 | 1,011,350 | 874,931 | 295,010 | 1,439,029 | 6,594,061 |
| San Bernardino | 355,341 | 339,852 | 163,998 | 108,905 | 108,788 | 54,870 | 602,315 | 69,412 | 569,154 | 535,423 | 970,375 | 865,565 | 297,519 | 1,383,832 | 6,425,351 |
| Ventura | 152,737 | 149,086 | 110,101 | 48,228 | 48,736 | 37,391 | 218,588 | 29,843 | 237,129 | 221,457 | 407,926 | 323,961 | 146,809 | 631,750 | 2,763,744 |
| Total | 3,600,922 | 3,049,223 | 1,866,739 | 1,096,993 | 973,795 | 628,346 | 4,850,786 | 688,715 | 5,204,226 | 4,814,553 | 8,694,607 | 7,418,810 | 3,519,576 | 14,147,584 | 60,554,875 |
| SBTAM Trip Production | | | | | | | | | | | | | | | |
| Imperial | 30,063 | 16,979 | 7,048 | 11,870 | 7,030 | 3,048 | 50,340 | 5,408 | 43,628 | 35,240 | 60,896 | 67,422 | 20,018 | 107,725 | 466,716 |
| Los Angeles | 2,024,684 | 1,553,125 | 905,125 | 608,743 | 488,505 | 301,037 | 2,640,332 | 383,219 | 2,888,746 | 2,662,290 | 4,781,565 | 4,100,901 | 2,032,421 | 7,851,776 | 33,222,467 |
| Orange | 629,130 | 586,062 | 450,294 | 191,902 | 187,728 | 152,802 | 763,320 | 131,087 | 884,725 | 827,207 | 1,521,360 | 1,215,552 | 727,800 | 2,791,087 | 11,060,056 |
| Riverside | 374,654 | 339,064 | 178,023 | 117,569 | 112,091 | 61,689 | 575,920 | 49,958 | 602,510 | 554,982 | 1,007,514 | 874,093 | 295,006 | 1,446,775 | 6,589,848 |
| San Bernardino | 354,463 | 339,401 | 163,838 | 108,550 | 108,567 | 54,797 | 612,589 | 58,983 | 567,236 | 532,839 | 965,816 | 870,067 | 297,497 | 1,391,403 | 6,426,046 |
| Ventura | 159,803 | 145,977 | 107,361 | 50,972 | 47,656 | 36,217 | 218,589 | 28,733 | 236,963 | 221,167 | 407,532 | 323,456 | 146,811 | 635,148 | 2,766,386 |
| Total | 3,572,795 | 2,980,608 | 1,811,690 | 1,089,607 | 951,577 | 609,590 | 4,861,090 | 657,387 | 5,223,808 | 4,833,726 | 8,744,683 | 7,451,491 | 3,519,553 | 14,223,914 | 60,531,519 |
| % Difference - Production | | | | | | | | | | | | | | | |
| Imperial | -1.7% | -1.5% | -1.2% | -1.6% | 1.2% | 4.8% | 0.0% | 1.0% | -0.1% | -0.4% | -0.5% | -0.1% | 0.0% | 0.5% | -0.1% |
| Los Angeles | -0.9% | -4.2% | -6.3% | -0.8% | -4.4% | -6.4% | 0.0% | -3.3% | 0.8% | 0.9% | 1.2% | 0.7% | 0.0% | 0.5% | -0.1% |
| Orange | -1.3% | -0.5% | 2.3% | -1.2% | -0.4% | 2.1% | 0.0% | -3.7% | 0.0% | 0.0% | 0.1% | 0.0% | 0.0% | 0.5% | 0.1% |
| Riverside | -1.9% | 2.0% | -0.4% | -2.0% | 2.1% | -0.2% | 0.0% | -3.1% | -0.3% | -0.4% | -0.4% | -0.1% | 0.0% | 0.5% | -0.1% |
| San Bernardino | -0.2% | -0.1% | -0.1% | -0.3% | -0.2% | -0.1% | 1.7% | -15.0% | -0.3% | -0.5% | -0.5% | 0.5% | 0.0% | 0.5% | 0.0% |
| Ventura | 4.6% | -2.1% | -2.5% | 5.7% | -2.2% | -3.1% | 0.0% | -3.7% | -0.1% | -0.1% | -0.1% | -0.2% | 0.0% | 0.5% | 0.1% |
| Total | -0.8% | -2.3% | -2.9% | -0.7% | -2.3% | -3.0% | 0.2% | -4.5% | 0.4% | 0.4% | 0.6% | 0.4% | 0.0% | 0.5% | 0.0% |

Source: SBTAM



Table 5.2 SCAG and SBTAM Trip Attraction Comparison

| County | HBWD1 | HBWD2 | HBWD3 | HBWS1 | HBWS2 | HBWS3 | HBSC | HBCU | HBSH | HBSR | HBO | HBSP | WBO | OBO | TOTAL |
|----------------------------------|------------------|------------------|------------------|----------------|----------------|----------------|------------------|----------------|------------------|------------------|------------------|------------------|------------------|------------------|-------------------|
| Peak Period Attraction | | | | | | | | | | | | | | | |
| SCAG Trip Attraction | | | | | | | | | | | | | | | |
| Imperial | 23,428 | 13,848 | 5,074 | 7,512 | 4,802 | 1,870 | 37,198 | 3,340 | 17,644 | 13,167 | 29,224 | 43,834 | 10,542 | 45,912 | 257,394 |
| Los Angeles | 1,367,886 | 1,122,137 | 698,471 | 388,209 | 333,992 | 219,125 | 1,951,176 | 217,595 | 1,148,129 | 950,145 | 2,155,230 | 2,671,379 | 1,044,936 | 3,385,329 | 17,653,740 |
| Orange | 423,208 | 423,335 | 299,889 | 120,757 | 126,651 | 94,666 | 564,095 | 68,712 | 360,483 | 317,461 | 673,375 | 815,561 | 407,160 | 1,225,625 | 5,920,979 |
| Riverside | 233,646 | 178,401 | 87,152 | 67,540 | 54,069 | 27,927 | 425,608 | 32,067 | 239,252 | 178,210 | 408,720 | 532,228 | 167,367 | 622,703 | 3,254,890 |
| San Bernardino | 240,305 | 199,072 | 93,885 | 68,463 | 59,416 | 29,539 | 445,110 | 40,340 | 240,443 | 178,914 | 420,332 | 545,974 | 167,828 | 596,813 | 3,326,436 |
| Ventura | 104,953 | 89,851 | 56,389 | 30,280 | 27,164 | 17,963 | 161,538 | 15,625 | 97,593 | 76,892 | 177,229 | 210,996 | 86,199 | 277,197 | 1,429,872 |
| Total | 2,393,427 | 2,026,645 | 1,240,860 | 682,761 | 606,094 | 391,091 | 3,584,725 | 377,680 | 2,103,545 | 1,714,789 | 3,864,110 | 4,819,973 | 1,884,032 | 6,153,579 | 31,843,312 |
| SBTAM Trip Attraction | | | | | | | | | | | | | | | |
| Imperial | 22,904 | 13,515 | 4,918 | 7,389 | 4,692 | 1,818 | 37,200 | 3,254 | 17,635 | 13,151 | 29,179 | 43,804 | 10,555 | 46,151 | 256,166 |
| Los Angeles | 1,359,617 | 1,097,254 | 678,075 | 386,280 | 326,410 | 212,594 | 1,951,204 | 217,676 | 1,151,487 | 953,254 | 2,166,300 | 2,680,936 | 1,044,903 | 3,403,508 | 17,629,497 |
| Orange | 421,057 | 413,900 | 291,089 | 120,289 | 123,789 | 91,847 | 564,098 | 68,597 | 362,239 | 318,806 | 677,614 | 818,996 | 407,162 | 1,232,254 | 5,911,738 |
| Riverside | 227,501 | 174,325 | 84,589 | 65,819 | 52,833 | 27,090 | 425,602 | 32,101 | 240,096 | 178,808 | 410,736 | 533,624 | 167,340 | 626,094 | 3,246,556 |
| San Bernardino | 239,323 | 194,795 | 91,157 | 68,219 | 58,004 | 28,645 | 452,704 | 23,452 | 242,217 | 180,261 | 424,057 | 551,972 | 167,857 | 600,079 | 3,322,741 |
| Ventura | 104,459 | 87,783 | 54,726 | 30,163 | 26,547 | 17,423 | 161,539 | 15,425 | 97,799 | 77,219 | 178,347 | 211,894 | 86,191 | 278,710 | 1,428,225 |
| Total | 2,374,861 | 1,981,571 | 1,204,554 | 678,158 | 592,275 | 379,417 | 3,592,347 | 360,504 | 2,111,472 | 1,721,499 | 3,886,234 | 4,841,226 | 1,884,008 | 6,186,797 | 31,794,923 |
| % Difference - Attraction | | | | | | | | | | | | | | | |
| Imperial | -2.2% | -2.4% | -3.1% | -1.6% | -2.3% | -2.8% | 0.0% | -2.6% | -0.1% | -0.1% | -0.2% | -0.1% | 0.1% | 0.5% | -0.5% |
| Los Angeles | -0.6% | -2.2% | -2.9% | -0.5% | -2.3% | -3.0% | 0.0% | 0.0% | 0.3% | 0.3% | 0.5% | 0.4% | 0.0% | 0.5% | -0.1% |
| Orange | -0.5% | -2.2% | -2.9% | -0.4% | -2.3% | -3.0% | 0.0% | -0.2% | 0.5% | 0.4% | 0.6% | 0.4% | 0.0% | 0.5% | -0.2% |
| Riverside | -2.6% | -2.3% | -2.9% | -2.5% | -2.3% | -3.0% | 0.0% | 0.1% | 0.4% | 0.3% | 0.5% | 0.3% | 0.0% | 0.5% | -0.3% |
| San Bernardino | -0.4% | -2.1% | -2.9% | -0.4% | -2.4% | -3.0% | 1.7% | -41.9% | 0.7% | 0.8% | 0.9% | 1.1% | 0.0% | 0.5% | -0.1% |
| Ventura | -0.5% | -2.3% | -3.0% | -0.4% | -2.3% | -3.0% | 0.0% | -1.3% | 0.2% | 0.4% | 0.6% | 0.4% | 0.0% | 0.5% | -0.1% |
| Total | -0.8% | -2.2% | -2.9% | -0.7% | -2.3% | -3.0% | 0.2% | -4.5% | 0.4% | 0.4% | 0.6% | 0.4% | 0.0% | 0.5% | -0.2% |



Table 5.2 SCAG and SBTAM Trip Attraction Comparison (Continued)

| County | HBWD1 | HBWD2 | HBWD3 | HBWS1 | HBWS2 | HBWS3 | HBSC | HBCU | HBSH | HBSR | HBO | HBSR | WBO | OBO | TOTAL |
|-----------------------------------|------------------|------------------|----------------|----------------|----------------|----------------|------------------|----------------|------------------|------------------|------------------|------------------|------------------|------------------|-------------------|
| Off-Peak Period Attraction | | | | | | | | | | | | | | | |
| SCAG Trip Attraction | | | | | | | | | | | | | | | |
| Imperial | 11,571 | 6,829 | 2,498 | 4,551 | 2,911 | 1,136 | 13,140 | 2,752 | 26,007 | 24,954 | 37,567 | 23,635 | 9,229 | 60,104 | 226,884 |
| Los Angeles | 690,695 | 566,626 | 352,567 | 235,511 | 202,621 | 132,946 | 689,124 | 179,194 | 1,692,382 | 1,714,663 | 2,691,639 | 1,440,369 | 906,921 | 4,396,691 | 15,891,950 |
| Orange | 213,492 | 213,577 | 151,214 | 73,285 | 76,841 | 57,423 | 199,224 | 56,589 | 531,350 | 574,117 | 842,099 | 439,723 | 353,474 | 1,592,199 | 5,374,607 |
| Riverside | 117,608 | 89,804 | 43,838 | 40,977 | 32,795 | 16,941 | 150,318 | 26,409 | 352,656 | 323,308 | 511,966 | 286,967 | 145,369 | 809,444 | 2,948,403 |
| San Bernardino | 121,278 | 100,483 | 47,365 | 41,539 | 36,052 | 17,922 | 157,205 | 33,220 | 354,426 | 323,242 | 525,249 | 294,372 | 145,682 | 775,282 | 2,973,318 |
| Ventura | 52,852 | 45,259 | 28,396 | 18,369 | 16,481 | 10,887 | 57,050 | 12,872 | 143,860 | 139,479 | 221,976 | 113,771 | 74,868 | 360,283 | 1,296,402 |
| Total | 1,207,495 | 1,022,578 | 625,879 | 414,232 | 367,701 | 237,255 | 1,266,061 | 311,035 | 3,100,681 | 3,099,764 | 4,830,497 | 2,598,837 | 1,635,544 | 7,994,005 | 28,711,564 |
| SBTAM Trip Attraction | | | | | | | | | | | | | | | |
| Imperial | 11,284 | 6,646 | 2,413 | 4,482 | 2,847 | 1,103 | 13,140 | 2,700 | 25,993 | 24,930 | 37,516 | 23,618 | 9,236 | 60,428 | 226,337 |
| Los Angeles | 686,402 | 553,639 | 342,035 | 234,376 | 198,039 | 128,991 | 689,128 | 179,203 | 1,697,307 | 1,720,518 | 2,705,685 | 1,445,505 | 906,922 | 4,420,295 | 15,908,043 |
| Orange | 212,389 | 208,660 | 146,671 | 72,989 | 75,102 | 55,722 | 199,222 | 56,509 | 533,951 | 576,612 | 847,435 | 441,592 | 353,480 | 1,600,796 | 5,381,129 |
| Riverside | 114,491 | 87,681 | 42,521 | 39,937 | 32,068 | 16,439 | 150,318 | 26,423 | 353,884 | 324,420 | 514,518 | 287,711 | 145,365 | 813,810 | 2,949,588 |
| San Bernardino | 120,770 | 98,237 | 45,960 | 41,364 | 35,140 | 17,346 | 159,885 | 19,297 | 357,046 | 325,661 | 529,907 | 297,592 | 145,677 | 779,549 | 2,973,433 |
| Ventura | 52,597 | 44,173 | 27,536 | 18,301 | 16,106 | 10,572 | 57,050 | 12,751 | 144,156 | 140,085 | 223,388 | 114,247 | 74,865 | 362,239 | 1,298,066 |
| Total | 1,197,934 | 999,036 | 607,136 | 411,448 | 359,302 | 230,173 | 1,268,743 | 296,884 | 3,112,336 | 3,112,227 | 4,858,449 | 2,610,265 | 1,635,545 | 8,037,117 | 28,736,596 |
| % Difference - Attraction | | | | | | | | | | | | | | | |
| Imperial | -2.5% | -2.7% | -3.4% | -1.5% | -2.2% | -2.8% | 0.0% | -1.9% | -0.1% | -0.1% | -0.1% | -0.1% | 0.1% | 0.5% | -0.2% |
| Los Angeles | -0.6% | -2.3% | -3.0% | -0.5% | -2.3% | -3.0% | 0.0% | 0.0% | 0.3% | 0.3% | 0.5% | 0.4% | 0.0% | 0.5% | 0.1% |
| Orange | -0.5% | -2.3% | -3.0% | -0.4% | -2.3% | -3.0% | 0.0% | -0.1% | 0.5% | 0.4% | 0.6% | 0.4% | 0.0% | 0.5% | 0.1% |
| Riverside | -2.6% | -2.4% | -3.0% | -2.5% | -2.2% | -3.0% | 0.0% | 0.1% | 0.3% | 0.3% | 0.5% | 0.3% | 0.0% | 0.5% | 0.0% |
| San Bernardino | -0.4% | -2.2% | -3.0% | -0.4% | -2.5% | -3.2% | 1.7% | -41.9% | 0.7% | 0.7% | 0.9% | 1.1% | 0.0% | 0.6% | 0.0% |
| Ventura | -0.5% | -2.4% | -3.0% | -0.4% | -2.3% | -2.9% | 0.0% | -0.9% | 0.2% | 0.4% | 0.6% | 0.4% | 0.0% | 0.5% | 0.1% |
| Total | -0.8% | -2.3% | -3.0% | -0.7% | -2.3% | -3.0% | 0.2% | -4.5% | 0.4% | 0.4% | 0.6% | 0.4% | 0.0% | 0.5% | 0.1% |



Table 5.2 SCAG and SBTAM Trip Attraction Comparison (Continued)

| County | HBWD1 | HBWD2 | HBWD3 | HBWS1 | HBWS2 | HBWS3 | HBSC | HBCU | HBHS | HBSR | HBO | HBSP | WBO | OBO | TOTAL |
|----------------------------------|------------------|------------------|------------------|------------------|----------------|----------------|------------------|----------------|------------------|------------------|------------------|------------------|------------------|-------------------|-------------------|
| Daily Attraction | | | | | | | | | | | | | | | |
| SCAG Trip Attraction | | | | | | | | | | | | | | | |
| Imperial | 34,999 | 20,677 | 7,572 | 12,063 | 7,713 | 3,006 | 50,338 | 6,092 | 43,651 | 38,121 | 66,791 | 67,469 | 19,771 | 106,017 | 484,279 |
| Los Angeles | 2,058,581 | 1,688,763 | 1,051,038 | 623,720 | 536,613 | 352,071 | 2,640,300 | 396,788 | 2,840,512 | 2,664,809 | 4,846,869 | 4,111,748 | 1,951,857 | 7,782,020 | 33,545,690 |
| Orange | 636,699 | 636,912 | 451,104 | 194,042 | 203,492 | 152,089 | 763,319 | 125,302 | 891,833 | 891,578 | 1,515,474 | 1,255,284 | 760,634 | 2,817,824 | 11,295,586 |
| Riverside | 351,254 | 268,205 | 130,990 | 108,517 | 86,864 | 44,868 | 575,926 | 58,476 | 591,908 | 501,518 | 920,687 | 819,195 | 312,736 | 1,432,147 | 6,203,293 |
| San Bernardino | 361,583 | 299,555 | 141,250 | 110,002 | 95,468 | 47,461 | 602,315 | 73,561 | 594,869 | 502,156 | 945,581 | 840,346 | 313,511 | 1,372,096 | 6,299,753 |
| Ventura | 157,805 | 135,110 | 84,785 | 48,649 | 43,646 | 28,850 | 218,588 | 28,497 | 241,453 | 216,371 | 399,205 | 324,768 | 161,068 | 637,480 | 2,726,274 |
| Total | 3,600,922 | 3,049,223 | 1,866,739 | 1,096,993 | 973,795 | 628,346 | 4,850,786 | 688,715 | 5,204,226 | 4,814,553 | 8,694,607 | 7,418,810 | 3,519,576 | 14,147,584 | 60,554,875 |
| SBTAM Trip Attraction | | | | | | | | | | | | | | | |
| Imperial | 34,189 | 20,161 | 7,331 | 11,870 | 7,539 | 2,922 | 50,340 | 5,954 | 43,628 | 38,081 | 66,695 | 67,422 | 19,791 | 106,579 | 482,503 |
| Los Angeles | 2,046,018 | 1,650,893 | 1,020,110 | 620,656 | 524,449 | 341,585 | 2,640,332 | 396,879 | 2,848,793 | 2,673,772 | 4,871,985 | 4,126,441 | 1,951,824 | 7,823,802 | 33,537,540 |
| Orange | 633,446 | 622,559 | 437,761 | 193,278 | 198,891 | 147,570 | 763,320 | 125,105 | 896,190 | 895,418 | 1,525,049 | 1,260,587 | 760,643 | 2,833,051 | 11,292,867 |
| Riverside | 341,992 | 262,006 | 127,110 | 105,756 | 84,900 | 43,529 | 575,920 | 58,524 | 593,979 | 503,228 | 925,255 | 821,335 | 312,706 | 1,439,904 | 6,196,144 |
| San Bernardino | 360,094 | 293,032 | 137,117 | 109,583 | 93,145 | 45,991 | 612,589 | 42,749 | 599,263 | 505,922 | 953,964 | 849,564 | 313,534 | 1,379,628 | 6,296,174 |
| Ventura | 157,056 | 131,956 | 82,262 | 48,464 | 42,653 | 27,995 | 218,589 | 28,176 | 241,955 | 217,304 | 401,735 | 326,142 | 161,056 | 640,949 | 2,726,291 |
| Total | 3,572,795 | 2,980,608 | 1,811,690 | 1,089,607 | 951,577 | 609,590 | 4,861,090 | 657,387 | 5,223,808 | 4,833,726 | 8,744,683 | 7,451,491 | 3,519,553 | 14,223,914 | 60,531,519 |
| % Difference - Attraction | | | | | | | | | | | | | | | |
| Imperial | -2.3% | -2.5% | -3.2% | -1.6% | -2.2% | -2.8% | 0.0% | -2.3% | -0.1% | -0.1% | -0.1% | -0.1% | 0.1% | 0.5% | -0.4% |
| Los Angeles | -0.6% | -2.2% | -2.9% | -0.5% | -2.3% | -3.0% | 0.0% | 0.0% | 0.3% | 0.3% | 0.5% | 0.4% | 0.0% | 0.5% | 0.0% |
| Orange | -0.5% | -2.3% | -3.0% | -0.4% | -2.3% | -3.0% | 0.0% | -0.2% | 0.5% | 0.4% | 0.6% | 0.4% | 0.0% | 0.5% | 0.0% |
| Riverside | -2.6% | -2.3% | -3.0% | -2.5% | -2.3% | -3.0% | 0.0% | 0.1% | 0.3% | 0.3% | 0.5% | 0.3% | 0.0% | 0.5% | -0.1% |
| San Bernardino | -0.4% | -2.2% | -2.9% | -0.4% | -2.4% | -3.1% | 1.7% | -41.9% | 0.7% | 0.7% | 0.9% | 1.1% | 0.0% | 0.5% | -0.1% |
| Ventura | -0.5% | -2.3% | -3.0% | -0.4% | -2.3% | -3.0% | 0.0% | -1.1% | 0.2% | 0.4% | 0.6% | 0.4% | 0.0% | 0.5% | 0.0% |
| Total | -0.8% | -2.3% | -2.9% | -0.7% | -2.3% | -3.0% | 0.2% | -4.5% | 0.4% | 0.4% | 0.6% | 0.4% | 0.0% | 0.5% | 0.0% |

Source: SBTAM

6.0 TRIP DISTRIBUTION

The trip distribution module determines the attraction zone of each trip production. Gravity models are used for trip distribution in SBTAM for both peak and off-peak periods consistent with the base SCAG V5 model. In this chapter, the trip distribution model calibration and results are summarized focusing on San Bernardino County.

6.1 MODEL DESCRIPTION

The trip distribution models were applied for each of the same trip purposes used in trip generation for both peak and off-peak conditions. The gravity model apportions the trips produced at each production zone among attraction zones according to the attractiveness of each zone and the disutility of travel for each trip interchange. This application is doubly constrained, which means that the program will iterate until the trips produced from and attracted to each zone are consistent with the input production and attraction assumptions on trips.

$$T_{ij} = \frac{P_i * (A_j * F(I_{ij}) * K_{ij})}{\sum_j (A_j * F(I_{ij}) * K_{ij})}$$

where, T_{ij} is the number of trips produced in zone i and attracted to zone j ;

P_i is the number of trips produced in zone i ;

A_j is the number of trips attracted to zone j ;

I_{ij} is a measure of impedance of travel from i to j ;

F is a friction factor, which is a function of the impedance that represents the disutility of travel between i and j ; and

K_{ij} is the zone-to-zone adjustment factor, which takes into account the effect of undefined socioeconomic linkages not otherwise incorporated in the gravity model.

The gravity model has three types of inputs, and they are a friction factor parameter table, trip production and attraction totals, and an impedance matrix. For HBW, the models use both highway travel time and mode choice logsums as impedance, while all other purposes use highway travel time. Friction factor curves were calibrated based on gamma functions.

6.2 TRIP DISTRIBUTION VALIDATION

The trip lengths by production county from SBTAM exhibited inconsistency with the observed trip length based on the survey data, especially for San Bernardino County. **Table 6.1** identifies the difference between the observed trip lengths and the SBTAM trip lengths by purpose and time period. **Table 6.1** reveals significant deviation for several purposes. For example, the average HBW D1 trip length in the

peak period was under-estimated by 24%, while home-based shopping was over-estimated by 65% in the peak period.

To resolve this issue, a gravity model recalibration was conducted on the friction factor parameters, focusing on San Bernardino County trips rather than on the entire region. The observed person trip tables produced from the survey data were used to develop the calibration targets, i.e., average trip length and trip length frequency for each purpose.

The calibrated average trip distance for each purpose and each time period are defined in **Figure 6.1** and **Figure 6.2** for region-wide and San Bernardino County trips, respectively. The region-wide average trip distance and the average trip distance for trips in San Bernardino County are compared among the SCAG model, the survey and SBTAM in both figures. As shown in **Figure 6.1** and **Figure 6.2**, the average trip distance for region-wide and San Bernardino County are fairly consistent with that in SCAG model and the targets from the survey.

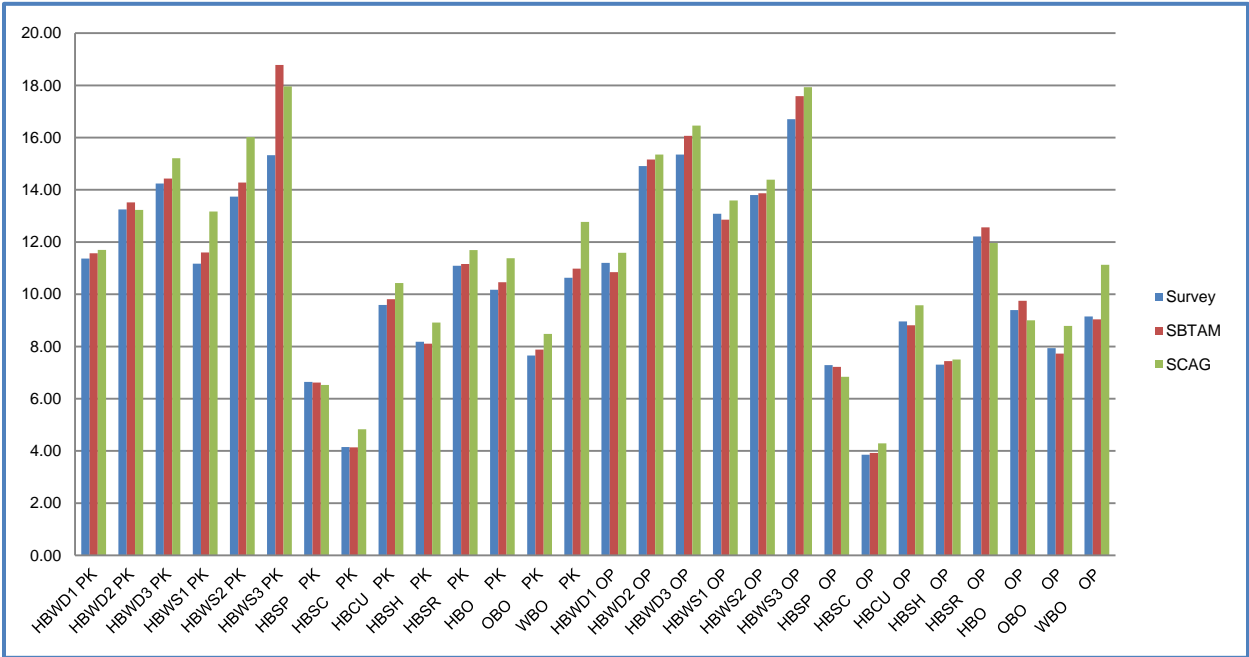
Figure 6.3 and **Figure 6.4** illustrate the shares of trips produced from San Bernardino County to the six counties in the region for HBW and all purposes combined, respectively, based upon the results from application of both the SCAG model and SBTAM. As indicated in both figures, the shares of these inter-county trips have consistent patterns between the SCAG model and SBTAM. San Bernardino intra-county trips have a significantly higher share than trips to the other counties, approximately 70% for HBW and 80% for all purposes combined. **Figure 6.5** and **Figure 6.6** illustrate the shares of trips attracted to San Bernardino County from the six counties in the region for HBW and all purposes combined, respectively. As indicated in both figures, the shares of these inter-county trips have consistent patterns as well between the SCAG model and SBTAM. San Bernardino intra-county trips have a significantly higher share than trips from the other counties, approximately 73% for HBW and 83% for all purposes combined.

Table 6.1 Average Trip Distance for San Bernardino County before Calibration

| Trip Purpose | Survey | SBTAM | Difference% |
|--------------|--------|-------|-------------|
| HBWD1 PK | 16.24 | 12.35 | -24% |
| HBWD2 PK | 19.22 | 18.92 | -2% |
| HBWD3 PK | 21.13 | 20.78 | -2% |
| HBWS1 PK | 15.53 | 16.82 | 8% |
| HBWS2 PK | 19.07 | 23.53 | 23% |
| HBWS3 PK | 24.39 | 25.33 | 4% |
| HBSP PK | 5.94 | 9.02 | 52% |
| HBSC PK | 4.76 | 5.55 | 17% |
| HBCU PK | 12.18 | 11.00 | -10% |
| HBSH PK | 8.24 | 13.55 | 65% |
| HBSR PK | 10.39 | 17.40 | 68% |
| HBO PK | 12.81 | 14.82 | 16% |
| OBO PK | 8.25 | 9.54 | 16% |
| WBO PK | 13.40 | 13.11 | -2% |
| HBWD1 OP | 17.76 | 12.99 | -27% |
| HBWD2 OP | 22.75 | 20.44 | -10% |
| HBWD3 OP | 23.42 | 22.04 | -6% |
| HBWS1 OP | 19.16 | 20.28 | 6% |
| HBWS2 OP | 22.55 | 23.86 | 6% |
| HBWS3 OP | 26.96 | 28.35 | 5% |
| HBSP OP | 6.39 | 9.91 | 55% |
| HBSC OP | 4.29 | 5.10 | 19% |
| HBCU OP | 11.13 | 10.22 | -8% |
| HBSH OP | 9.06 | 12.20 | 35% |
| HBSR OP | 14.98 | 19.32 | 29% |
| HBO OP | 12.73 | 13.54 | 6% |
| OBO OP | 10.01 | 9.93 | -1% |
| WBO OP | 10.94 | 10.62 | -3% |

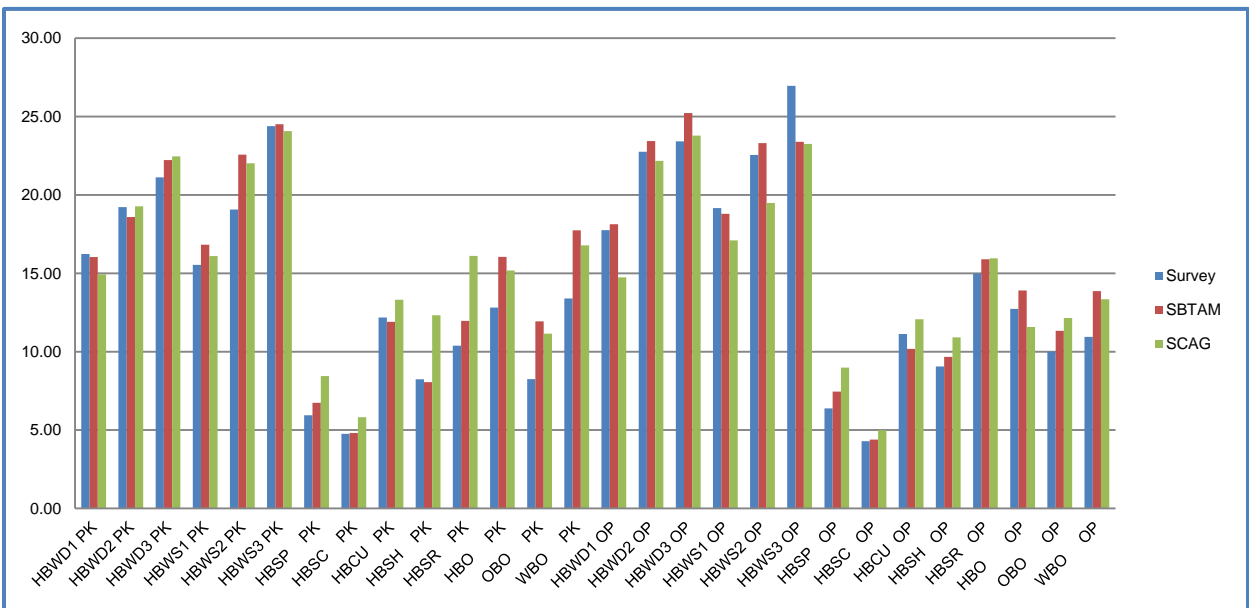
Source: SBTAM

Figure 6.1 Calibrated Region-Wide Average Trip Distance Comparison



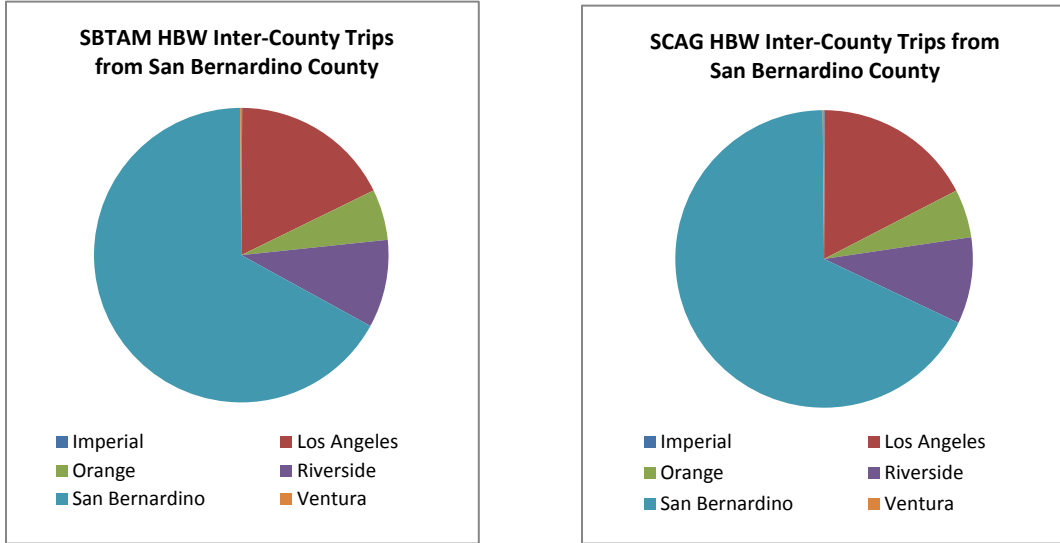
Source: SBTAM

Figure 6.2 Calibrated San Bernardino County Average Trip Distance Comparison



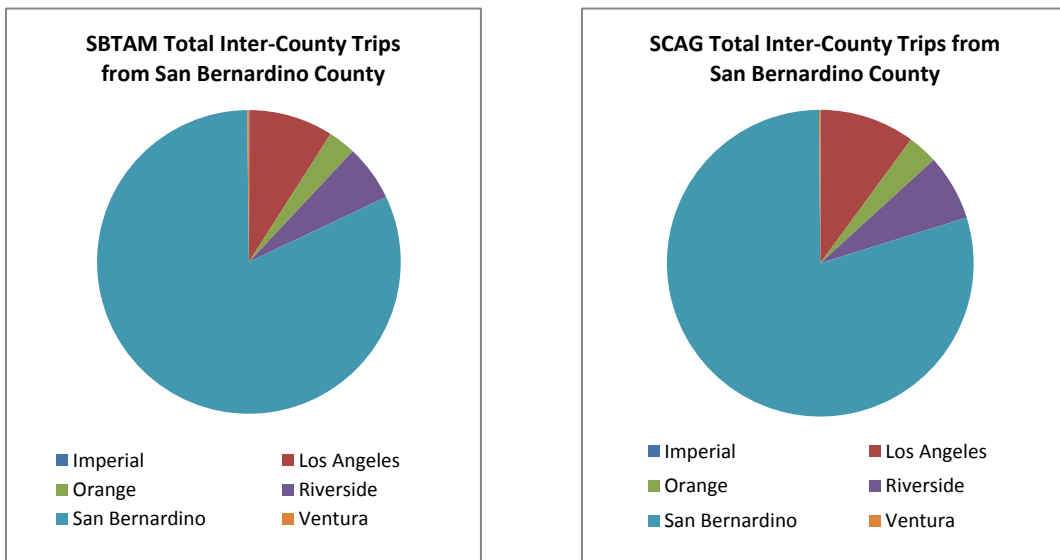
Source: SBTAM

Figure 6.3 San Bernardino County Home-Based Work Trip Productions



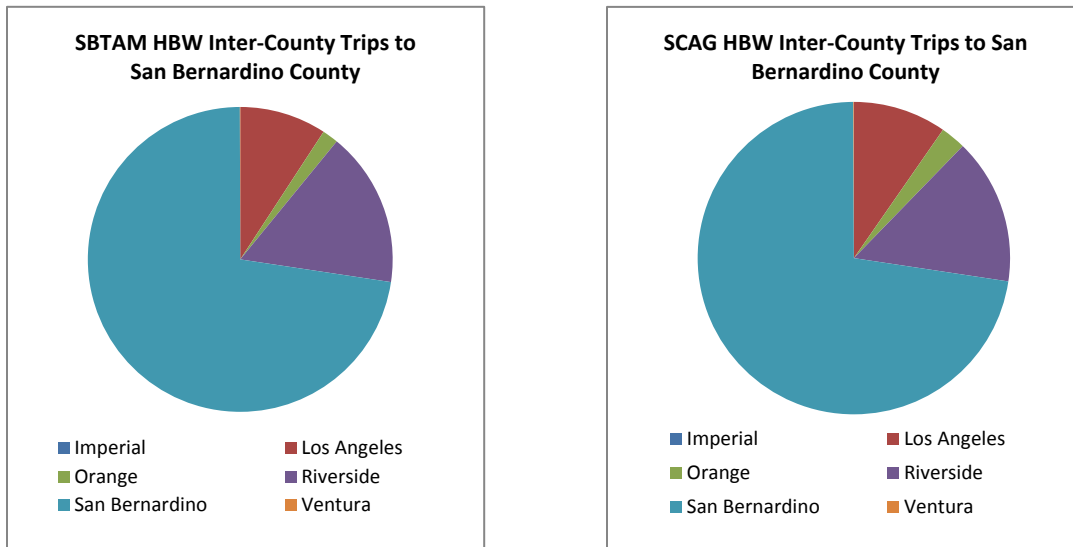
Source: SBTAM

Figure 6.4 San Bernardino County Total Person Trip Productions



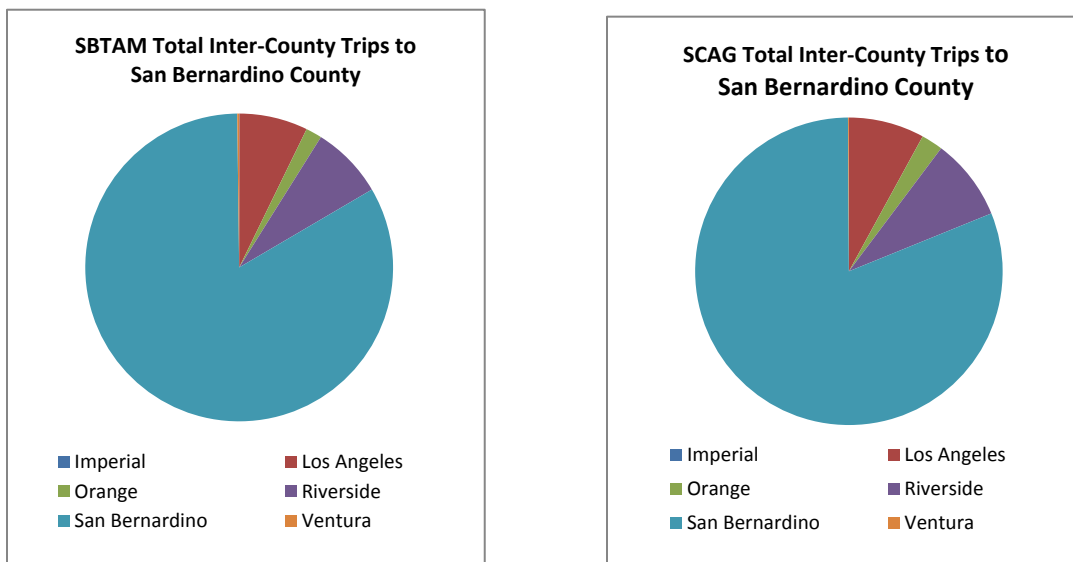
Source: SBTAM

Figure 6.5 San Bernardino County Home-Based Work Trip Attractions



Source: SBTAM

Figure 6.6 to San Bernardino County Total Trip Attractions



Source: SBTAM

7.0 MODE CHOICE

Mode choice is the process that determines how many person trips are made by various travel modes. The travel modes considered in SBTAM include non-motorized modes (walk and bike), auto modes (drive alone, shared ride 2 and shared ride 3+) and transit modes (drive and walk access to transit and drive and walk egress to transit). Consistent with the mode choice model in the base SCAG V5 model, the SBTAM mode choice model is briefly described and the mode share summaries from its application in the 2008 model validation are presented and compared to the SCAG mode share data.

7.1 MODE CHOICE MODEL STRUCTURE

The SBTAM mode choice model structure is consistent with the mode choice model in the SCAG V6 Interim model. There are eight separate mode choice models applied to the following trip purposes for both peak and off-peak periods:

- Home Based Work Direct (HBWD)
- Home Based Work Strategic (HBWS)
- Home Based School (HBSC)
- Home Based University/College (HBU)
- Home Based Shopping (HBSH)
- Home Based Other (HBO) (includes Home based Social / Recreational)
- Home Based Serve Passenger (HBSP)
- Work-Based Other (WBO)
- Other-Based Other (OBO)

The variable "Income" was used as the market segmentation variable for HBW trips in the mode choice model. The following income categories are used to classify the income level for travelers.

- Income Group 1 – (Less than \$25,000 depending on the survey)
- Income Group 2 – (\$25,000 - \$50,000 depending on the survey)
- Income Group 3 – (Greater than \$50,000)

As noted in **Table 7.1**, auto modes and non-motorized modes are available to all purposes, while the representation of transit modes varies by purpose. For HBW, the transit choices include local bus, express bus, urban rail and commuter rail. For the other purposes, all transit modes are represented by a single 'transit' choice.

Table 7.1 Mode Choice Model Travel Modes by Trip Purpose

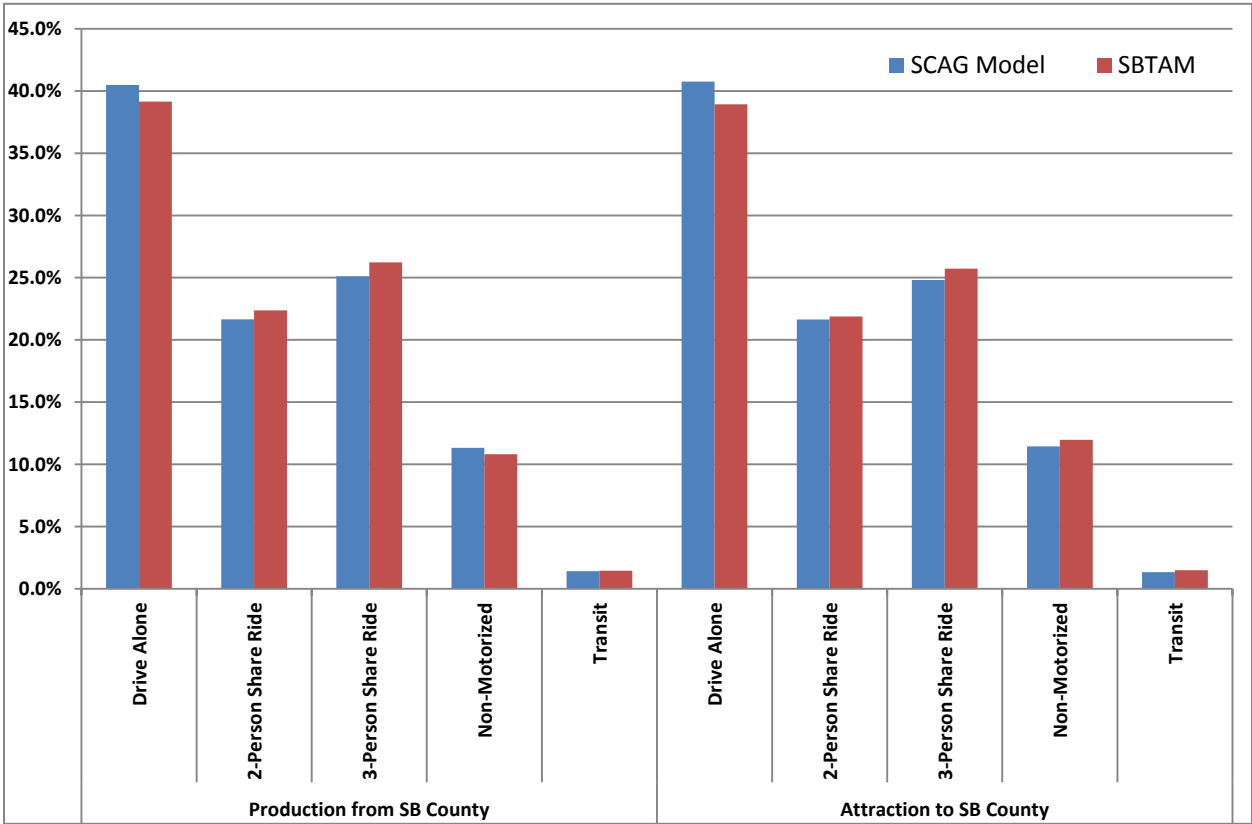
| Travel Mode | | Home-Based Work | Home-Based School | Home-Based Non-Work | Work-Other | Other-Other |
|---------------------|-------------------|-----------------|-------------------|---------------------|------------|-------------|
| Auto Modes | Drive Alone | X | X | X | X | X |
| | 2 Person Carpool | X | X | X | X | X |
| | 3+ Person Carpool | X | X | X | X | X |
| Transit Modes | Local Bus | Walk Access | X | X | X | X |
| | | Drive Access | X | | | |
| | Express Bus | Walk Access | X | | | |
| | | Drive Access | X | | | |
| | Urban Rail | Walk Access | X | | | |
| | | Drive Access | X | | | |
| | Commuter Rail | Walk Access | X | | | |
| | | Drive Access | X | | | |
| School Bus | | | X | | | |
| Non-Motorized Modes | Walk | X | X | X | X | X |
| | Bike | X | X | X | X | X |

Source: SCAG Year 2003 Model Validation and Summary.

7.2 MODE CHOICE MODEL VALIDATION

In the application of the originally developed SBTAM, the estimated mode shares did not align with the SCAG regional model, i.e., non-motorized and transit mode shares for trips to/from San Bernardino County are significantly higher in SBTAM than the mode shares from SCAG model, at the expense of auto mode shares. Due to the highly dense zone structure in San Bernardino County, the accessibility of non-motorized modes and transit modes are significantly increased. To resolve this issue, a post-processing procedure was incorporated to adjust the mode shares between transit/non-motorized modes and auto modes focusing on San Bernardino County. Since there is not enough survey data to support mode share calibration for San Bernardino County, the mode share adjustment was based upon the mode share patterns estimated in the base SCAG V5 model by shifting trips between target modes at the county level. The detailed adjustment setup file is presented in **Appendix E**. The resulting mode share for trips from/to San Bernardino County is presented in **Figure 7.1**. As shown in **Figure 7.1**, the mode shares among travel modes are consistent between SBTAM and the SCAG regional model for trips produced from or attracted to San Bernardino County. A summary of mode shares are presented in **Table 7.2** through **Table 7.10** for each trip purpose and for all purposes combined. As shown in these tables, the mode shares are consistent between the SCAG regional model and SBTAM.

Figure 7.1 San Bernardino County Daily Mode Share Comparison



Source: SBTAM



Table 7.2 Home-Based Work Mode Share Comparison

| Time Period | Mode | Production | | | | | | Attraction | | | | | |
|------------------------|---------------------|------------|-------|-----------------|-------|-----------------------|-------|------------|-------|-----------------|-------|-----------------------|-------|
| | | Valley | | Mountain/Desert | | San Bernardino County | | Valley | | Mountain/Desert | | San Bernardino County | |
| | | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM |
| Peak Period | Drive Alone | 77.1% | 77.4% | 73.2% | 80.3% | 76.3% | 78.1% | 80.7% | 79.2% | 76.1% | 80.5% | 79.8% | 79.4% |
| | 2-Person Share Ride | 11.4% | 11.9% | 12.5% | 10.6% | 11.6% | 11.6% | 9.7% | 9.5% | 10.4% | 9.9% | 9.8% | 9.7% |
| | 3-Person Share Ride | 6.4% | 6.4% | 10.0% | 6.8% | 7.2% | 6.5% | 4.9% | 4.9% | 8.3% | 7.1% | 5.6% | 5.3% |
| | Non-Motorized | 4.1% | 3.7% | 4.3% | 2.2% | 4.2% | 3.4% | 4.2% | 5.9% | 5.2% | 2.6% | 4.4% | 5.0% |
| | Transit | 1.0% | 0.6% | 0.0% | 0.0% | 0.8% | 0.5% | 0.5% | 0.6% | 0.0% | 0.0% | 0.4% | 0.5% |
| Off-Peak Period | Drive Alone | 78.4% | 78.3% | 72.3% | 75.2% | 77.1% | 77.6% | 79.2% | 78.7% | 73.9% | 77.9% | 78.2% | 77.9% |
| | 2-Person Share Ride | 11.0% | 11.3% | 13.2% | 12.4% | 11.5% | 11.6% | 10.8% | 9.7% | 11.8% | 11.3% | 10.9% | 10.3% |
| | 3-Person Share Ride | 5.5% | 6.3% | 9.8% | 10.0% | 6.5% | 7.1% | 5.0% | 4.4% | 8.6% | 7.9% | 5.7% | 5.7% |
| | Non-Motorized | 4.5% | 3.7% | 4.7% | 2.4% | 4.6% | 3.4% | 4.6% | 6.3% | 5.8% | 2.8% | 4.8% | 5.4% |
| | Transit | 0.5% | 0.4% | 0.0% | 0.1% | 0.4% | 0.3% | 0.4% | 0.9% | 0.0% | 0.1% | 0.3% | 0.7% |
| Daily | Drive Alone | 77.6% | 77.7% | 72.9% | 78.5% | 76.5% | 77.9% | 80.2% | 79.0% | 75.3% | 79.6% | 79.2% | 79.1% |
| | 2-Person Share Ride | 11.2% | 11.7% | 12.7% | 11.2% | 11.6% | 11.6% | 10.1% | 9.6% | 10.9% | 10.3% | 10.2% | 9.7% |
| | 3-Person Share Ride | 6.1% | 6.4% | 9.9% | 7.9% | 6.9% | 6.7% | 5.0% | 4.7% | 8.4% | 7.4% | 5.6% | 5.2% |
| | Non-Motorized | 4.3% | 3.7% | 4.4% | 2.3% | 4.3% | 3.4% | 4.3% | 6.0% | 5.4% | 2.7% | 4.5% | 5.4% |
| | Transit | 0.8% | 0.5% | 0.0% | 0.0% | 0.6% | 0.4% | 0.5% | 0.7% | 0.0% | 0.1% | 0.4% | 0.6% |

Source: SBTAM



Table 7.3 Home-Based College Mode Share Comparison

| Time Period | Mode | Production | | | | | | Attraction | | | | | |
|------------------------|---------------------|------------|-------|-----------------|-------|-----------------------|-------|------------|-------|-----------------|-------|-----------------------|-------|
| | | Valley | | Mountain/Desert | | San Bernardino County | | Valley | | Mountain/Desert | | San Bernardino County | |
| | | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM |
| Peak Period | Drive Alone | 68% | 61% | 58% | 52% | 65% | 59% | 58% | 59% | 58% | 56% | 58% | 59% |
| | 2-Person Share Ride | 13% | 16% | 18% | 19% | 14% | 16% | 18% | 14% | 16% | 17% | 18% | 15% |
| | 3-Person Share Ride | 6% | 9% | 16% | 23% | 8% | 11% | 15% | 9% | 17% | 18% | 15% | 11% |
| | Non-Motorized | 12% | 14% | 8% | 7% | 11% | 13% | 9% | 18% | 9% | 8% | 9% | 16% |
| | Transit | 1% | 1% | 0% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Off-Peak Period | Drive Alone | 73% | 69% | 64% | 63% | 71% | 68% | 62% | 64% | 64% | 66% | 63% | 64% |
| | 2-Person Share Ride | 9% | 13% | 15% | 15% | 11% | 13% | 15% | 13% | 13% | 13% | 14% | 13% |
| | 3-Person Share Ride | 4% | 6% | 13% | 12% | 6% | 7% | 13% | 8% | 14% | 13% | 13% | 9% |
| | Non-Motorized | 12% | 11% | 8% | 10% | 11% | 11% | 10% | 15% | 9% | 8% | 10% | 14% |
| | Transit | 1% | 0% | 0% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Daily | Drive Alone | 70% | 64% | 61% | 57% | 68% | 63% | 60% | 61% | 61% | 61% | 60% | 61% |
| | 2-Person Share Ride | 11% | 14% | 17% | 17% | 13% | 15% | 17% | 14% | 15% | 15% | 16% | 14% |
| | 3-Person Share Ride | 5% | 8% | 15% | 18% | 8% | 10% | 14% | 8% | 16% | 16% | 14% | 10% |
| | Non-Motorized | 12% | 13% | 8% | 8% | 11% | 12% | 10% | 17% | 9% | 8% | 9% | 15% |
| | Transit | 1% | 0% | 0% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |

Source: SBTAM



Table 7.4 Home-Based School Mode Share Comparison

| Time Period | Mode | Production | | | | | | Attraction | | | | | |
|------------------------|---------------------|------------|-------|-----------------|-------|-----------------------|-------|------------|-------|-----------------|-------|-----------------------|-------|
| | | Valley | | Mountain/Desert | | San Bernardino County | | Valley | | Mountain/Desert | | San Bernardino County | |
| | | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM |
| Peak Period | Drive Alone | 2% | 3% | 2% | 2% | 2% | 2% | 2% | 3% | 2% | 2% | 2% | 2% |
| | 2-Person Share Ride | 21% | 20% | 21% | 20% | 21% | 20% | 20% | 20% | 22% | 20% | 21% | 20% |
| | 3-Person Share Ride | 34% | 33% | 36% | 34% | 34% | 33% | 34% | 33% | 36% | 34% | 34% | 33% |
| | Non-Motorized | 32% | 32% | 28% | 30% | 31% | 32% | 32% | 32% | 28% | 30% | 31% | 32% |
| | Transit | 12% | 13% | 13% | 14% | 12% | 13% | 12% | 13% | 13% | 13% | 12% | 13% |
| Off-Peak Period | Drive Alone | 3% | 4% | 3% | 3% | 3% | 4% | 3% | 4% | 3% | 3% | 3% | 4% |
| | 2-Person Share Ride | 15% | 15% | 16% | 16% | 16% | 15% | 15% | 15% | 17% | 16% | 16% | 15% |
| | 3-Person Share Ride | 26% | 25% | 27% | 26% | 26% | 25% | 26% | 25% | 28% | 26% | 26% | 25% |
| | Non-Motorized | 42% | 42% | 37% | 38% | 40% | 41% | 42% | 42% | 37% | 39% | 40% | 41% |
| | Transit | 14% | 15% | 16% | 17% | 15% | 15% | 14% | 15% | 16% | 16% | 15% | 15% |
| Daily | Drive Alone | 2% | 3% | 2% | 3% | 2% | 3% | 2% | 3% | 2% | 3% | 2% | 3% |
| | 2-Person Share Ride | 19% | 18% | 20% | 19% | 19% | 19% | 19% | 18% | 20% | 19% | 19% | 19% |
| | 3-Person Share Ride | 32% | 31% | 33% | 32% | 32% | 31% | 32% | 31% | 34% | 32% | 32% | 31% |
| | Non-Motorized | 35% | 35% | 31% | 32% | 34% | 34% | 35% | 35% | 30% | 32% | 34% | 34% |
| | Transit | 12% | 13% | 14% | 14% | 13% | 14% | 12% | 13% | 14% | 14% | 13% | 13% |

Source: SBTAM



Table 7.5 Home-Based Shopping Mode Share Comparison

| Time Period | Mode | Production | | | | | | Attraction | | | | | |
|-----------------|---------------------|------------|-------|-----------------|-------|-----------------------|-------|------------|-------|-----------------|-------|-----------------------|-------|
| | | Valley | | Mountain/Desert | | San Bernardino County | | Valley | | Mountain/Desert | | San Bernardino County | |
| | | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM |
| Peak Period | Drive Alone | 37% | 31% | 34% | 37% | 36% | 33% | 36% | 28% | 35% | 37% | 36% | 31% |
| | 2-Person Share Ride | 23% | 29% | 21% | 24% | 22% | 28% | 23% | 28% | 21% | 24% | 22% | 27% |
| | 3-Person Share Ride | 27% | 29% | 33% | 34% | 29% | 31% | 29% | 29% | 33% | 33% | 30% | 30% |
| | Non-Motorized | 13% | 10% | 11% | 5% | 12% | 9% | 12% | 14% | 11% | 6% | 12% | 12% |
| | Transit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Off-Peak Period | Drive Alone | 44% | 42% | 40% | 44% | 43% | 42% | 43% | 38% | 40% | 44% | 42% | 40% |
| | 2-Person Share Ride | 23% | 25% | 21% | 21% | 22% | 24% | 23% | 25% | 21% | 22% | 22% | 24% |
| | 3-Person Share Ride | 22% | 22% | 30% | 30% | 24% | 24% | 24% | 23% | 29% | 28% | 25% | 24% |
| | Non-Motorized | 11% | 11% | 9% | 5% | 10% | 9% | 10% | 14% | 10% | 6% | 10% | 12% |
| | Transit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Daily | Drive Alone | 41% | 38% | 37% | 41% | 40% | 39% | 40% | 34% | 38% | 42% | 40% | 36% |
| | 2-Person Share Ride | 23% | 27% | 21% | 22% | 22% | 26% | 23% | 26% | 21% | 23% | 22% | 25% |
| | 3-Person Share Ride | 24% | 25% | 31% | 32% | 26% | 27% | 26% | 25% | 31% | 30% | 27% | 27% |
| | Non-Motorized | 12% | 11% | 10% | 5% | 11% | 9% | 11% | 14% | 10% | 6% | 11% | 12% |
| | Transit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |

Source: SBTAM



Table 7.6 Home-Based Serving Passenger Mode Share Comparison

| Time Period | Mode | Production | | | | | | Attraction | | | | | | |
|------------------------|---------------------|------------|-------|-----------------|-------|-----------------------|-------|------------|-------|-----------------|-------|-----------------------|-------|-----|
| | | Valley | | Mountain/Desert | | San Bernardino County | | Valley | | Mountain/Desert | | San Bernardino County | | |
| | | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | |
| Peak Period | Drive Alone | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% |
| | 2-Person Share Ride | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% |
| | 3-Person Share Ride | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% |
| | Non-Motorized | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% |
| | Transit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Off-Peak Period | Drive Alone | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% |
| | 2-Person Share Ride | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% |
| | 3-Person Share Ride | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% |
| | Non-Motorized | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% |
| | Transit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Daily | Drive Alone | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% | 26% |
| | 2-Person Share Ride | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% |
| | 3-Person Share Ride | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% | 31% |
| | Non-Motorized | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% | 14% |
| | Transit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |

Source: SBTAM



Table 7.7 Home-Based Other Mode Share Comparison

| Time Period | Mode | Production | | | | | | Attraction | | | | | |
|-----------------|---------------------|------------|-------|-----------------|-------|-----------------------|-------|------------|-------|-----------------|-------|-----------------------|-------|
| | | Valley | | Mountain/Desert | | San Bernardino County | | Valley | | Mountain/Desert | | San Bernardino County | |
| | | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM |
| Peak Period | Drive Alone | 32% | 31% | 33% | 35% | 33% | 32% | 34% | 32% | 33% | 34% | 34% | 33% |
| | 2-Person Share Ride | 22% | 24% | 21% | 21% | 22% | 23% | 23% | 23% | 21% | 21% | 22% | 23% |
| | 3-Person Share Ride | 32% | 34% | 34% | 35% | 33% | 34% | 30% | 31% | 35% | 36% | 31% | 32% |
| | Non-Motorized | 13% | 12% | 12% | 9% | 12% | 11% | 13% | 13% | 12% | 9% | 12% | 12% |
| | Transit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Off-Peak Period | Drive Alone | 38% | 32% | 39% | 39% | 38% | 34% | 40% | 33% | 39% | 37% | 40% | 34% |
| | 2-Person Share Ride | 24% | 26% | 22% | 24% | 23% | 26% | 24% | 25% | 22% | 23% | 23% | 24% |
| | 3-Person Share Ride | 28% | 32% | 29% | 28% | 28% | 31% | 26% | 31% | 30% | 32% | 27% | 31% |
| | Non-Motorized | 10% | 10% | 10% | 9% | 10% | 9% | 10% | 11% | 10% | 8% | 10% | 10% |
| | Transit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Daily | Drive Alone | 36% | 31% | 37% | 37% | 36% | 33% | 38% | 33% | 36% | 36% | 37% | 34% |
| | 2-Person Share Ride | 23% | 25% | 21% | 23% | 23% | 25% | 23% | 24% | 21% | 22% | 23% | 24% |
| | 3-Person Share Ride | 30% | 33% | 31% | 31% | 30% | 32% | 27% | 31% | 32% | 34% | 29% | 32% |
| | Non-Motorized | 11% | 10% | 11% | 9% | 11% | 10% | 11% | 12% | 10% | 8% | 11% | 11% |
| | Transit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |

Source: SBTAM



Table 7.8 Work-Based Other Mode Share Comparison

| Time Period | Mode | Production | | | | | | Attraction | | | | | |
|------------------------|---------------------|------------|-------|-----------------|-------|-----------------------|-------|------------|-------|-----------------|-------|-----------------------|-------|
| | | Valley | | Mountain/Desert | | San Bernardino County | | Valley | | Mountain/Desert | | San Bernardino County | |
| | | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM |
| Peak Period | Drive Alone | 76% | 71% | 69% | 69% | 74% | 71% | 74% | 72% | 66% | 68% | 73% | 71% |
| | 2-Person Share Ride | 9% | 10% | 10% | 9% | 10% | 10% | 10% | 10% | 11% | 10% | 10% | 10% |
| | 3-Person Share Ride | 9% | 15% | 16% | 21% | 11% | 16% | 10% | 12% | 18% | 20% | 12% | 14% |
| | Non-Motorized | 5% | 4% | 5% | 1% | 5% | 3% | 5% | 6% | 5% | 2% | 5% | 5% |
| | Transit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Off-Peak Period | Drive Alone | 60% | 57% | 60% | 60% | 60% | 57% | 58% | 54% | 56% | 57% | 58% | 55% |
| | 2-Person Share Ride | 16% | 17% | 15% | 15% | 16% | 17% | 17% | 18% | 16% | 17% | 17% | 18% |
| | 3-Person Share Ride | 12% | 16% | 13% | 20% | 12% | 17% | 13% | 15% | 16% | 20% | 14% | 16% |
| | Non-Motorized | 12% | 10% | 12% | 5% | 12% | 9% | 11% | 13% | 11% | 5% | 11% | 12% |
| | Transit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Daily | Drive Alone | 68% | 65% | 65% | 65% | 68% | 65% | 67% | 64% | 62% | 63% | 66% | 63% |
| | 2-Person Share Ride | 13% | 13% | 12% | 12% | 13% | 13% | 13% | 13% | 13% | 14% | 13% | 13% |
| | 3-Person Share Ride | 10% | 15% | 14% | 20% | 11% | 16% | 12% | 13% | 17% | 20% | 13% | 15% |
| | Non-Motorized | 8% | 7% | 8% | 3% | 8% | 6% | 8% | 9% | 8% | 3% | 8% | 8% |
| | Transit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |

Source: SBTAM



Table 7.9 Other-Based Other Mode Share Comparison

| Time Period | Mode | Production | | | | | | Attraction | | | | | |
|------------------------|---------------------|------------|-------|-----------------|-------|-----------------------|-------|------------|-------|-----------------|-------|-----------------------|-------|
| | | Valley | | Mountain/Desert | | San Bernardino County | | Valley | | Mountain/Desert | | San Bernardino County | |
| | | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM |
| Peak Period | Drive Alone | 28% | 27% | 30% | 28% | 28% | 27% | 28% | 27% | 30% | 28% | 29% | 27% |
| | 2-Person Share Ride | 28% | 26% | 27% | 25% | 28% | 26% | 28% | 27% | 27% | 25% | 28% | 27% |
| | 3-Person Share Ride | 36% | 37% | 36% | 39% | 36% | 38% | 35% | 36% | 36% | 38% | 36% | 36% |
| | Non-Motorized | 8% | 10% | 7% | 8% | 8% | 9% | 8% | 10% | 7% | 8% | 8% | 10% |
| | Transit | 0% | 1% | 0% | 0% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% |
| Off-Peak Period | Drive Alone | 39% | 36% | 40% | 39% | 39% | 37% | 40% | 39% | 40% | 39% | 40% | 39% |
| | 2-Person Share Ride | 27% | 28% | 26% | 27% | 27% | 28% | 27% | 27% | 26% | 27% | 27% | 27% |
| | 3-Person Share Ride | 27% | 30% | 30% | 28% | 28% | 29% | 26% | 28% | 30% | 29% | 27% | 28% |
| | Non-Motorized | 6% | 6% | 5% | 5% | 6% | 6% | 7% | 6% | 5% | 5% | 6% | 6% |
| | Transit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Daily | Drive Alone | 34% | 32% | 36% | 34% | 35% | 32% | 35% | 33% | 35% | 34% | 35% | 34% |
| | 2-Person Share Ride | 28% | 27% | 26% | 26% | 27% | 27% | 28% | 27% | 26% | 26% | 27% | 27% |
| | 3-Person Share Ride | 31% | 33% | 32% | 33% | 31% | 33% | 30% | 31% | 33% | 33% | 31% | 32% |
| | Non-Motorized | 7% | 7% | 6% | 6% | 7% | 7% | 7% | 8% | 6% | 6% | 7% | 8% |
| | Transit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |

Source: SBTAM



Table 7.10 Total Mode Share Comparison

| Time Period | Mode | Production | | | | | | Attraction | | | | | |
|------------------------|---------------------|------------|-------|-----------------|-------|-----------------------|-------|------------|-------|-----------------|-------|-----------------------|-------|
| | | Valley | | Mountain/Desert | | San Bernardino County | | Valley | | Mountain/Desert | | San Bernardino County | |
| | | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM | SCAG | SBTAM |
| Peak Period | Drive Alone | 39% | 38% | 37% | 38% | 39% | 38% | 40% | 38% | 35% | 36% | 39% | 38% |
| | 2-Person Share Ride | 21% | 21% | 21% | 21% | 21% | 21% | 21% | 21% | 21% | 21% | 21% | 21% |
| | 3-Person Share Ride | 25% | 26% | 28% | 29% | 26% | 27% | 25% | 25% | 29% | 29% | 26% | 26% |
| | Non-Motorized | 12% | 12% | 12% | 11% | 12% | 12% | 12% | 13% | 12% | 11% | 12% | 13% |
| | Transit | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| Off-Peak Period | Drive Alone | 43% | 40% | 41% | 41% | 42% | 40% | 43% | 40% | 40% | 40% | 43% | 40% |
| | 2-Person Share Ride | 22% | 24% | 22% | 23% | 22% | 24% | 23% | 23% | 22% | 23% | 22% | 23% |
| | 3-Person Share Ride | 23% | 25% | 26% | 26% | 24% | 26% | 23% | 24% | 27% | 28% | 24% | 25% |
| | Non-Motorized | 11% | 10% | 10% | 9% | 10% | 10% | 11% | 12% | 10% | 9% | 11% | 11% |
| | Transit | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| Daily | Drive Alone | 41% | 39% | 39% | 40% | 40% | 39% | 42% | 39% | 38% | 38% | 41% | 39% |
| | 2-Person Share Ride | 22% | 23% | 22% | 22% | 22% | 22% | 22% | 22% | 22% | 22% | 22% | 22% |
| | 3-Person Share Ride | 24% | 26% | 27% | 27% | 25% | 26% | 24% | 25% | 28% | 29% | 25% | 26% |
| | Non-Motorized | 11% | 11% | 11% | 10% | 11% | 11% | 12% | 13% | 11% | 10% | 11% | 12% |
| | Transit | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 2% | 1% | 1% | 1% | 1% |

Source: SBTAM

8.0 TRIP ASSIGNMENT

This chapter describes the trip assignment methodology and the 2008 validation results. Highway assignment validation is a crucial step in the model development process. The ability of the model to replicate base year volume estimates within acceptable ranges of tolerance compared to actual ground counts is essential to validate the entire travel demand model. The screenline analysis for the 2008 validation year is presented in this Chapter. Also, key to highway assignment validation is the comparison of model estimated VMT to estimates from the Highway Performance Monitoring System (HPMS). An acceptable tolerance level is mandatory for regional air quality planning and conformity purposes. Specifics regarding the comparative analyses are summarized in this Chapter and assignment statistics for the SBTAM region are also presented. It should be noted that transit validation was not performed during the development of SBTAM. SBTAM was developed with the option to allow for transit level application or to transfer mode share percentages directly from the base SCAG V5 model.

8.1 ASSIGNMENT METHODOLOGY

The SBTAM assignment includes a static, multiclass user equilibrium highway assignment procedure which simultaneously loads the vehicles forecast by the mode choice model, the internal-external and external-external vehicle trips and the heavy-duty trucks. The origin-destination trip tables loaded to the highway network include the following vehicle classes:

- Drive Alone
- Shared Ride 2 No HOV
- Shared Ride 3 No HOV
- Shared Ride 2 HOV
- Shared Ride 3 HOV
- Light Trucks
- Medium Trucks
- Heavy Trucks

Highway assignment is the process of loading vehicles onto the appropriate highway facilities to produce traffic volumes, congested speeds, vehicle-miles traveled (VMT), and vehicle-hours traveled (VHT) estimates for each of the four model time periods. Link or segment assignments by time period are added to produce average daily traffic volumes for the model network.

8.2 TIME OF DAY FACTORING

In the highway assignment, vehicle trips for all trip purposes are assigned, or loaded, onto each of four time period highway networks:

- A.M. Peak - 6:00 A.M. to 9:00 A.M.
- Mid-day - 9:00 A.M. to 3:00 P.M.
- P.M. Peak - 3:00 P.M. to 7:00 P.M.



- Night - 7:00 P.M. to 6:00 A.M.

Prior to assignment, the mode choice output is converted from peak/off-peak production-attraction format to time-of-day origin-destination format. Two sets of diurnal factors were developed to accomplish this conversion: peak factors and time-of-day factors.

These diurnal factors were derived from the 2001 Post-Census Household Survey and consistent with the factors used in the SCAG V6 Interim Model, which allocates the production-attraction trips by purpose to each of the four time periods. The first set of diurnal factors, peaking factors as presented in **Table 8.1**, is applied in the trip generation step to subdivide the resulting productions and attractions by purpose into "peak" and "off-peak" categories prior to trip distribution. The second set is applied prior to trip assignment to allocate peak trips into the A.M. and P.M. peak period by direction of travel, and off-peak trips into mid-day and night by direction of travel, as shown in **Table 8.2**. Once all of these factors are applied, origin-destination trip tables by mode are summed for all trip purposes, combined with the internal-external, external-external and heavy duty truck trips and then assigned by time period.

Table 8.1 SBTAM Peaking Factors

| Trip Purpose | Peak | Off-peak |
|--------------|--------|----------|
| HBWD | 0.6628 | 0.3372 |
| HBWS | 0.6224 | 0.3776 |
| HBCU | 0.5483 | 0.4517 |
| HBSC | 0.7390 | 0.2610 |
| HBSH | 0.4042 | 0.5958 |
| HBSR | 0.3574 | 0.6426 |
| HBSP | 0.6497 | 0.3503 |
| HBO | 0.4451 | 0.5549 |
| WBO | 0.5353 | 0.4647 |
| OBO | 0.4350 | 0.5651 |

Source: SBTAM

Table 8.2 SBTAM Time-of-Day Factors

| Trip Purpose | Peak Period | | | | Off-peak Period | | | |
|--------------|-------------|-------|-------|-------|-----------------|-------|-------|-------|
| | A.M. | | P.M. | | Mid-day | | Night | |
| | PA | AP | PA | AP | PA | AP | PA | AP |
| HBWD | 44.96 | 1.40 | 3.37 | 50.26 | 27.53 | 18.22 | 25.48 | 28.77 |
| HBWS_HBI | 29.70 | 0.25 | 2.42 | 67.63 | 27.85 | 14.51 | 7.66 | 49.98 |
| HBWS_IBW | 33.42 | 1.37 | 3.42 | 61.79 | 33.98 | 45.66 | 8.16 | 12.20 |
| HBCU | 47.93 | 1.20 | 18.27 | 31.34 | 34.28 | 31.34 | 2.07 | 32.32 |
| HBSC | 68.80 | 0.0 | 0.98 | 30.22 | 8.71 | 82.03 | 5.85 | 3.41 |
| HBSH | 12.52 | 2.76 | 23.82 | 60.90 | 35.75 | 35.06 | 8.82 | 20.37 |
| HBSR | 24.36 | 2.86 | 30.34 | 42.43 | 35.45 | 23.55 | 10.76 | 30.23 |
| HBSP | 36.83 | 14.02 | 17.00 | 32.14 | 38.79 | 29.63 | 11.30 | 20.27 |
| HBO | 24.36 | 2.86 | 30.34 | 42.43 | 35.45 | 23.55 | 10.76 | 30.23 |
| WBO | 5.26 | 26.89 | 62.72 | 5.13 | 60.40 | 26.54 | 8.33 | 4.73 |
| OBO | 11.52 | 11.52 | 38.48 | 38.48 | 40.36 | 40.36 | 9.64 | 9.64 |

Source: SBTAM

8.3 EXTERNAL TRIPS

External trips (cordon trips) are trips with one or both ends outside of the modeling area. External trips for the light-duty and medium-duty vehicles are estimated independently from heavy-duty vehicles (trucks). The base year external trip tables are generated based on the traffic counts that were obtained for each cordon location and the previous cordon survey results used to split total external trips into the following three categories:

- Through trips - External-to-External (E-E)
- External-to-Internal (E-I)
- Internal-to-External (I-E)

The resulting through trip table (E-E) and the I-E/E-I trip table were combined with trip tables from previous steps to form final O-D vehicle trip tables for highway assignment. SBTAM directly inherits the external trip tables from the SCAG regional model, with adjustment to maintain consistency with the SBTAM zone structure.

8.4 HIGHWAY ASSIGNMENT PROCEDURE

Vehicle trip assignment is the process of loading vehicle trips onto the appropriate highway facilities. This process produces traffic volumes and resulting congested speeds on each road segment represented in the network for the four time periods. The SBTAM assignment consists of a series of multi-class simultaneous equilibrium assignments for the eight classes of vehicles noted above for each of the four time periods. During the assignment process, trucks are converted to passenger-car equivalents (PCE) for each link based on the percentage of trucks, grade, link length and level of congestion. Transit vehicles are pre-loaded to the highway links.

To achieve travel time convergence between the highway assignment and the demand model, a five loop feedback procedure is applied in SBTAM (note that the option to run in stage or loop mode is also available). The following describes the travel time feedback process:

- **Step 1:** Auto ownership, trip generation, trip distribution and mode choice are run using the initial speeds coded on the input highway networks. The resulting trip tables for each vehicle class and time period are assigned to the highway networks, which yields the first pass loaded volumes and congested speeds.
- **Step 2:** Congested speeds are fed back into the demand model (auto ownership, trip generation, etc.) to produce a second set of congested speeds for the A.M. peak and mid-day periods. An averaging process is utilized to smooth the volume variation between the first and second pass (loop) assignments. The resulting averaged speeds are fed back to the demand model, and the process is repeated three more times for a total of five feedback loops.
- **Step 3:** During the final, 5th loop assignment, all highway assignments are performed: A.M. peak, mid-day, P.M. peak and night time.

8.5 HIGHWAY ASSIGNMENT VALIDATION

The model validation process includes comparison of model estimated traffic volumes for the base year with the traffic counts. This comparison is based upon the volume and counts on screenlines which are imaginary lines drawn across the major streets and freeways in the modeling area. This section describes how the SBTAM highway trip assignment module has been validated to observed conditions.

8.5.1 Screenline Setup

As SBTAM is a countywide model focusing on San Bernardino County, all screenlines developed to validate SBTAM are located within San Bernardino County, covering major highway facilities in the county. A total of 32 screenlines were developed, thirteen of them are in the Valley Subregion while nineteen are located in the Mountain/Desert Subregion, which includes 66 freeway, 8 HOV and 284 arterial links. **Figure 8.1** and **Figure 8.2** provide a visual representation of the SBTAM screenlines.

Traffic counts on the screenline links were assembled from various sources including San Bernardino County, cities and Caltrans. In addition, daily traffic counts were collected at 76 locations in San Bernardino County, 49 located in the Valley Subregion and 28 located in the Mountain/Desert Subregion.

8.5.2 Screenline Validation Results

Table 8.2 presents the final screenline analysis results. The maximum desirable deviations were derived from the standard prescribed by Federal Highway Administration and National Cooperative Highway Research Program (NCHRP) 255 guidelines. Based on the standard, the lower the screenline count volumes, the higher the maximum deviation allowed. The relationship of the maximum allowed deviation and the screenline counts are defined by the curve in **Figure 8.3**. As indicated in **Table 8.2**, all

the screenlines are within the acceptable tolerance range of deviation. The overall screenline daily forecast traffic volumes in the Valley Subregion are 0.6% higher than the total corresponding daily traffic counts, while overall screenline daily forecast traffic volumes are 3.4% lower than the corresponding daily traffic counts in the Mountain/Desert Subregion.

Figure 8.1 Screenlines Location (County-Wide)

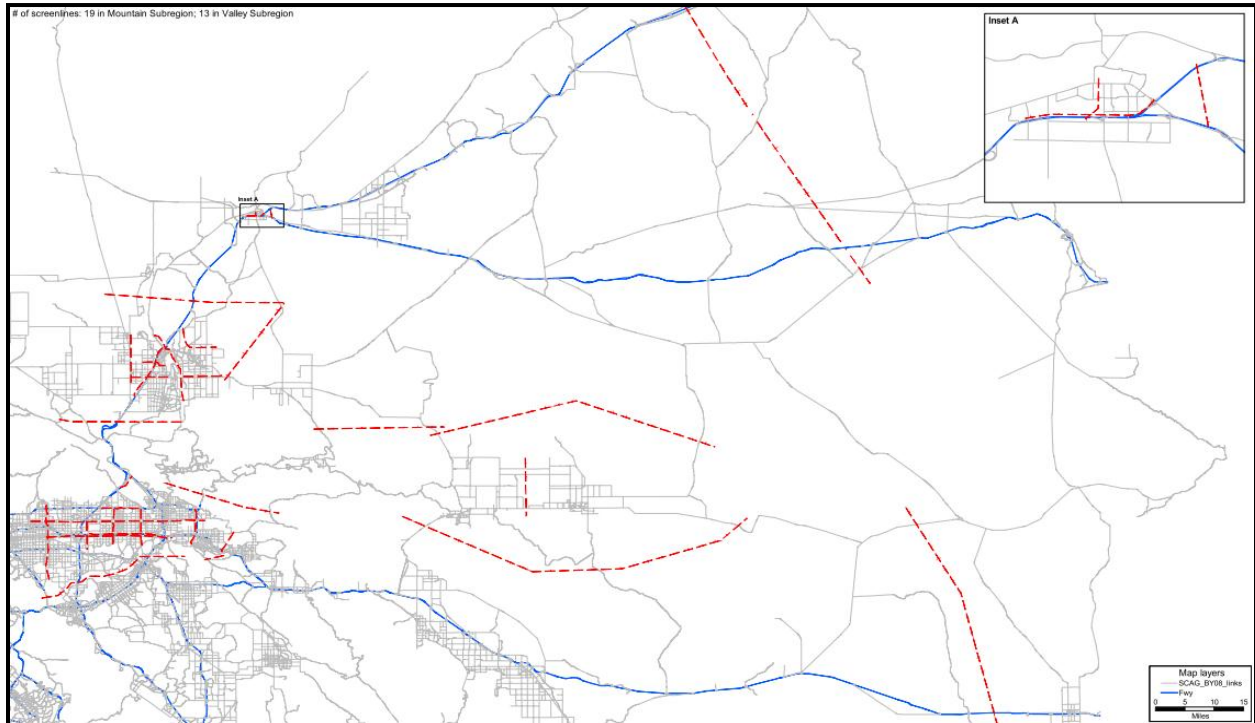
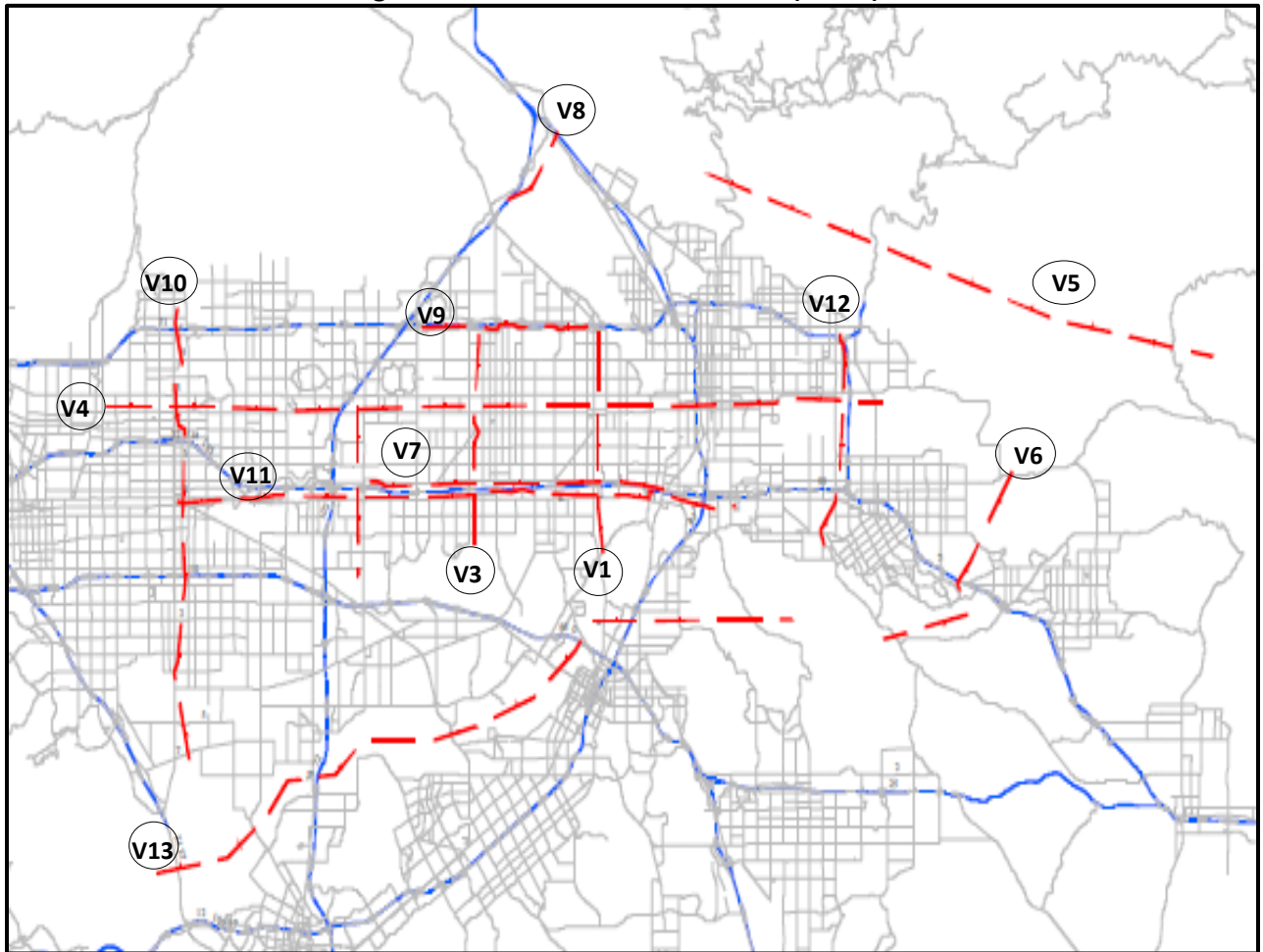


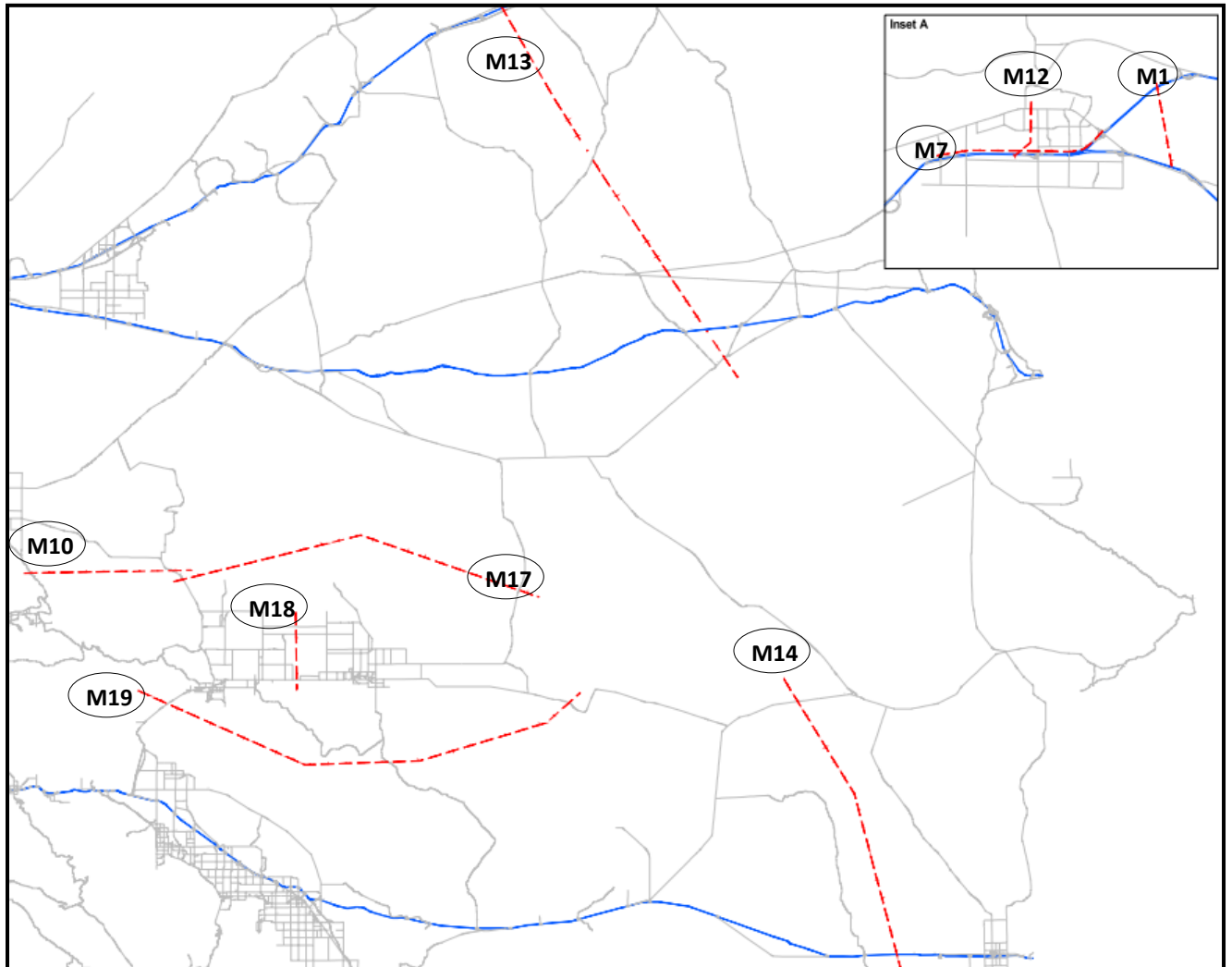
Figure 8.2 Screenlines Location (Detail)



(a) Valley Subregion



(b) Mountain/Desert Subregion I



(c) Mountain/Desert Subregion II

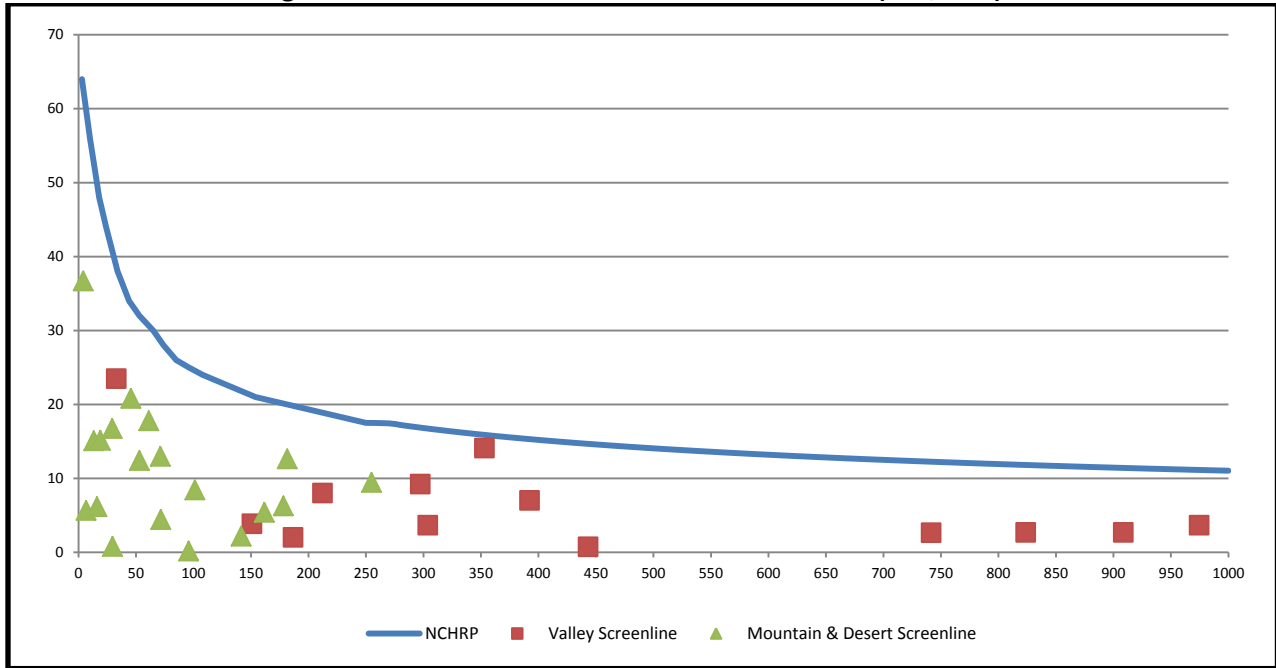


Table 8.3 SBTAM 2008 Model Screenline Validation Results

| ID | Street Name | No. of Locations | Daily Traffic Count | Max Desirable Deviation | 2008 SBTAM ADT | % Diff (Model - Count) |
|---------------------------------------|--|------------------|---------------------|-------------------------|------------------|------------------------|
| VALLEY SUBREGION SCREENLINES | | | | | | |
| 1 | North/South east of Riverside Avenue | 17 | 352,966 | 15.9% | 402,723 | 14.1% |
| 2 | North/South west of Etiwanda Avenue | 12 | 303,769 | 16.8% | 292,596 | -3.7% |
| 3 | North/South east of Citrus Avenue | 17 | 443,102 | 14.7% | 439,813 | -0.7% |
| 4 | East/West north of Arrow Highway | 62 | 974,525 | 11.2% | 938,763 | -3.7% |
| 5 | East/West north of SR-210 at foothills | 3 | 32,900 | 38.6% | 40,627 | 23.5% |
| 6 | North/South west of Yucaipa Blvd | 6 | 186,552 | 19.8% | 182,774 | -2.0% |
| 7 | East/West north of I-10 between I-15 and I-215 | 13 | 297,177 | 17.0% | 324,603 | 9.2% |
| 8 | East/West South of I-215/I-15 Junction | 5 | 212,117 | 18.9% | 229,105 | 8.0% |
| 9 | East/West south of SR-210 between I-15 and I-215 | 11 | 150,779 | 21.2% | 144,962 | -3.9% |
| 10 | North/South east of Euclid Avenue | 42 | 910,127 | 11.4% | 934,611 | 2.7% |
| 11 | East/West south of I-10 | 27 | 840,408 | 11.7% | 817,733 | -2.7% |
| 12 | North/south west of SR-215 | 14 | 389,540 | 15.3% | 362,177 | -7.0% |
| 13 | East/West north of SR-91 | 22 | 741,496 | 12.3% | 761,152 | 2.7% |
| VALLEY SUBREGIONL TOTAL | | | 5,835,457 | | 5,871,640 | 0.6% |
| MOUNTAIN SUBREGION SCREENLINES | | | | | | |
| 1 | North/South - South of I-15/Old Highway 58 | 4 | 71,672 | 28.4% | 74,844 | 4.4% |
| 2 | North/South - West of SR-247/Barstow Road | 2 | 13,400 | 53.0% | 11,380 | -15.1% |
| 3 | East/West - North of Bear Valley Road/East of Yates Road | 5 | 61,200 | 30.7% | 50,324 | -17.8% |
| 4 | North/South - West of I-15 | 8 | 161,624 | 20.7% | 152,886 | -5.4% |
| 5 | East/West - North of Palmdale Road (SR-18)/North of Green Tree | 9 | 178,183 | 20.1% | 167,022 | -6.3% |
| 6 | North/South - East of US-395 | 8 | 52,939 | 32.0% | 59,507 | 12.4% |
| 7 | East/West - North of I-15/East of SR-58 | 5 | 45,669 | 33.6% | 36,165 | -20.8% |
| 8 | East/West - North of Happy Trails Highway (SR-18) | 6 | 19,015 | 47.3% | 16,136 | -15.1% |
| 9 | East/West - North of Cajon Pass | 6 | 181,524 | 20.0% | 204,454 | 12.6% |
| 10 | East/West - South of SR-247 (Big Bear Area) | 2 | 6,735 | 59.4% | 6,354 | -5.7% |
| 11 | East/West - North of SR-18/North of Dale Evans Parkway | 6 | 95,866 | 25.0% | 95,710 | -0.2% |
| 12 | North/South - North of SR-15/West of Bartow Road | 4 | 101,340 | 24.6% | 92,802 | -8.4% |
| 13 | North/South - North of SR-18/North of Dale Evans Parkway | 6 | 71,217 | 28.7% | 61,970 | -13.0% |
| 14 | North/South - South of SR-62/West of US Highway 95 | 3 | 29,300 | 41.0% | 34,205 | 16.7% |
| 15 | North/South - East of I-15 / North of State Highway 173 | 6 | 141,441 | 21.8% | 138,362 | -2.2% |
| 16 | East/West - East of US Highway 395/North of Bear Valley Road | 18 | 254,881 | 17.5% | 230,809 | -9.4% |
| 17 | East/West - South of SR-247/East of SR-18 | 2 | 4,200 | 62.9% | 5,741 | 36.7% |
| 18 | North/South - East of SR-247/North of 29 Palms Highway | 3 | 16,157 | 50.0% | 15,163 | -6.1% |
| 19 | East/West - North of I-10/ South of 29 Palms Highway | 3 | 29,699 | 40.4% | 29,464 | -0.8% |
| MOUNTAIN SUBREGION TOTAL | | | 1,536,062 | | 1,483,300 | -3.4% |
| SAN BERNARDINO COUNTY TOTAL | | | 7,371,519 | | 7,354,940 | -0.2% |

Source: SBTAM

Figure 8.3 SBTAM 2008 Screenline Validation (in 1,000s)



Source: SBTAM

Figure 8.3 depicts the deviation of the model volumes from the daily traffic counts. The blue curve line in **Figure 8.3** represents the maximum allowable deviation for traffic count. The model-estimated volume and count pair for each screenline is below the blue curve line, which means all screenlines are within acceptable local and industry standards as prescribed by NCHRP 255 guidelines.

Table 8.4 summarizes the results of final traffic assignment validation by facility type based on the screenline volume and counts. The comparison shows that model volumes on freeway mix-flow lanes are 6% and 9% higher than daily traffic counts in the Valley Subregion and the Mountain/Desert Subregion, respectively, while the total model volume on HOV facility in the Valley Subregional is 5% lower than daily traffic counts. As shown in **Table 8.4**, the model volumes on the low volume facilities, such as minor arterial and the collectors in both Valley and Mountain/Desert Subregions are generally under-estimated.

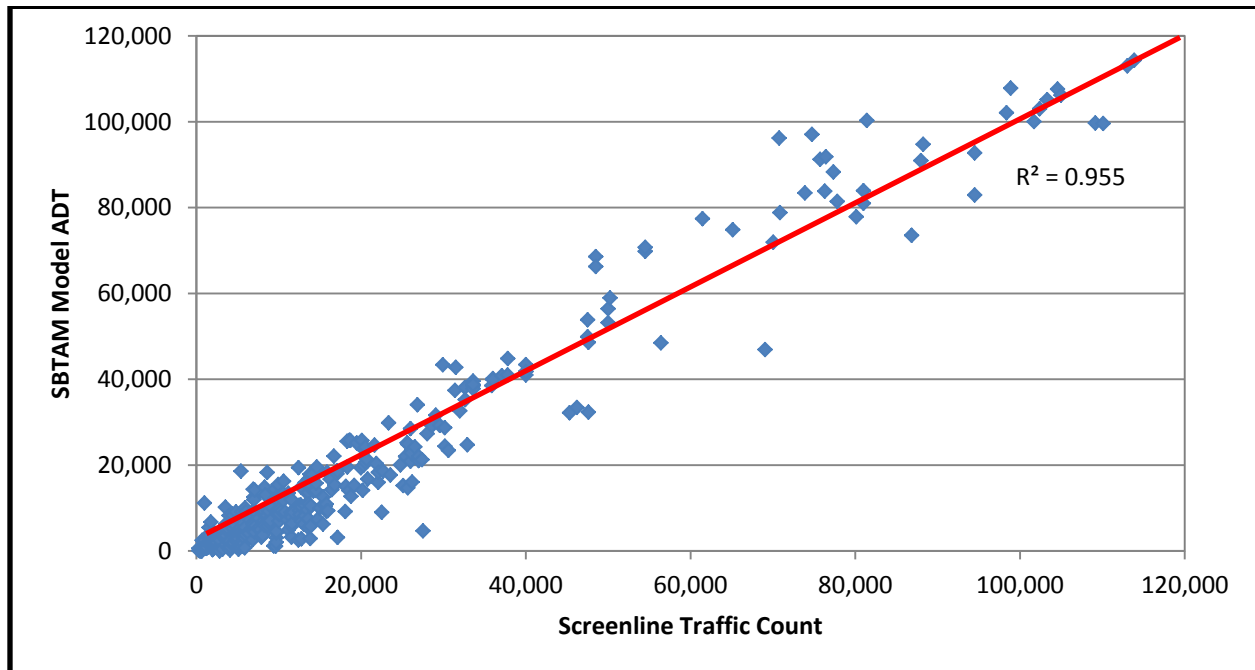
Figure 8.4 presents a scatter plot of screenline directional link volumes between 2008 model volumes and actual traffic counts, and **Table 8.5** presents the percent Root Mean Square Error (PRMSE) between model-estimated volumes and the traffic counts on the screenlines. As shown in **Figure 8.4**, the regression R-square value is 0.955, and the PRMSEs are 27% and 31% in the Valley subregion and the Mountain/Desert Subregion respectively. Overall the model shows good fit with ground counts.

Table 8.4 SBTAM 2008 Screenline Validation Results by Facility Type

| Facility Code | Facility Type | Daily Traffic Counts | 2008 SBTAM ADT | % Diff (Model - Count) |
|---------------------------------------|----------------------------|----------------------|------------------|------------------------|
| VALLEY SUBREGION SCREENLINES | | | | |
| 1 | Freeway | 3,259,039 | 3,464,277 | 6% |
| 2 | HOV | 80,322 | 75,934 | -5% |
| 3 | Divided Expressway/Parkway | 95,200 | 80,931 | -15% |
| 4 | Principal Arterial | 1,063,113 | 1,085,641 | 2% |
| 5 | Minor Arterial | 1,074,326 | 988,046 | -8% |
| 6 | Major Collector | 251,438 | 168,955 | -33% |
| 7 | Minor Collector | 12,019 | 7,856 | -35% |
| VALLEY SUBREGIONL TOTAL | | 5,835,457 | 5,871,640 | 1% |
| MOUNTAIN SUBREGION SCREENLINES | | | | |
| 1 | Freeway | 732,728 | 799,473 | 9% |
| 4 | Principal Arterial | 289,585 | 268,449 | -7% |
| 5 | Minor Arterial | 391,881 | 333,874 | -15% |
| 6 | Major Collector | 112,468 | 67,844 | -40% |
| 7 | Minor Collector | 9,400 | 13,659 | 45% |
| MOUNTAIN SUBREGION TOTAL | | 1,536,062 | 1,483,300 | -3% |

Source: SBTAM

Figure 8.4 SBTAM 2008 Screenline Volume Vs. Counts (in 1,000s)



Source: SBTAM

Table 8.5 SBTAM Screenline PRMSE

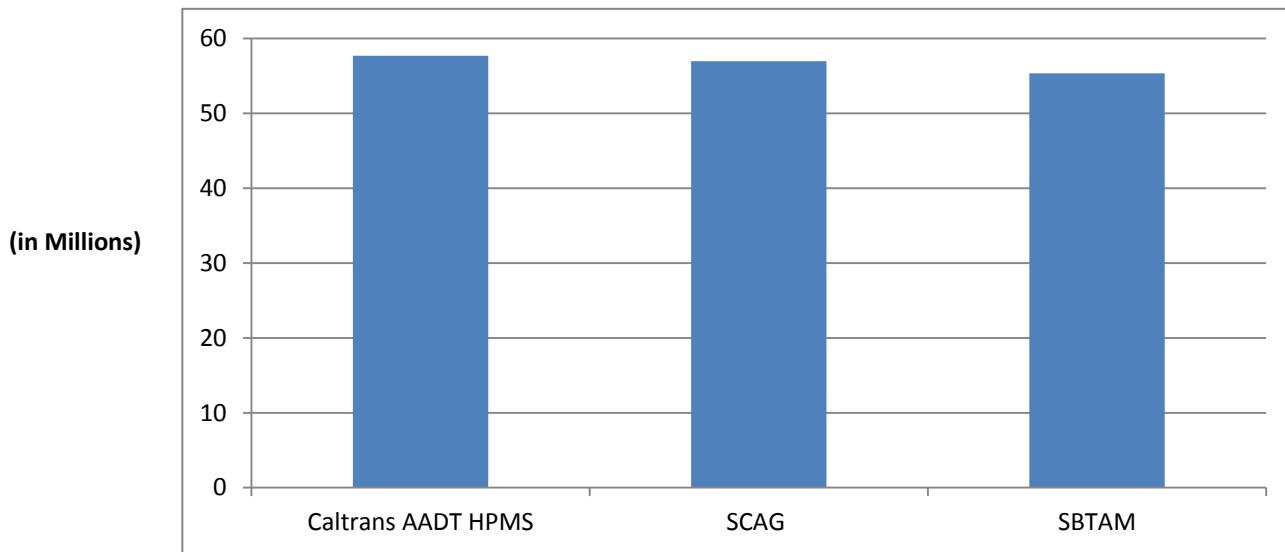
| Subregion | Traffic Counts | SBTAM | PRMSE |
|-----------------|----------------|-----------|-------|
| Valley | 5,835,457 | 5,871,640 | 27% |
| Mountain/Desert | 1,536,062 | 1,483,300 | 31% |

Source: SBTAM

8.5.3 Vehicle Miles Travelled (VMT) Comparison

Figure 8.5 and **Figure 8.6** presents the comparison of VMT from SBTAM against the VMTs reported from the Highway Performance Monitoring System (HPMS) and the SCAG regional model. SBTAM forecasts 55,336,000 VMT on an average weekday in 2008 within San Bernardino County and 417,630,000 VMT region wide. The VMT estimated from the SBTAM within San Bernardino County is 4.1% lower than HPMS and 2.9% lower than the SCAG regional model, while the region wide VMT is 1.6% lower than HPMS and 1.3% lower than the SCAG regional model. The percentage difference between the Caltrans VMT and SBTAM model VMT is within 5%, the maximum allowable threshold defined as reasonable by SANBAG.

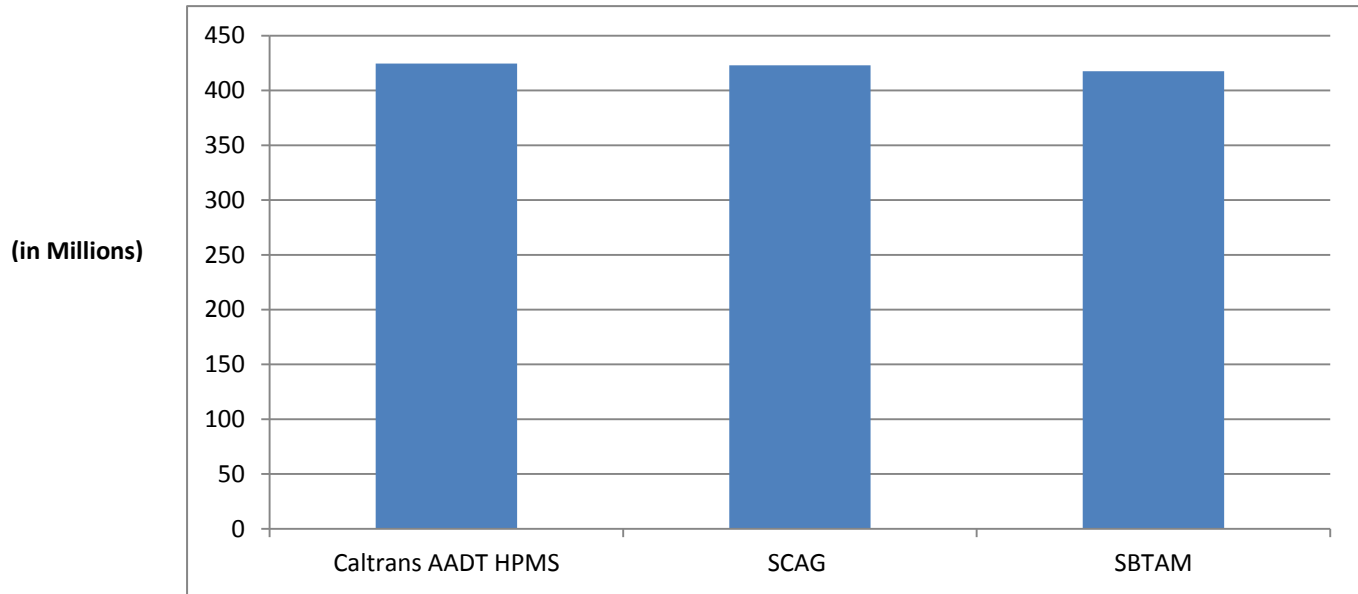
Figure 8.5 SBTAM 2008 San Bernardino County VMT Comparison (in 1,000,000s)



| County | Caltrans AADT HPMS | SCAG Model | SBTAM |
|------------------|--------------------|------------|------------|
| San Bernardino | 57,701,180 | 56,967,227 | 55,336,315 |
| compared to HPMS | | -1.3% | -4.1% |
| compared to SCAG | | | -2.9% |

Source: SBTAM

Figure 8.6 SBTAM 2008 Region wide VMT Comparison (in 1,000,000s)



| County | Caltrans AADT HPMS | SCAG Model | SBTAM |
|------------------|--------------------|-------------|-------------|
| Region-wide | 424,598,100 | 422,942,866 | 417,630,336 |
| compared to HPMS | | -0.4% | -1.6% |
| compared to SCAG | | | -1.3% |

Source: SBTAM

9.0 SBTAM 2035 FORECAST

As part of SBTAM development, a future scenario has been prepared and year 2035 forecasts generated using the validated model. The recently developed SCAG 2035 highway network was created as part of its Version 6 (V6) model and includes all highway and transit projects adopted in the 2012 Regional Transportation Plan (RTP). As such, the V6 highway network was the basis for the development of the SBTAM 2035 highway network. The alternative used to develop the SBTAM future scenario is the SCAG V6 2035 Plan B scenario, released by SCAG in November 2011, which is the basis for the SCAG 2035 summaries presented in this section.

Consistent with development of the 2008 SBTAM scenario, the 2035 SBTAM scenario can be generated from the SCAG 2035 scenario through application of the Sub-Regional Model Development Tool (SMDT). However, due to differences between the SCAG model versions used in the SCAG 2035 scenario (V6) and the version that the SMDT uses (V5), the SCAG V6 2035 scenario required modification to be consistent with the SCAG V5 framework before applying the SMDT to convert the SCAG scenario to the SBTAM scenario. In this section, details of the modification of the V6 model input files are described in detail.

9.1 OVERVIEW

The SCAG V6 model has significant upgrades compared to the SCAG V5 model, the base model that is used to develop SBTAM. The details of the SCAG V6 model update are described in the *SCAG Regional Travel Demand Model and 2008 Model Validation Draft* (SCAG, March 2012) with the major updates as follows:

- Zone Structure
 - SCAG V5 model uses Tier 1 zone structure
 - SCAG V6 model uses mixed zone structures
 - Tier 1 zone structure (4,192 zones): Time-of-day and assignment models
 - Tier 2 zone structure (11,350 zones): Skimming, trip generation, distribution and mode choice
- Toll procedure
 - Toll facility coding and toll scheme enhanced by introducing congestion pricing attributes
- Significant enhancement in each model step
 - Trip Generation, distribution, mode split and assignment

Because the SCAG V6 model applies the Tier 2 zone structure to the skimming, trip generation, distribution and mode choice steps, the input files that employ the Tier 2 structure must be converted back to the Tier 1 structure that is used in the SCAG V5 model. In addition, the input files with Tier 1 structure in SCAG V6 model need to be updated due to the different numbering system used compared

to the numbering system in the SCAG V5 model. **Table 9.1** identifies the files that have been processed to be consistent with the numbering of the Tier 1 structure in the SCAG V5 model.

The parameter files are directly used from the validated version of SBTAM, rather than from the SCAG V6 model, where most of the modeling processes have been modified from the SCAG V5 model. Such parameters include trip rates, friction factor and K-factor files, and the mode split parameter files, etc.

9.2 2035 SOCIOECONOMIC DATA

To develop the SBTAM 2035 socioeconomic data, SANBAG prepared the core socioeconomic variables for each Tier 3 zone within San Bernardino County, including population, households, single family units, multiple family units, retail employment, non-retail employment, and K-12 and college enrollment. The data source and detailed methodology to develop these core variables at the Tier 3 level are consistent with the process prepared for the 2008 scenario.

Table 9.2 summarizes the core 2035 socioeconomic variables and the growth compared to 2008 data. San Bernardino County, followed by Imperial County and Riverside County, experience significant growth in population, household and employment. **Figure 9.1** and **Figure 9.2** illustrate the growth of the key socioeconomic variables in San Bernardino County and region wide.

9.3 2035 NETWORK

The SCAG V6 2035 Plan B highway and transit networks were reviewed prior to application to the SBTAM framework. The following updates have been performed for both highway and transit networks.

- Highway Network Update
 - Delete all Tier 2 centroid connectors (facility type = 200)
 - Change facility type (from freeway to Principal Arterial) and posted speed (from 70 mph to 55 mph) on US-395 between Adelanto (Purple Sage) and I-15
 - Deactivate truck toll lanes between SR-60 and High Desert Corridor
- Transit Network Update
 - Removed the Sierra BRT service and add BRT service along Euclid as rapid bus mode
 - Re-create walk connectors from zones to transit stops
 - Change transit modes

The mode split model in the SCAG V5 model has been replaced completely in the SCAG V6 model. The classification of the transit modes has been changed and the transit modes are re-defined. **Table 9.3** defines the transit mode classification and the correspondence between the SCAG V5 and V6 models. The transit modes 6TB and 7BR in the V6 transit network are modified to be 3EX and 6TW, respectively, to fit into the SCAG V5 model and SBTAM framework.

Table 9.1 Input File Update List

| Folder | Files | Under V6 T1 structure | Under V6 T2 structure |
|-----------------|----------------------------------|-----------------------|-----------------------|
| SED | model_sed.bin | X | |
| Tripgen/Inputs | HH Income to Worker Income.bin | X | |
| Tripdist/Inputs | TAZEQCOUNTY.bin | X | |
| | worker_to_household_income.bin | | X |
| ExHDT/Output | AM_Port_Trips.mtx | X | |
| | MD_Port_Trips.mtx | X | |
| | NT_Port_Trips.mtx | X | |
| | PM_Port_Trips.mtx | X | |
| | FINAL_EI_IE_EE_TRUCKS.mtx | X | |
| ExLM/Output | IX_Prods.bin | X | |
| | XI_Attrs.bin | X | |
| | AMXIX_2.mtx | X | |
| | PMXIX_2.mtx | X | |
| | MDXIX_2.mtx | X | |
| | NTXIX_2.mtx | X | |
| | XXAM.mtx | X | |
| | XXPM.mtx | X | |
| | XXMD.mtx | X | |
| | XXNT.mtx | X | |
| Truck/Input | MODEL35_T1_TRUCK_TODb_101811.bin | X | |
| ODTable/Inputs | am_airtrips.mtx | X | |
| | pm_airtrips.mtx | X | |
| | md_airtrips.mtx | X | |
| | nt_airtrips.mtx | X | |
| | AM_air_truck_trips.mtx | X | |
| | PM_air_truck_trips.mtx | X | |
| | MD_air_truck_trips.mtx | X | |
| | NT_air_truck_trips.mtx | X | |

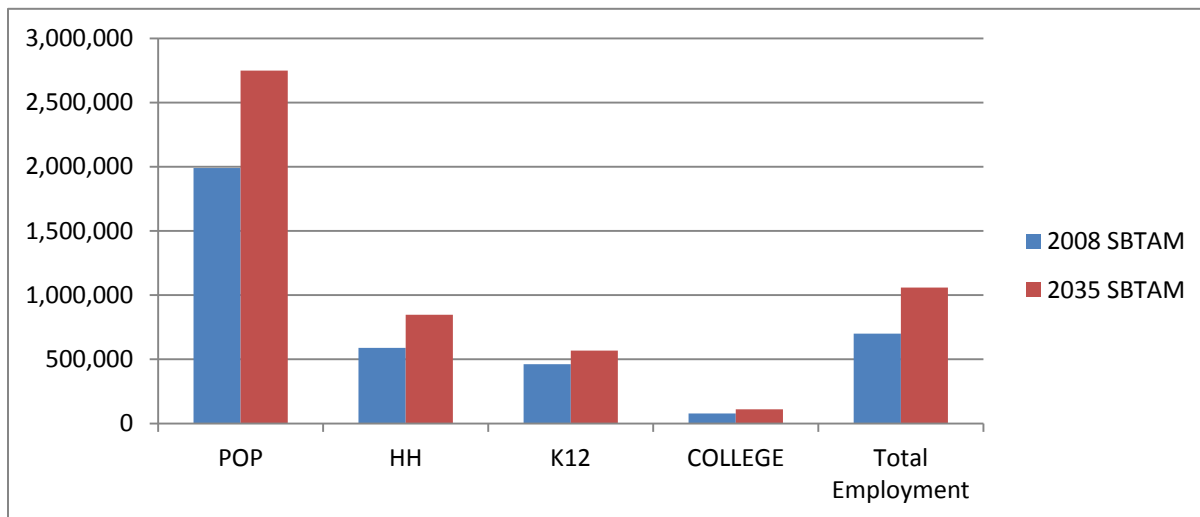


Table 9.2 2035 SBTAM Socioeconomic Growth in San Bernardino County

| County | Population | | | Household | | | | | | Employment | | | Enrollment | |
|---------------------------|-------------------|-------------------|------------------|------------------|------------------|------------------|----------------|------------------|-------------|----------------|------------------|------------------|------------------|---------------------|
| | Residents | Total | Resident Workers | Below 25k | 25k - 50k | 50k-100k | 100k Over | Total | HH Size | Retail | Non-Retail | Total | K-12 | College/ University |
| 2035 | | | | | | | | | | | | | | |
| Imperial | 274,855 | 288,178 | 112,293 | 44,229 | 23,790 | 18,651 | 4,090 | 90,760 | 3.03 | 14,155 | 106,902 | 121,057 | 52,729 | 16,019 |
| Los Angeles | 11,155,439 | 11,345,266 | 4,640,164 | 1,266,409 | 1,075,340 | 1,012,716 | 494,973 | 3,849,438 | 2.90 | 482,320 | 4,339,464 | 4,821,784 | 2,129,396 | 730,379 |
| Orange | 3,369,952 | 3,417,866 | 1,514,713 | 243,557 | 290,130 | 362,404 | 227,412 | 1,123,503 | 3.00 | 177,698 | 1,601,272 | 1,778,970 | 581,689 | 230,735 |
| Riverside | 3,343,718 | 3,380,860 | 1,288,412 | 331,559 | 315,998 | 325,076 | 118,907 | 1,091,540 | 3.06 | 142,280 | 1,094,510 | 1,236,790 | 668,932 | 167,300 |
| San Bernardino | 2,685,255 | 2,749,810 | 1,052,729 | 249,137 | 255,921 | 256,355 | 85,992 | 847,405 | 3.17 | 102,699 | 956,630 | 1,059,329 | 568,079 | 110,756 |
| Ventura | 943,151 | 958,684 | 430,755 | 69,031 | 79,740 | 109,451 | 60,154 | 318,376 | 2.96 | 47,478 | 365,781 | 413,259 | 175,646 | 63,595 |
| Total | 21,772,370 | 22,140,664 | 9,039,066 | 2,203,922 | 2,040,919 | 2,084,653 | 991,528 | 7,321,022 | 2.97 | 966,630 | 8,464,559 | 9,431,189 | 4,176,471 | 1,318,784 |
| 2008 | | | | | | | | | | | | | | |
| Imperial | 149,905 | 161,607 | 65,845 | 22,365 | 12,137 | 9,693 | 2,216 | 46,411 | 3.23 | 8,163 | 53,341 | 61,504 | 37,962 | 11,234 |
| Los Angeles | 9,587,367 | 9,766,948 | 3,987,341 | 1,046,370 | 887,655 | 835,448 | 407,498 | 3,176,969 | 3.02 | 443,961 | 3,892,080 | 4,336,041 | 1,991,198 | 730,381 |
| Orange | 2,934,626 | 2,978,605 | 1,443,716 | 210,272 | 251,818 | 314,801 | 197,092 | 973,984 | 3.01 | 165,781 | 1,458,280 | 1,624,061 | 575,658 | 230,736 |
| Riverside | 2,006,410 | 2,041,726 | 798,560 | 195,224 | 186,981 | 192,429 | 70,555 | 645,188 | 3.11 | 90,731 | 573,259 | 663,990 | 434,335 | 107,644 |
| San Bernardino | 1,956,361 | 1,990,316 | 749,548 | 177,184 | 179,306 | 177,398 | 54,915 | 588,802 | 3.32 | 89,651 | 610,982 | 700,633 | 461,986 | 78,546 |
| Ventura | 783,218 | 797,107 | 366,968 | 55,362 | 64,274 | 88,501 | 49,114 | 257,251 | 3.04 | 40,488 | 307,189 | 347,677 | 164,848 | 52,495 |
| Total | 17,417,887 | 17,736,309 | 7,411,977 | 1,706,777 | 1,582,170 | 1,618,270 | 781,390 | 5,688,605 | 3.06 | 838,775 | 6,895,131 | 7,733,906 | 3,665,987 | 1,211,036 |
| % Growth from 2008 | | | | | | | | | | | | | | |
| Imperial | 83% | 78% | 71% | 98% | 96% | 92% | 85% | 96% | -6% | 73% | 100% | 97% | 39% | 43% |
| Los Angeles | 16% | 16% | 16% | 21% | 21% | 21% | 21% | 21% | -4% | 9% | 11% | 11% | 7% | 0% |
| Orange | 15% | 15% | 5% | 16% | 15% | 15% | 15% | 15% | 0% | 7% | 10% | 10% | 1% | 0% |
| Riverside | 67% | 66% | 61% | 70% | 69% | 69% | 69% | 69% | -2% | 57% | 91% | 86% | 54% | 55% |
| San Bernardino | 37% | 38% | 40% | 41% | 43% | 45% | 57% | 44% | -5% | 15% | 57% | 51% | 23% | 41% |
| Ventura | 20% | 20% | 17% | 25% | 24% | 24% | 22% | 24% | -3% | 17% | 19% | 19% | 7% | 21% |
| Total | 25% | 25% | 22% | 29% | 29% | 29% | 27% | 29% | -3% | 15% | 23% | 22% | 14% | 9% |

Source: SBTAM 2035

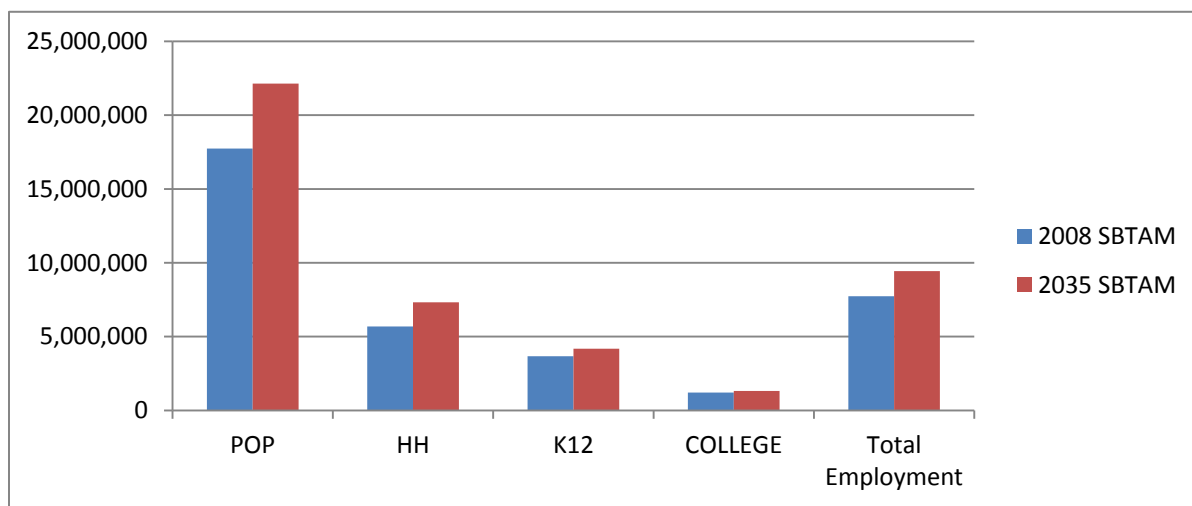
Figure 9.1 San Bernardino County Key Socioeconomic Data Growth



| SED | Population | Household | K12 | College | Employment |
|-------------------|------------|-----------|-------|---------|------------|
| SB County Growth% | 38.2% | 43.9% | 23.0% | 41.0% | 51.2% |

Source: SBTAM 2035

Figure 9.2 Region Wide Key Socioeconomic Data Growth



| SED | Population | Household | K12 | College | Employment |
|----------------------|------------|-----------|-------|---------|------------|
| Region wide Growth % | 24.8% | 28.7% | 13.9% | 8.9% | 21.9% |

Source: SBTAM 2035

Table 9.3 SCAG Model Transit Modes Classification and Correspondence

| SCAG V5 Model | | | SCAG V6 Model | | |
|---------------|------|-------------------|---------------|------|-------------------|
| Mode | Mode | Notes | Mode | Mode | Notes |
| 1CR | 10 | | 1CR | 10 | |
| 2LR | 13 | | 2LR | 13 | |
| 3EX | 14 | | 3EX | 14 | |
| 4RB | 22 | | 4RB | 22 | |
| 5LB | 11 | | 5LB | 11 | |
| 6TW | 30 | Metro Orange Line | 6TB | 30 | |
| | | | 7BR | 31 | Metro Orange Line |
| | | | HSR | 21 | |

Source: SCAG Version 5 and Version 6 Models

In addition to the network updates, a major update has applied to the toll facilities in the 2035 highway network. In the SCAG V6 model, the toll procedures including the toll coding convention in the highway network have been changed substantially. To fit into the SCAG V5 and SBTAM framework, the toll coding in the V6 2035 highway network was modified accordingly. Once all the inputs were revised to be consistent with SCAG V5 model framework, the 2035 scenario was converted to SBTAM through application of the SMDT, while carrying over the model parameters from the validated SBTAM.

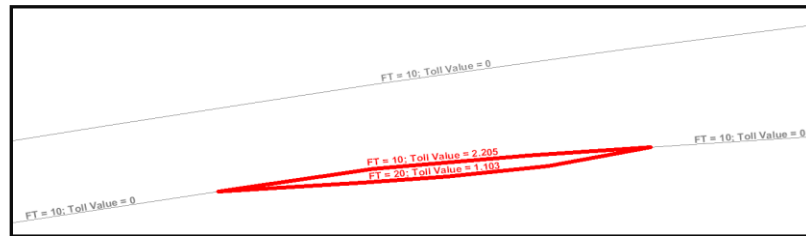
As noted, the toll procedure in the SCAG V6 model has been substantially changed from V5 and more sophisticated toll scheme options are implemented which resulted in inconsistencies in SBTAM. Both per-mile and fixed toll schemes have been applied to V6, while only the fixed toll scheme applied to the V5 model. The new V6 toll features were desirable to incorporate into SBTAM to provide the flexibility and improve the functionality for toll forecasting. As a result, a methodology was developed and implemented to incorporate the new toll schemes into SBTAM through the revised coding convention for toll facilities in the highway network.

Due to the revised coding conventions in V6 for toll facilities, it was not possible to incorporate the toll coding and toll attributes directly from the SCAG V6 model into SBTAM without affecting the model stream and validated results. **Figure 9.3** presents the toll facility coding convention in the SCAG V5 and V6 models. Each toll link in the SCAG V6 highway network is associated with tolls by time period and direction based on the latest SCAG congestion pricing study, unlike in SCAG v5 networks where only the highway links representing the toll entrance/booth have tolls and the toll links are duplicated with each link representing a vehicle class (such as drive alone and shared ride). **Figure 9.4** illustrates the distribution of the toll facility in 2008 and 2035. As indicated in **Figure 9.4**, the toll system has been widely implemented and becomes a major travel mode in the Southern California region in 2035.

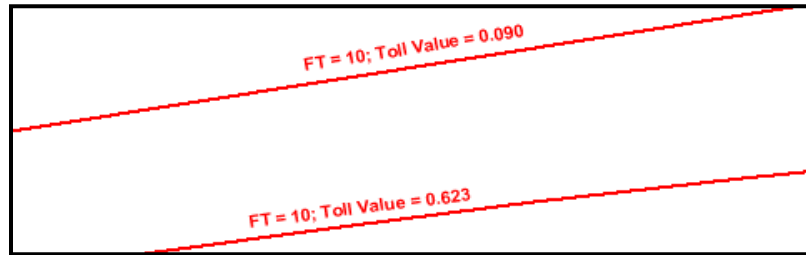
Another major difference in toll in the SCAG 2035 scenario is that the 2035 V6 highway network has differentiated the High-Occupancy Toll (HOT) facility from the regular toll facility by an indicator “Toll_flag” (i.e., 1: regular toll links; 2: HOT lane). **Table 9.4** lists key toll-related variables in both SCAG

model versions. In the SCAG V6 model, after the tolls are calculated based upon different toll schemes and stored in the toll fields (e.g., AB_TollV_AM, AB_TollV_MD) by time period and direction, the tolls are further adjusted to reflect the cost effects in the cost fields (e.g., AB_AM_DA_LINKCOST, AB_AM_SR2_LINKCOST) differentiated by vehicle class, e.g., drive alone (DA), shared ride 2 (SR2), shared ride 3+ (SR3+) as documented in **Table 9.4**. These cost fields are applied when assigning the trips to the highway network. Compared to the SCAG V6 model, the toll fields exist in the SCAG V5 model while the cost fields do not exist.

Figure 9.3 Comparison of Toll Coding Convention



(a) SCAG V5 Model and SBTAM

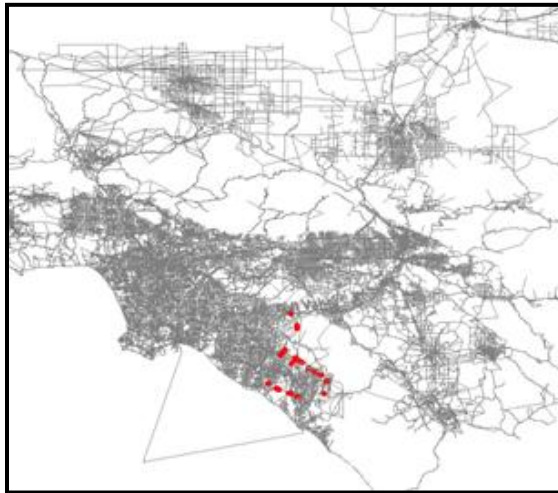


(b) SCAG V6 Model

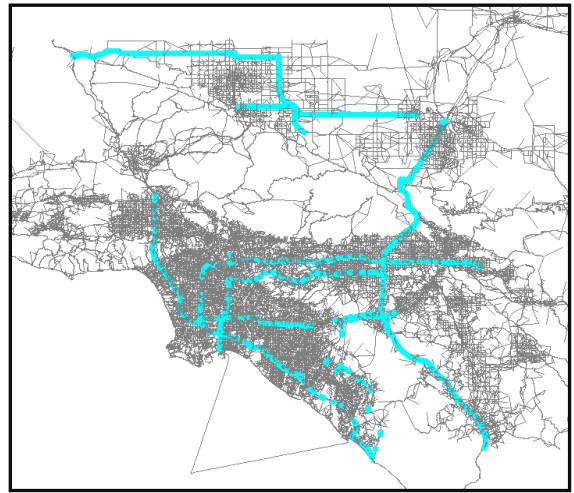
To address the inconsistency in toll procedures between the SCAG V5 and V6 models, a methodology was developed to approximate the V6 toll procedure by modifying the toll coding and recalculating toll values in the V6 2035 highway network. As shown in the **Table 9.4**, the tolls are calculated to reflect the cost effects by vehicle class which is absent from SCAG V5 model. The toll links in the V6 highway network were re-coded to have one toll link for each vehicle class with corresponding toll values to reflect cost.

No additional fields in the highway link layer can be recognized by SBTAM except the existing toll fields representing the tolls charged by using the link. The existing toll fields are set up in such a way that they are only differentiated by time period and direction but not by vehicle occupancy. Therefore, to implement the new tolls calculated for each of the vehicle classes, the current highway network was revised by duplication of toll links, each representing one vehicle class.

Figure 9.4 Facilities with Valid Tolls in SBTAM 2008 and SCAG 2035 Highway Networks



(a) SBTAM 2008



(b) SCAG V6 2035

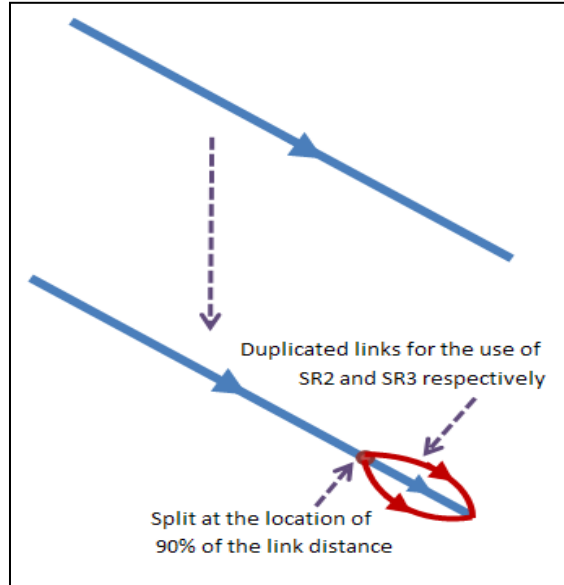
To avoid duplication of capacity on toll facilities, the process to duplicate the toll links is designed as depicted in **Figure 9.5**. A toll link is first split into two links with the split node located at approximately 90% of the link length. Therefore, the long portion of the link has 90% of the original link length, while the short portion has only 10% of the original link length. The short portion of the link is then duplicated for SR2 and SR3+, respectively.

Since the duplication only occurs on the short portion of toll links, both DA and SR traffic volumes still need to traverse the long portion of the links, therefore the congestion level can be correctly evaluated based on the long portion of toll links. Even though the tolls or the cost effects of tolls are for the use of the entire length of toll links, they will only be applied to the short portion of the toll link and its duplicated links, while the tolls on the long portion of the links are reset to 0 to avoid double counting. This coding method is similar to the coding in SBTAM 2008 highway network except it occurs at each toll link rather than just at the toll entrances as in the 2008 network.

Table 9.4 Comparison of Key Toll Variables between SCAG V5 and V6 Models

| SCAG V5 Model | SCAG V6 Model | | |
|---------------|---------------------|---------------------|--------------------|
| TOLL_FLAG | TOLL_FLAG | | |
| AB TOLLV AM | AB TOLLV AM | | |
| AB TOLLV PM | AB TOLLV PM | | |
| AB TOLLV MD | AB TOLLV MD | | |
| AB TOLLV EVE | AB TOLLV EVE | | |
| AB TOLLV NT | AB TOLLV NT | | |
| BA TOLLV AM | BA TOLLV AM | | |
| BA TOLLV PM | BA TOLLV PM | | |
| BA TOLLV MD | BA TOLLV MD | | |
| BA TOLLV EVE | BA TOLLV EVE | | |
| BA TOLLV NT | BA TOLLV NT | | |
| N/A | AB_AM_DA_LINKCOST | AB_AM_SR3_LINKCOST | AB_AM_MT_LINKCOST |
| | BA_AM_DA_LINKCOST | BA_AM_SR3_LINKCOST | BA_AM_MT_LINKCOST |
| | AB_PM_DA_LINKCOST | AB_PM_SR3_LINKCOST | AB_PM_MT_LINKCOST |
| | BA_PM_DA_LINKCOST | BA_PM_SR3_LINKCOST | BA_PM_MT_LINKCOST |
| | AB_MD_DA_LINKCOST | AB_MD_SR3_LINKCOST | AB_MD_MT_LINKCOST |
| | BA_MD_DA_LINKCOST | BA_MD_SR3_LINKCOST | BA_MD_MT_LINKCOST |
| | AB_EVE_DA_LINKCOST | AB_EVE_SR3_LINKCOST | AB_EVE_MT_LINKCOST |
| | BA_EVE_DA_LINKCOST | BA_EVE_SR3_LINKCOST | BA_EVE_MT_LINKCOST |
| | AB_NT_DA_LINKCOST | AB_NT_SR3_LINKCOST | AB_NT_MT_LINKCOST |
| | BA_NT_DA_LINKCOST | BA_NT_SR3_LINKCOST | BA_NT_MT_LINKCOST |
| | AB_AM_SR2_LINKCOST | AB_AM_LT_LINKCOST | AB_AM_HT_LINKCOST |
| | BA_AM_SR2_LINKCOST | BA_AM_LT_LINKCOST | BA_AM_HT_LINKCOST |
| | AB_PM_SR2_LINKCOST | AB_PM_LT_LINKCOST | AB_PM_HT_LINKCOST |
| | BA_PM_SR2_LINKCOST | BA_PM_LT_LINKCOST | BA_PM_HT_LINKCOST |
| | AB_MD_SR2_LINKCOST | AB_MD_LT_LINKCOST | AB_MD_HT_LINKCOST |
| | BA_MD_SR2_LINKCOST | BA_MD_LT_LINKCOST | BA_MD_HT_LINKCOST |
| | AB_EVE_SR2_LINKCOST | AB_EVE_LT_LINKCOST | AB_EVE_HT_LINKCOST |
| | BA_EVE_SR2_LINKCOST | BA_EVE_LT_LINKCOST | BA_EVE_HT_LINKCOST |
| | AB_NT_SR2_LINKCOST | AB_NT_LT_LINKCOST | AB_NT_HT_LINKCOST |
| | BA_NT_SR2_LINKCOST | BA_NT_LT_LINKCOST | BA_NT_HT_LINKCOST |

Figure 9.5 Illustration of Toll Link Split and Duplication



In the SCAG V6 model, the tolls are based on different toll schemes and the cost effects of the tolls are calculated and used in the highway assignment. The tolls based on different toll schemes can be directly copied from the SCAG V6 model into the SCAG V5 highway network. The cost effects of tolls can be incorporated by further updating the toll fields, based on the following formula:

1. For TOLL_FLAG = 1, tolls are assessed an additional VOT factor of 0.65 for DA, 0.85 for SR2, and no change for SR3+:
 - For DA: new toll = original toll/0.65
 - For SR2: new toll = original toll/0.85
 - For SR3+: new toll = original toll
2. For TOLL_FLAG = 2, links are assessed an additional 50 cent per mile penalty and then multiplied by the length of the link for DA in addition to a VOT factor (0.65) while for SR the tolls do not change:
 - For DA: new toll = Original toll / 0.65 + 0.5*Length*24.27/60
 where 24.27 is the “distance cost factor” from SCAG v6 model to convert time into cost, essentially the value of time (\$/hr)
 - For both SR2 and SR3+: new toll = original toll

Table 9.5 defines the setup of key variables for the original and duplicated toll links by facility type for both regular toll facilities and HOT facilities. As shown in **Table 9.5**, regular toll facilities include freeways and ramps, HOV facilities, Expressways/Parkways, Principal Arterials and truck lanes while HOT facilities include freeways, HOV facilities and ramps. As HOV-only facilities cannot be used by DA vehicles, no

duplication is required for the DA class but is required for the SR3+ class. For truck-only facilities, no duplication is required as the toll costs are not differentiated by vehicle class.

For toll facilities other than HOV or Truck-only lanes, the corresponding HOV facility types are applied, e.g., for freeway, the corresponding HOV lane is coded with facility type 20 and 21 for SR2 and SR3+, respectively; while for ramps, the corresponding HOV facility type codes are 22 and 21. For those duplicated links, the speed, capacity and VDF parameters will be based on the corresponding HOV facility types. However, for toll links with no corresponding HOV facility types defined, i.e., facility types 31, 32 and 40 (mostly on the High Desert Corridor), new HOV facility types are defined. In the SCAG model, facility types between 20 and 29 are reserved for HOV only, whereas facility types 26, 27 and 28 are not specifically defined. To ensure that the duplicated links will maintain the same speed, capacity and VDF parameter as the original links, new facility types 26, 27 and 28 have been defined and the corresponding entries of these facility types to the speed, capacity and VDF look-up tables added. These new entries are consistent with the records for the corresponding original facility types. In regards to links duplicated for SR3+ only, facility type 21 is required since the model recognizes facility type 21 as SR3+ only.

Table 9.5 Comparison of Key Toll Variables between SCAG Model V5 and V6

| Toll Flag | Original Link | | Duplicate Links | |
|-------------------|-----------------------------|--------------------------------------|--------------------------------------|-------------------|
| | Facility Type | Toll Value | Facility Type | Toll Value |
| 1: Regular Toll | 10 Freeway | TOLL/0.65 | 20 21 | TOLL/0.85 TOLL |
| | 20 HOV-only | TOLL/0.85 | 21 | TOLL |
| | 31,32 Expressway/Parkway | TOLL/0.65 | 26,27 21 | TOLL/0.85 TOLL |
| | 40 Principal Arterial | TOLL/0.65 | 28 21 | TOLL/0.85 TOLL |
| | 80,81,82 Ramp | TOLL/0.65 | 22 21 | TOLL/0.85 TOLL |
| | 89,90 Truck-only | TOLL/0.65 | No duplication | |
| | 2: HOT | 10 Freeway | TOLL / 0.65 + 0.5*Length*24.27/60 | 20 21 |
| 20,22 HOV-only | | TOLL | 21 | TOLL |
| 80,81,82 Ramp | | TOLL / 0.65 + 0.5*Length*24.27/60 | 22 21 | TOLL TOLL |

The methodology has been automated and implemented to modify the toll coding in the highway network. The detailed steps for the toll facility update and implementation are described as follows:

Step 1: Copy the values in the toll fields (e.g., [AB TollV AM], [BA TollV AM], [AB TollV MD], etc.) from the SCAG Plan B working highway network to the SBTAM input highway network (in v6).

Step 2: Re-calculate the tolls for different vehicle occupancies for each toll link as follows:

- a. If Toll_flag=1, then $AB_TOLLV_AM_DA = AB_TOLLV_AM / 0.65$
 $AB_TOLLV_PM_DA = AB_TOLLV_PM / 0.65$
 (for all the time periods and both direction)
 $AB_TOLLV_AM_HOV = AB_TOLLV_AM / 0.85$
 $AB_TOLLV_PM_HOV = AB_TOLLV_PM / 0.85$
 (for all the time periods and both direction)

- b. If Toll_flag=2, then $AB_TOLLV_AM_DA = AB_TOLLV_AM / 0.65 + 0.5 * Length * 24.27 / 60$
 $AB_TOLLV_PM_DA = AB_TOLLV_PM / 0.65 + 0.5 * Length * 24.27 / 60$
 (for all the time periods and both direction)
 $AB_TOLLV_AM_HOV = AB_TOLLV_AM$
 $AB_TOLLV_PM_HOV = AB_TOLLV_PM$
 (for all the time periods and both direction)

Step 3: Toll link split excluding truck-only facilities

- a. Choose all toll links except truck-only facilities
- b. Find the coordinate on each toll link at the location with 90% of the link distance and split the toll link at this coordinate

Step 4: Duplicate the short portion of the toll links for SR2 and SR3+, respectively, or just for SR3+ for HOV only links. A couple of indicators can be used to identify the toll link after split and duplication.

- NewSplit=1 & Dup_toll=0: the long portion of a toll link excluding HOV and truck-only links
- NewSplit=1 & Dup_toll=1: the long portion of a toll link for HOV links only
- NewSplit=2 & Dup_toll=0: the short portion of a toll link that will be duplicated
- NewSplit=2 & Dup_toll=1: the duplicated link of the short portion for SR2, or
the short portion of a toll link for HOV only that will be duplicated
- NewSplit=2 & Dup_toll=2: the duplicated link of the short portion for SR3+

Step 5: Reset the toll values and facility types of the split toll links and the duplicated links.

- a. The tolls of the long portion of toll links are reset to be 0.
- b. The tolls of the short portion of toll links equal the new tolls calculated for DA only:

For duplicated links, the facility type and toll values will be set up for SR2 and SR3+ respectively, as shown in **Table 9.5**. The methodology described above resolves the lack of the flexibility in SBTAM to model toll facilities by vehicle class and toll facility type. The resulting highway network facilitates future subregional toll-related studies, such as the study of network impact and induced travel demand by incorporating new toll facilities or the impact of implementation of different toll schemes.

It should be noted that the implementation of this methodology cannot fully replicate the toll capability in the SCAG V6 model. In addition, as the tolls apply to all toll facilities in 2035 rather than only a few selected locations (such as toll booths) as in the SBTAM 2008 scenario, the accumulated tolls along the path, as a result, may over-estimate the impact of tolls on the overall cost of a toll path, potentially resulting in an under-estimation of the volume on toll facilities. Further adjustment of toll-related parameters or coefficients may be required when forecasting toll volume for the future scenario, as discussed in the following section.

9.4 2035 FORECAST

The SCAG V5 2035 scenario was generated after updating the required SCAG V6 model inputs to be consistent with the SCAG V5 model framework. The SCAG V5 2035 scenario was further converted through application of the SMDT to create the SBTAM 2035 base scenario. The resulting SBTAM 2035 scenario, with the most recent 2035 updates including all the highway and transit projects adopted in the 2012 RTP, has been run and the results are summarized and discussed in this section.

9.4.1 County to County Trip Growth

With the population, household and employment growth in San Bernardino County, the overall trips from or to the county increase accordingly. As documented in **Table 9.6**, the trips produced in or attracted to San Bernardino County increase by 39% and 36%, respectively. The trips made within San Bernardino County increase by approximately 1.86 million. Among all the counties in the modeling region, trips to Riverside County have the highest growth rate (83%) while the trips from Imperial County have the highest growth rate (88%).

9.4.2 Person Trip Growth by Travel Mode

The growth of person trips by travel mode is summarized in **Table 9.7** for the San Bernardino County subareas. The growth rates for production trips are slightly higher than the growth rates for attraction trips for the Valley and Mountain/Desert subareas for motorized travel modes. The Mountain/Desert subarea has a higher growth rate than the Valley subarea.

Table 9.6 SBTAM County-to-County Growth – 2035 vs. 2008

| From | To | Growth | Growth Rate | |
|----------------|----------------|------------------|------------------|------------|
| San Bernardino | Imperial | 73 | 2% | |
| | Los Angeles | 204,849 | 36% | |
| | Orange | 103,761 | 55% | |
| | Riverside | 316,832 | 83% | |
| | San Bernardino | 1,861,974 | 35% | |
| | Ventura | 5,769 | 49% | |
| | TOTAL | 2,493,258 | 39% | |
| From | To | Growth | Growth Rate | |
| | San Bernardino | Imperial | 1,548 | 88% |
| | | Los Angeles | 131,007 | 29% |
| | | Orange | 33,728 | 31% |
| | | Riverside | 253,924 | 53% |
| | | San Bernardino | 1,861,974 | 35% |
| | | Ventura | 3,808 | 30% |
| | | TOTAL | 2,285,989 | 36% |

Source: SBTAM 2035

Table 9.7 SBTAM Person Trip Growth by Travel Mode – 2035 vs. 2008

| Time Period | Mode | Production Growth % | | Attraction Growth % | |
|-------------|-----------------------|---------------------|-----------------|---------------------|-----------------|
| | | Valley | Mountain/Desert | Valley | Mountain/Desert |
| Peak | DA | 40% | 56% | 40% | 54% |
| | SR2 | 30% | 45% | 29% | 43% |
| | SR3 | 34% | 50% | 30% | 43% |
| | Non-Motorized | 34% | 59% | 47% | 62% |
| | Transit | 19% | 25% | 19% | 30% |
| | TOTAL PEAK | 34% | 51% | 33% | 47% |
| Off-Peak | DA | 39% | 52% | 38% | 50% |
| | SR2 | 34% | 46% | 30% | 43% |
| | SR3 | 37% | 50% | 30% | 41% |
| | Non-Motorized | 36% | 64% | 51% | 67% |
| | Transit | 23% | 24% | 24% | 30% |
| | TOTAL OFF-PEAK | 36% | 50% | 33% | 46% |
| Daily | DA | 39% | 54% | 39% | 52% |
| | SR2 | 32% | 46% | 30% | 43% |
| | SR3 | 36% | 50% | 30% | 42% |
| | Non-Motorized | 35% | 61% | 49% | 64% |
| | Transit | 20% | 25% | 20% | 30% |
| | TOTAL DAILY | 35% | 50% | 33% | 47% |

Source: SBTAM 2035

9.4.3 Corridor Volume Growth

The growth in volume is calculated for the corridors identified by the screenlines used in the 2008 validation. **Table 9.7** and **Table 9.8** summarize the corridor volume growth for the Valley and Mountain/Desert subareas. The growth in traffic volumes ranges from 25% to 107% in the Valley and 8% to 84% in the Mountain/Desert. Overall, the volume increases by 43% across all Valley screenlines and by 51% across all Mountain/Desert screenlines.

Table 9.7 SBTAM Daily Corridor Volume Growth in the Valley Subarea – 2035 vs. 2008

| Screenline ID | Screenline Street Name | 2008 | 2035 | Percent Growth |
|-----------------------------|--|------------------|------------------|----------------|
| 1 | North/South east of Riverside Avenue | 402,723 | 569,276 | 41% |
| 2 | North/South west of Etiwanda Avenue | 292,596 | 393,118 | 34% |
| 3 | North/South east of Citrus Avenue | 439,813 | 608,742 | 38% |
| 4 | East/West north of Arrow Highway | 938,763 | 1,309,273 | 39% |
| 5 | East/West north of SR-210 at Foothills | 40,627 | 83,951 | 107% |
| 6 | North/South west of Yucaipa Blvd | 182,774 | 268,842 | 47% |
| 7 | East/West north of I-10 between I-15 and I-215 | 324,603 | 429,268 | 32% |
| 8 | East/West South of I-215/I-15 Junction | 229,105 | 360,541 | 57% |
| 9 | East/West south of SR-210 between I-15 and I-215 | 144,962 | 181,800 | 25% |
| 10 | (SCAG SCREENLINE 6): North/South east of Euclid Avenue | 934,611 | 1,298,147 | 39% |
| 11 | (SCAG SCREENLINE 7): East/West south of I-10 | 817,733 | 1,168,966 | 43% |
| 12 | (SCAG SCREENLINE 9): North/South west of SR-215 | 362,177 | 527,991 | 46% |
| 13 | (SCAG SCREENLINE 30): East/West north of SR-91 | 761,152 | 1,182,027 | 55% |
| VALLEY SUBAREA TOTAL | | 5,871,640 | 8,381,942 | 43% |

Source: SBTAM 2035

The corridor link forecast volumes have been summarized by facility type in **Table 9.9**. It should be noted that the facility types that the volumes are categorized by represent the facility types defined in the 2008 highway network for consistency purposes as the facility types of some links have been changed in the 2035 highway network due to proposed highway improvement projects between 2008 and 2035. The volumes increase for most of the facility types with the exception HOV facilities since many of these links become Express Lanes in the 2035 network (i.e. I-10 Express Lanes). As previously indicated, the toll coding in the SCAG V6 model may over-estimate the impact of tolls on the overall cost of a toll path under the current toll procedure in SBTAM, therefore the potential exists for under-estimation of the volume on toll facilities. Total volume in San Bernardino County increases in comparison to the SCAG model forecast volumes. This is an expected result due to the disaggregation of San Bernardino County traffic analysis zones and the refined detail throughout the county.

Table 9.8 Corridor Screenline Volume Growth in the Mountain/Desert Subarea – 2035 vs. 2008

| Screenline ID | Screenline Street Name | 2008 | 2035 | Percent Growth |
|-------------------------------|--|------------------|------------------|----------------|
| 1 | North/South - South of I-15/Old Highway 58 | 74,844 | 111,634 | 49% |
| 2 | North/South - West of SR-247/Barstow Road | 11,380 | 17,885 | 57% |
| 3 | East/West - North of Bear Valley Road/East of Yates Road | 50,324 | 56,625 | 13% |
| 4 | North/South - West of I-15 | 152,886 | 217,383 | 42% |
| 5 | East/West - North of Palmdale Road (SR-18)/North of Green Tree Boulevard | 167,022 | 263,784 | 58% |
| 6 | North/South - East of US-395 | 59,507 | 109,373 | 84% |
| 7 | East/West - North of I-15/East of SR-58 | 36,165 | 43,809 | 21% |
| 8 | East/West - North of Happy Trails Highway (SR-18) | 16,136 | 28,497 | 77% |
| 9 | (SCAG Screenline 13): East/West - North of Cajon Pass | 204,454 | 338,181 | 65% |
| 10 | (SCAG Screenline 13): East/West - South of SR-247 (Big Bear Area) | 6,354 | 6,853 | 8% |
| 11 | (SCAG Screenline 20): East/West - North of SR-18/North of Dale Evans Parkway | 95,710 | 161,142 | 68% |
| 12 | North/South - North of SR-15/West of Bartow Road | 92,802 | 135,896 | 46% |
| 13 | (SCAG Screenline 31): North/South - North of SR-18/North of Dale Evans Parkway | 61,970 | 95,270 | 54% |
| 14 | (SCAG Screenline 32): North/South - South of SR-62/West of US Highway 95 | 34,205 | 59,709 | 75% |
| 15 | (SCAG Screenline 34): North/South - East of I-15 / North of State Highway 173 | 138,362 | 216,571 | 57% |
| 16 | East/West - East of US Highway 395/North of Bear Valley Road | 230,809 | 312,897 | 36% |
| 17 | (Part of SCAG Screenline 13): East/West - South of SR-247/East of SR-18 | 5,741 | 7,706 | 34% |
| 18 | North/South - East of SR-247/North of 29 Palms Highway | 15,163 | 17,005 | 12% |
| 19 | East/West - North of I-10/ South of 29 Palms Highway | 29,464 | 39,261 | 33% |
| MOUNTAIN SUBAREA TOTAL | | 1,483,300 | 2,239,479 | 51% |

Source: SBTAM 2035

Based on the understanding of the toll procedure in SBTAM, the cost effect of tolls can be effectively affected by changing the value of the variable 'CToll' which effectively converts time to cost. 'CToll' is the coefficient variable directly inherited from the SCAG TRANPLAN model and the value has been maintained at 3.0. Lowering the 'CToll' value reduces the toll impact on the overall cost and thus increases forecast volume on toll links.

SBTAM 2035 runs were performed to examine the sensitivity of toll forecast volumes on different 'CToll' values. **Table 9.9** includes the results of two sensitivity tests for 'CToll' equal to 0.3 and 0.1 which are more in line with the traditional application of the 'CToll' variable in travel demand models. The 2035 run with 'CToll' assumed at 0.3 reveals a minor influence on forecast volumes by facility type compared to the 2035 run without changing the 'CToll' value. The adjustment of the 'CToll' value from 3.0 to 0.3 does not reveal a significant degree of sensitivity while the adjustment from 0.3 to 0.1 reveals a significant shift in behavior due to the small adjustment to the 'CToll' value. Once the 'CToll' value

exceeds a certain value, the sensitivity to toll cost is lost which is what the original test supported. The larger shift in forecast volumes with the slight change from 0.3 to 0.1 is reasonable as typical 'CToll' values fall within this range.

From the above observations, the toll volumes shift from being potentially underestimated due to insensitivity to a high 'CToll' value to being potentially overestimated with lower 'CToll' values. Based on the results from the sensitivity runs, the recommended range of 'CToll' values for SBTAM application should range from 0.1 to 0.3 to generate reasonable toll volumes on toll facilities throughout San Bernardino County.

Figure 9.6 and **Figure 9.7** present the growth in forecast traffic volumes from 2008 to 2035 in the Valley and Mountain/Desert subareas. As expected, the forecast volume grows throughout the county with the freeways experiencing the greatest level of growth in volume. A small set of local highway facilities do experience negative growth in SBTAM due in large part to changing paths as a result of shifting travel demands, highway system improvements and congestion levels experienced in 2008 and 2035. Consistent with volume increases, VMT grows by 29% throughout San Bernardino County and 21% region wide from 2008 to 2035.

9.5 2035 FORECAST SUMMARY

Due to the different SCAG model versions used to develop SBTAM, SCAG V5 model for 2008 and the SCAG V5 and V6 models for 2035, various model input files required updates to be consistent with the SCAG V5 model framework from which SBTAM was developed. The most significant update was incorporation of toll coding refinements to take advantage of the sophisticated and flexible toll scheme implemented in the SCAG V6 model. A methodology was designed and implemented to incorporate the new toll schemes into SBTAM through the revised coding convention of toll facilities in the highway network to provide the flexibility and functionality for future toll studies.

Although the different toll schemes have been implemented through the network coding, sensitivity tests revealed that additional adjustments to toll parameters may be required to obtain reasonable toll forecast volumes. Sensitivity tests revealed that adjustment of the 'CToll' value from 3.0 to a range between 0.1 and 0.3 would potential result in more reasonable toll forecast volumes.

The SBTAM 2035 results reveal reasonable growth in travel from 2008 to 2035. San Bernardino County trips increase by approximately 35%. Mountain/Desert Subarea trips grow at a higher rate than Valley Subarea trips. The resulting corridor volume growth aligns with the auto trip increases in the Valley and Mountain/Desert Subareas. San Bernardino County 2035 VMT increases by 29%, consistent with trip growth rates.

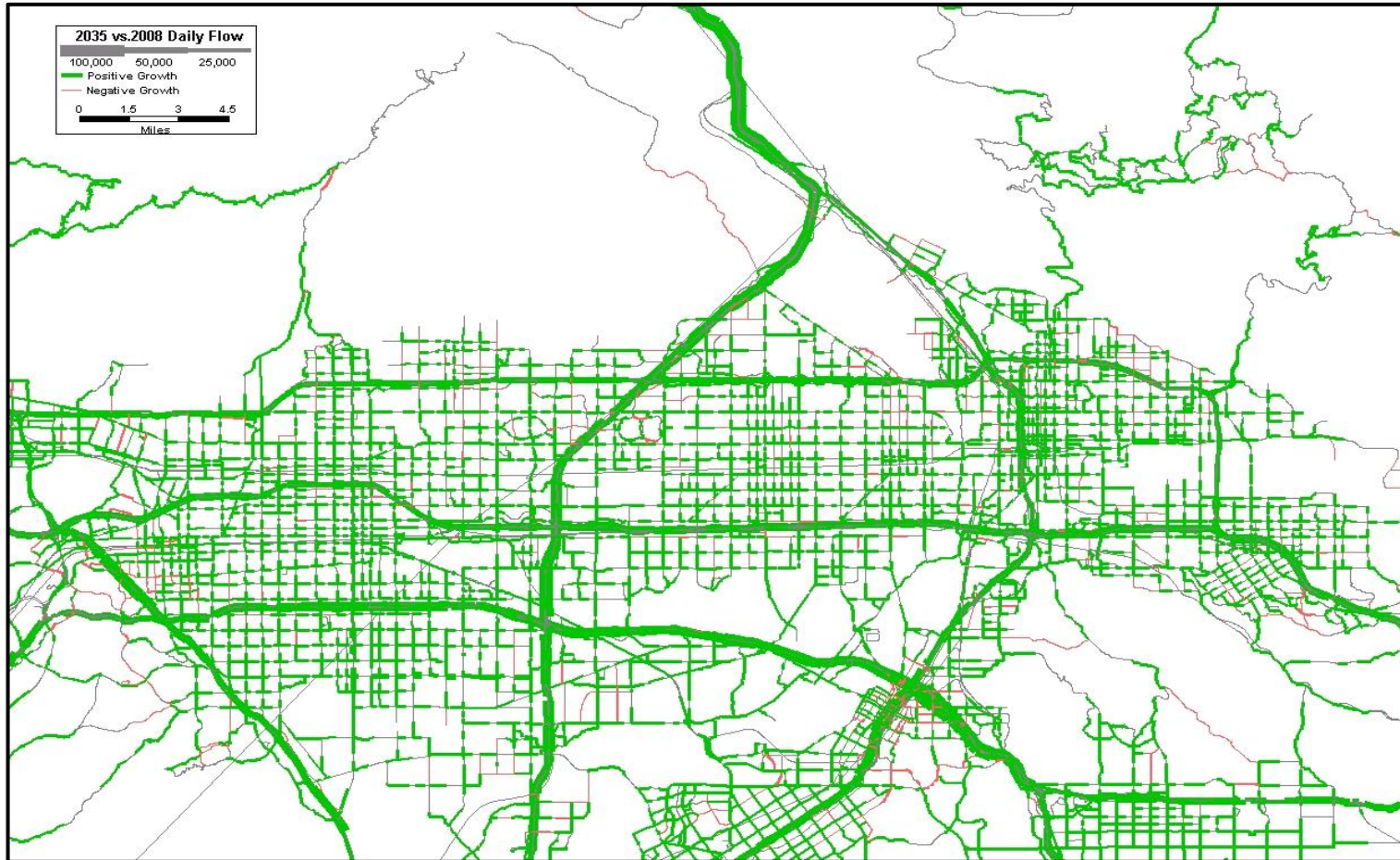


Table 9.9 SBTAM Corridor Volume Growth by Facility Type – 2035 Vs. 2008

| 2008 Facility Type | 2008 SBTAM ADT | 2035 SCAG V6 Plan B Model ADT | 2035 SBTAM (CToll = 3.0) | | | 2035 SBTAM - Adjusted CToll Run #1 (CToll=0.3) | | | | 2035 SBTAM - Adjusted CToll Run #2 (CToll=0.1) | | | |
|--------------------------------------|------------------|-------------------------------|--------------------------|------------|-----------------------|--|------------|-----------------------|------------------------------------|--|------------|-----------------------|------------------------------------|
| | | | ADT | % Growth | % Diff (SBTAM - SCAG) | ADT | % Growth | % Diff (SBTAM - SCAG) | % Diff (Adjusted CToll - Original) | ADT | % Growth | % Diff (SBTAM - SCAG) | % Diff (Adjusted CToll - Original) |
| Valley Subarea | | | | | | | | | | | | | |
| Freeway | 3,464,277 | 3,593,000 | 4,725,745 | 36% | 32% | 4,729,155 | 37% | 32% | 0% | 4,048,888 | 17% | 13% | -14% |
| HOV | 75,934 | 237,842 | 149,000 | 96% | -37% | 170,652 | 125% | -28% | 15% | 265,189 | 249% | 11% | 78% |
| Expressway/Parkway | 80,931 | 148,209 | 166,171 | 105% | 12% | 176,893 | 119% | 19% | 6% | 171,648 | 112% | 16% | 3% |
| Principal Arterial | 1,085,641 | 1,420,057 | 1,531,263 | 41% | 8% | 1,491,554 | 37% | 5% | -3% | 1,545,733 | 42% | 9% | 1% |
| Minor Arterial | 988,046 | 1,521,118 | 1,509,002 | 53% | -1% | 1,452,832 | 47% | -4% | -4% | 1,526,460 | 54% | 0% | 1% |
| Major Collector | 168,955 | 241,114 | 290,047 | 72% | 20% | 276,871 | 64% | 15% | -5% | 284,355 | 68% | 18% | -2% |
| Minor Collector | 7,856 | 1,360 | 10,713 | 36% | 688% | 10,544 | 34% | 675% | -2% | 11,036 | 40% | 711% | 3% |
| Valley Subarea Total | 5,871,640 | 7,162,700 | 8,381,942 | 43% | 17% | 8,308,501 | 42% | 16% | -1% | 7,853,310 | 34% | 10% | -6% |
| Mountain/Desert Subarea | | | | | | | | | | | | | |
| Freeway | 799,473 | 983,489 | 1,250,091 | 56% | 27% | 1,217,706 | 52% | 24% | -3% | 1,107,207 | 38% | 13% | -11% |
| HOV | 0 | 29,255 | 25,571 | NA | -13% | 28,911 | NA | -1% | 13% | 36,194 | NA | 24% | 42% |
| Principal Arterial | 268,449 | 279,059 | 349,637 | 30% | 25% | 340,532 | 27% | 22% | -3% | 342,095 | 27% | 23% | -2% |
| Minor Arterial | 333,874 | 442,713 | 504,153 | 51% | 14% | 500,203 | 50% | 13% | -1% | 506,241 | 52% | 14% | 0% |
| Major Collector | 67,844 | 105,643 | 90,395 | 33% | -14% | 89,693 | 32% | -15% | -1% | 93,371 | 38% | -12% | 3% |
| Minor Collector | 13,659 | 7,879 | 19,545 | 43% | 148% | 19,413 | 42% | 146% | -1% | 19,347 | 42% | 146% | -1% |
| Mountain/Desert Subarea Total | 1,483,300 | 1,848,038 | 2,239,391 | 51% | 21% | 2,196,457 | 48% | 19% | -2% | 2,104,455 | 42% | 14% | -6% |

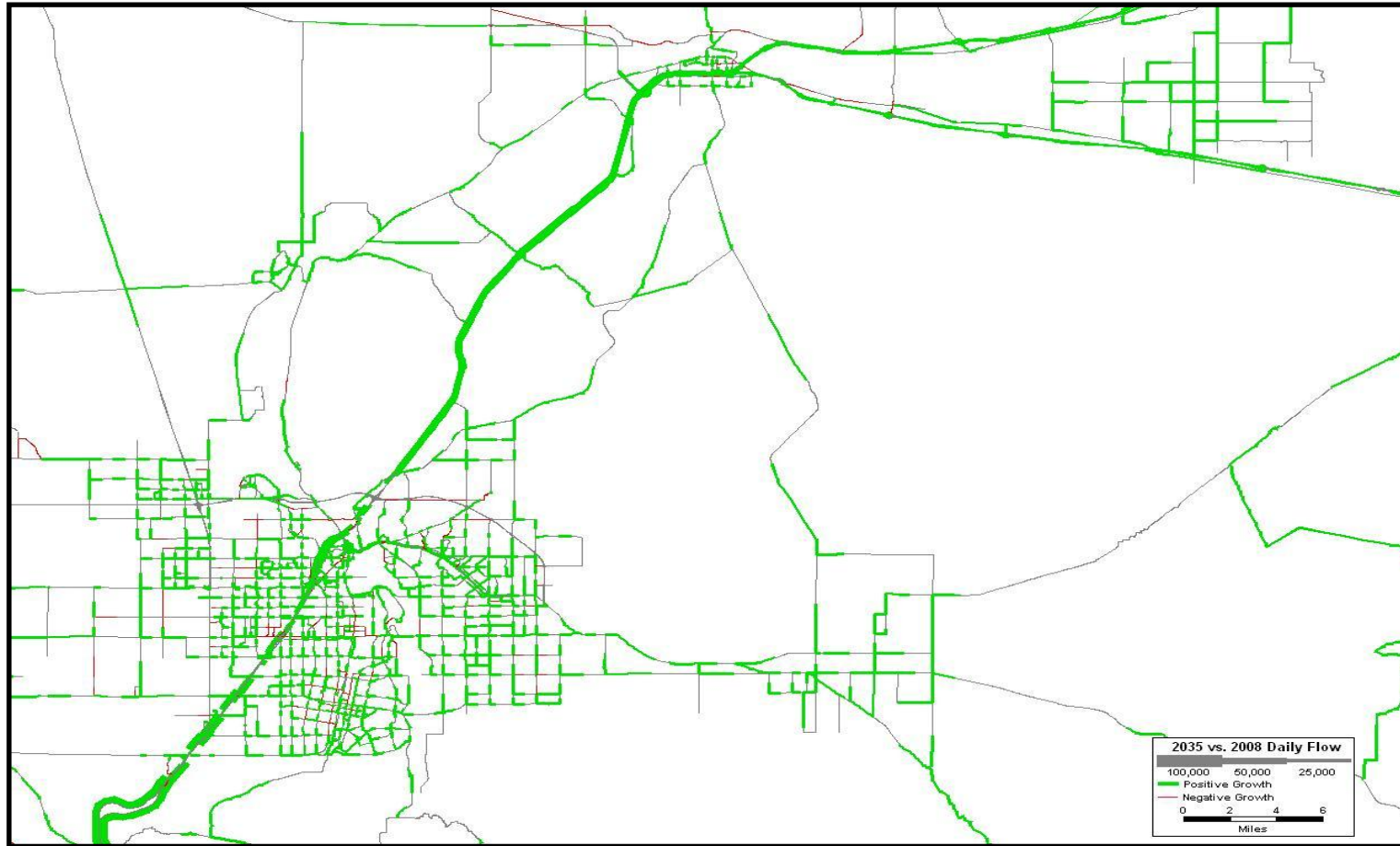
Source: SBTAM 2035

Figure 9.6 SBTAM Valley Subarea Daily Volume Growth – 2035 vs. 2008



Source: SBTAM 2035

Figure 9.7 SBTAM Mountain/Desert Subarea Daily Volume Growth – 2035 vs. 2008

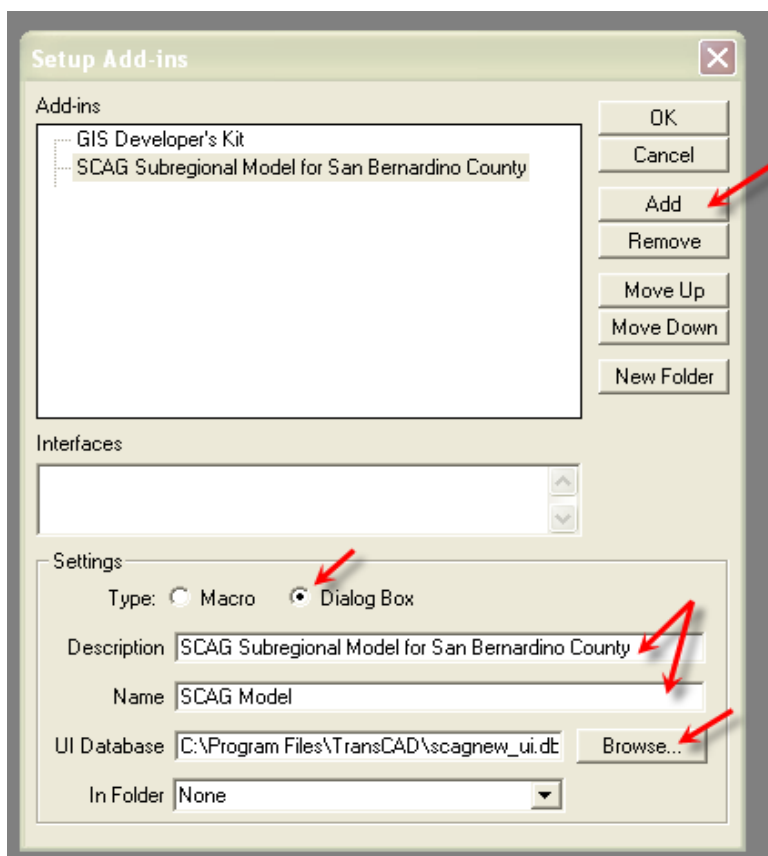


Source: SBTAM 2035

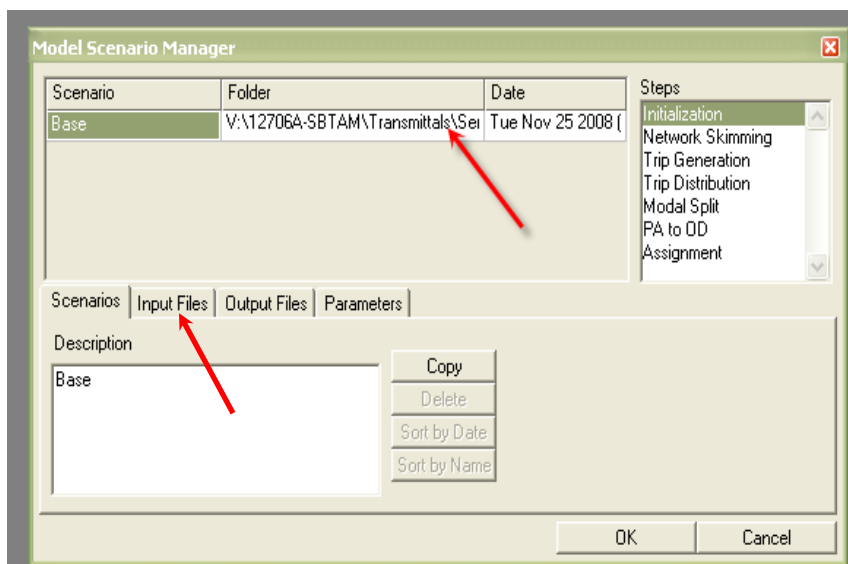
10.0 USER'S GUIDE

TransCAD 5.0 is required to install and run SBTAM. SBTAM has been successfully run on TransCAD 5.0 using build number 2005. Earlier builds may be used but consistent results are not assured. Once TransCAD is installed, the SBTAM Graphic User Interface (GUI) must be installed. The detailed steps required to install the SBTAM GUI are as follows:

- Step 1: Copy images in "bmp" folder and paste to Program Files\TransCAD\bmp
- Step 2: Copy scagnew.ui files in "UI" folder and paste to Program Files\TransCAD
- Step 3: Copy scagnew.vdf in "VDF" folder and paste to Program Files\TransCAD
- Step 4: Open TransCAD → Tools → Setup Add-ins, then click "Add" button, and a new Add-in will be added in the Add-ins dialog box. Provide Description (flexible for user definition) and Name (must be specific and read 'SCAG Model') for the new Add-in, and then click "Browse" to choose "scagnew.ui.dbd" that was pasted to the TransCAD folder in Step 2, and then click "OK" to finish the setup. (Make sure to choose "Dialog Box" under Settings)



- Step 5: Open TransCAD → Tools, and click “SCAG Subregional Model for San Bernardino County” (or whatever you defined under Description in Step 4) from the drop-down list. The SBTAM GUI will be displayed.
- Step 6: Click “Model Table” on SBTAM GUI, and then select “scag_mod_2008.bin” from the SBTAM_Y08 model folder.
- Step 7: Click Setup, the Model Scenario Manager dialog box shows → Click Folder to select the folder for the scenario (Note that it should be the folder where scag_mod_2008.bin is stored)
- Step 8: Follow SCAG Subregional Planning Model in TransCAD 5.0 for model run instructions. Before running a scenario, click Input Files and ensure the existence of all the input files for each step.



Turning movement and select link/zone analysis are functions widely used in various traffic studies and model application projects. SBTAM incorporates these functions in its highway assignment procedure. The setup for the turning movement and select link/zone analysis in SBTAM are explained in detail below. Once the setup is completed, the corresponding functions will be activated in SBTAM. Both turning movement and select link/zone analysis are enabled only in the following cases:


- When running SBTAM in Stage mode
- During the last feedback iteration if running the model in Feedback mode

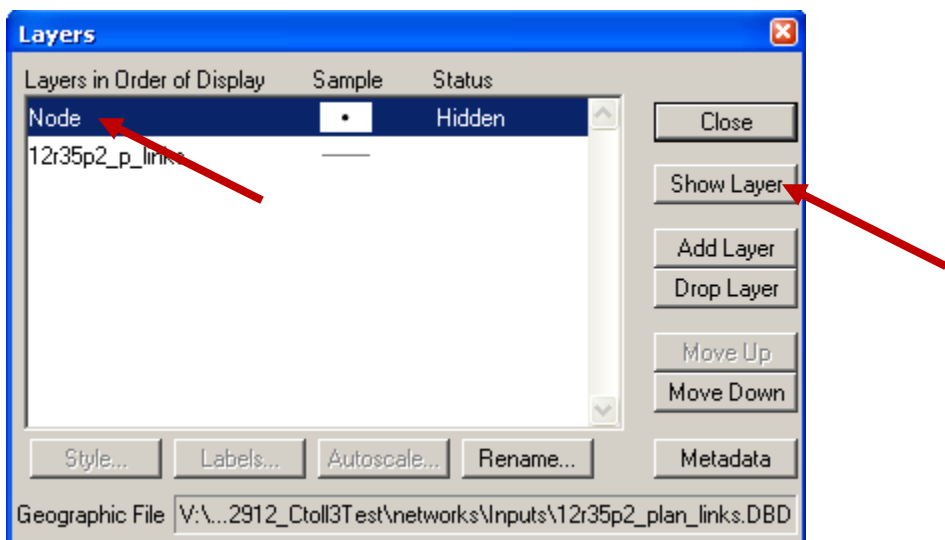
It should be noted that the target locations for the turning movement and select link/zone analysis using SBTAM are expected to be within San Bernardino County.

TURNING MOVEMENT VOLUME DEVELOPMENT

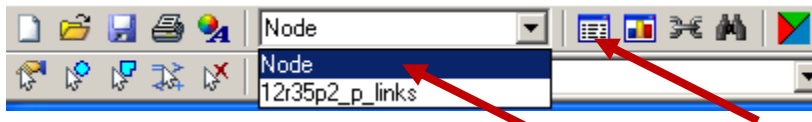
In SBTAM the turning movement volume function is activated when there is any node with the corresponding node field TURN_MOVEMENT_FLAG = 1 in the highway network. If the model has not been run, this node field can be added or edited in the input highway network under \networks\Inputs\, otherwise this node field should be directly added or edited in the working highway network under \network\Outputs\. The detailed steps to add or edit the node field TURN_MOVEMENT_FLAG are as follows:

Step 1: Open the highway network.

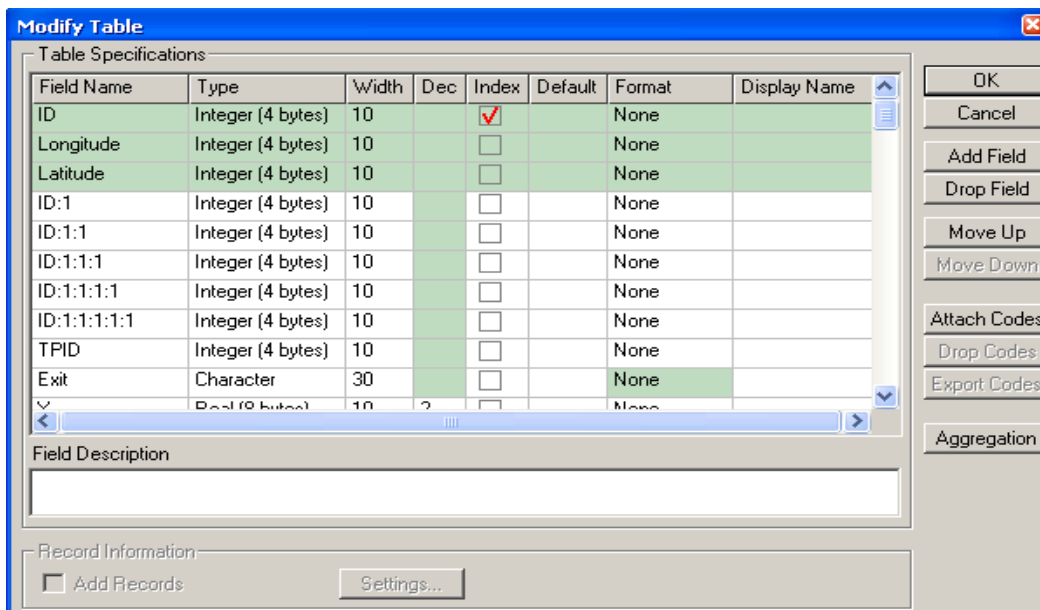
Step 2: Click the icon , and then choose the Node layer and click Show Layer, all the nodes are shown in the highway network.



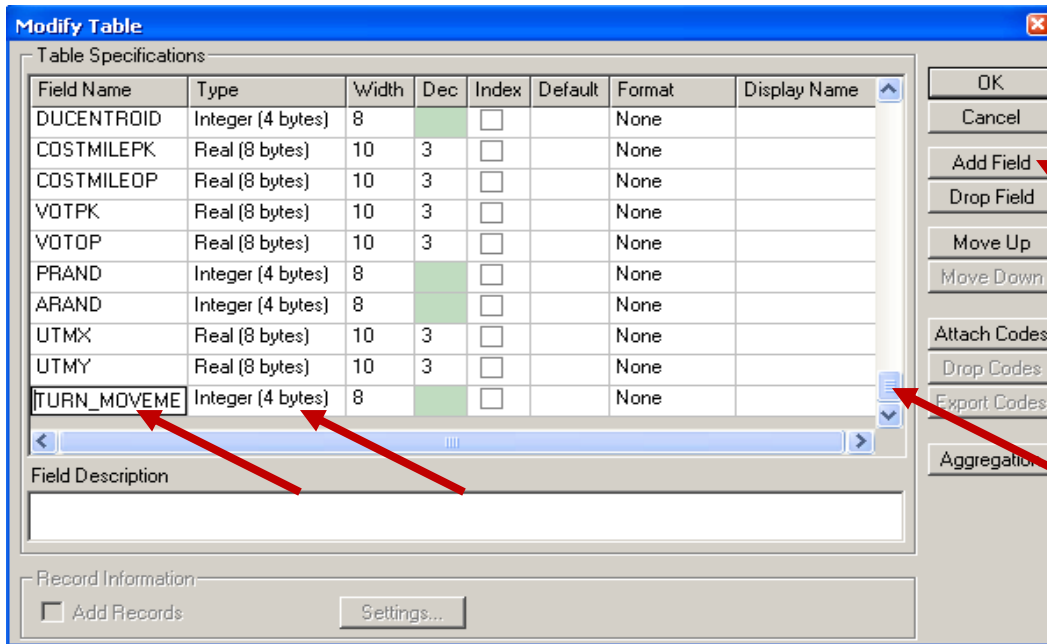
Step 3: Choose Node as the current layer, and then click the icon to open the database of the Node layer.



Step 4: In the Node database, if there is no field "TURN_MOVEMENT_FLAG", this field needs to be added, otherwise directly go to Step 6. To add this field, click Dataview -> Modify Table, the dialog box is opened as shown below.



Step 5: Scroll down to the very bottom and click Add Field and a new line is shown. Type in TURN_MOVEMENT_FLAG and ensure the field type is Integer, and then click OK.



Step 6: Select the node (or intersection) in the Node layer whose turning movement information is required, and set the value to be 1 in the corresponding field TURN_MOVEMENT_FLAG. Do the same for all the required nodes or intersections, and then close the highway network.

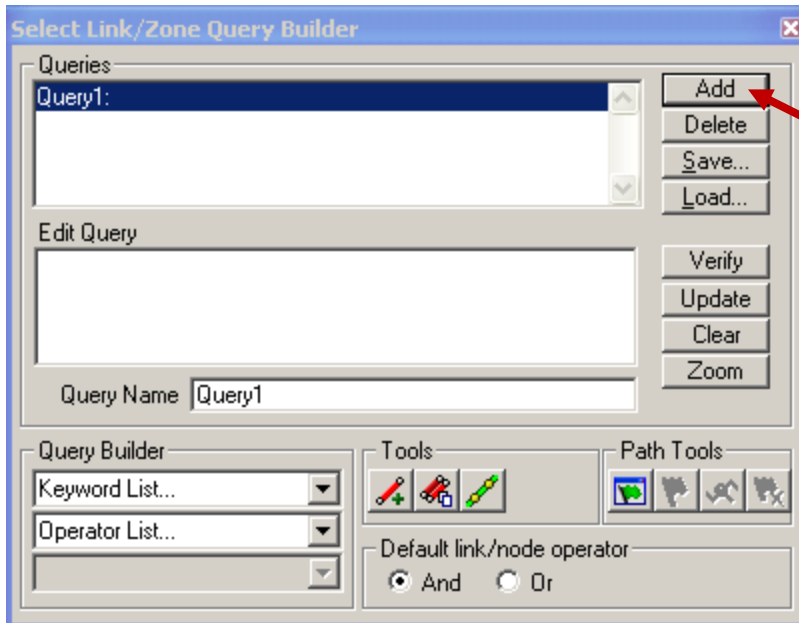
SELECT LINK/ZONE ANALYSIS

In SBTAM, the select link/zone analysis is activated when a file named "SelectLink.qry" exists under the folder \Assign\Inputs\. The query file can include more than one query and can be developed through the query builder in TransCAD. The detailed steps to build a query file are as follows:

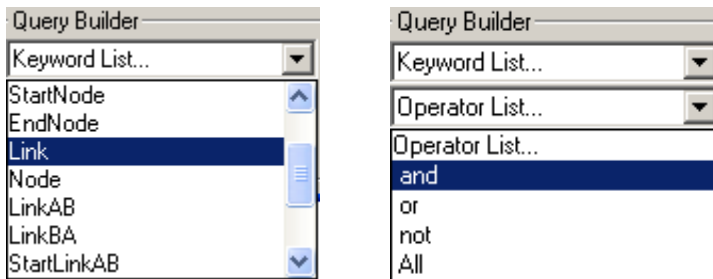
Step 1: Open the highway network.

Step 2: Click TransCAD menu item Planning -> Assignment Utilities -> Select Link/Zone Query Builder, to display the Select Link/Zone Queries toolbox.

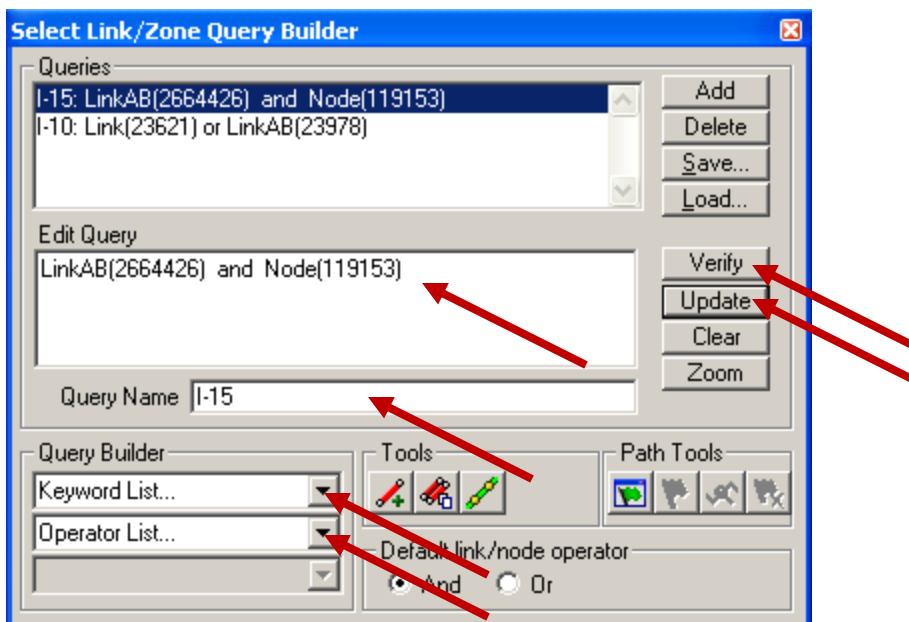
Step 3: In the toolbox, click Add, and it is ready to input a query under the Edit Query.



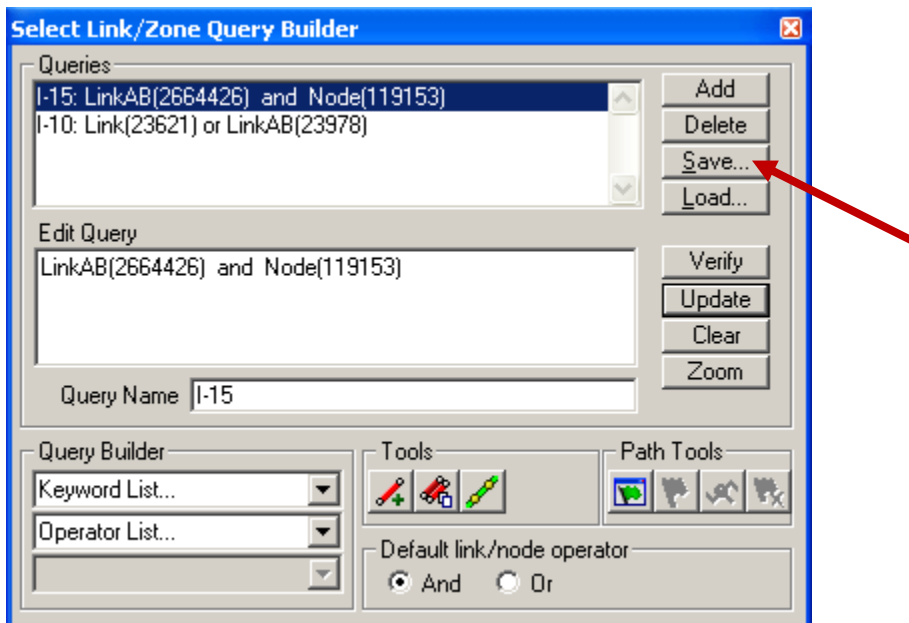
Step 4: Choose from the Keyword List and Operator List under Query Builder to find the appropriate keyword and operators to build the query. The detailed explanation for each keyword and operator can be found in the TransCAD help file.

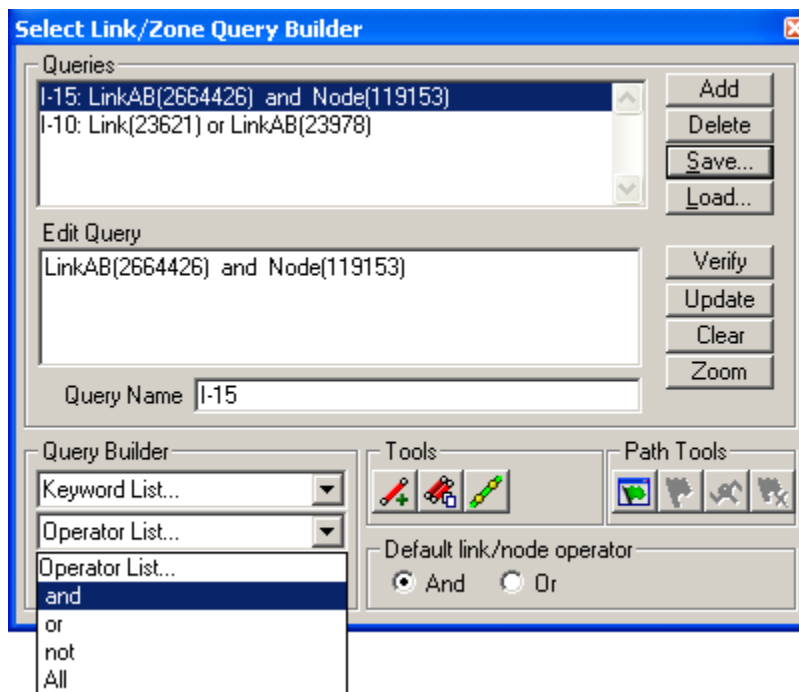
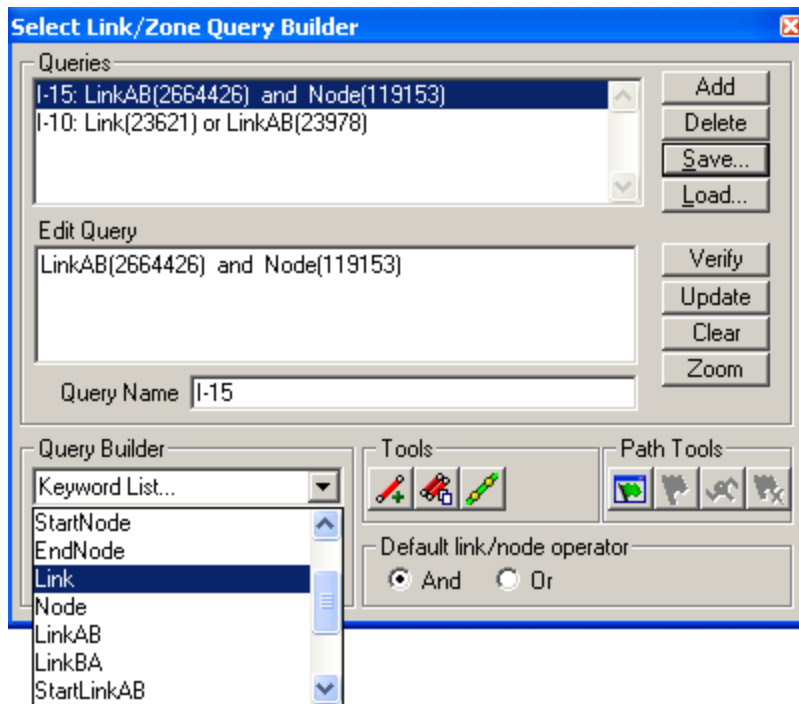


The query name can be updated next to the Query Name. Once a query is created, click Verify to confirm that the query is logically correct. If verified, click Update and the query will be added under Queries. Additional queries can be created sequentially following the same procedure.



Step 5: Once all the queries are created in the Query Builder, click Save, and name the query file as SelectLink.qry under \Assign\Inputs\.







The report, *Users' Guide for the SCAG Subregional Planning Model in TransCAD 5.0* (Caliper Corporation, June 2010) provides detailed instruction on how to use SBTAM, including the model installation, preparation of the data for scenarios and how to set up model runs. The electronic copies can be either obtained by contacting SANBAG at (909) 884-8276 or Southern California Association of Governments at (213) 236-1800. Model runs are organized using the directory structure and required files can be checked through the SBTAM GUI dialogue box.

APPENDIX A SBTAM ZONE STRUCTURE AND NUMERING SYSTEM

SCAG Regional Model prescribed a generic TAZ numbering system in order to overcome the challenges of sequential ordering of TAZs in the subregional models. The new zone numbering system consists of a total of eight digits. Generically the numbering system follows guidelines prescribed in the *Users' Guide for the SCAG Subregional Planning Model in TransCAD 5.0* (Caliper Corporation, June 2010); and is summarized below:

- Digit 1 represents the county of zone (1-6) for internal, sea or airport, and county adjacent to the external zones:
 - 1 = Imperial County
 - 2 = Los Angeles
 - 3 = Orange County
 - 4 = Riverside County
 - 5 = San Bernardino County
 - 6 = Ventura County
- Digits 2,3,4,5 represent original SCAG TAZ number (0001-4109)
- Digit 6 represents Tier 2 TAZ number subdivision (0-9)
- Digits 7,8 represent Tier 3 TAZ number subdivision (0-99)

Table A.1 presents detailed TAZ breakdown for SBTAM.



Table A.1 SBTAM Number System in a Tiered Zone Structure

| TAZ Level | County / Subarea | Code | SBTAM TAZ Range | Number of SBTAM TAZ |
|---|------------------|------|--|---------------------|
| Tier 3 | | | | 2,521 |
| Valley Subarea | San Bernardino | 5 | 53598101 - 53856402 | 1,480 |
| Mountain Subarea | San Bernardino | 5 | 53857101 - 53999101 | 1,041 |
| Airports | | | | |
| Ontario | Valley | 5 | 57010000 | 1 |
| San Bernardino International | Valley | 5 | 57011000 | 1 |
| Southern California Logistics | Mountain | 5 | 57012000 | 1 |
| Tier 2 | | | | 604 |
| | Los Angeles | 2 | 20337100 - 22453200 | 174 |
| | Orange | 3 | 32534100 - 33059100 | 89 |
| | Riverside | 4 | 43120100 - 43595100 | 341 |
| Tier 1 | | | | 337 |
| | Imperial | 1 | 14012000 - 14109000 | 3 |
| | Los Angeles | 2 | 20219000 - 22423000 | 105 |
| | Orange | 3 | 32493000 - 33119000 | 117 |
| | Riverside | 4 | 43166000 - 43537000 | 111 |
| | Ventura | 6 | 60001000 | 1 |
| CSA | | | | 229 |
| | Imperial | 1 | 110001000 - 110014000 | 12 |
| | Los Angeles | 2 | 120016000 - 120170000 | 141 |
| | Orange | 3 | 130171000 - 130208000 | 36 |
| | Riverside | 4 | 140217000 - 140251000 | 24 |
| | Ventura | 6 | 160286000 - 160302000 | 16 |
| External Zone | | | 1 st digit: county code; 2 nd digit: 6 | 40 |
| | | | 3 rd – 5 th digit: 110 - 150 | |
| Airport Zone | | | 1 st digit: county code; 2 nd digit: 7 | 12 |
| | | | 3 rd – 5 th digit: 001 - 012 | |
| Seaport Zone | | | 1 st digit: county code; 2 nd digit: 8 | 31 |
| | | | 3 rd – 5 th digit: 001 - 031 | |
| External, Airport, Seaport Total | | | | 83 |
| SBTAM Total | | | | 3,774 |

Source: SBTAM

APPENDIX B SBTAM SOCIOECONOMIC VARIABLE DESCRIPTION

Table B-1: Description of Socioeconomic Variables

| | |
|---|--|
| 1. Population (7 variables) | |
| 1.1. | Total Population: total number of people living within a zone. Total population is composed of residential population and group quarters population. |
| 1.2. | Group Quarters (Non-Institutional) Population: is primarily comprised of students residing in dormitories, military personnel living in barracks, and individuals staying in homeless shelters. Group quarters (non-institutional) population does NOT include persons residing in institutions. |
| 1.3. | Residential Population: the number of residents NOT living in "group quarters." |
| 1.4. | Population by Age (4 variables): the number of population for different age groups: 5-17, 18-24, 16-64, and 65+. |
| 2. Households (19 variables) | |
| 2.1. | Total Households: Household refers to all of the people who occupy a housing unit. By definition there is only one household in an occupied housing unit. |
| 2.2. | Households by Household Size (4 variables): the number of one-person households, two-person households, three-person households, and four or more person households. |
| 2.3. | Households by Age of Householder (4 variables): the number of households with age of householder between 18 and 24 years old, 25 and 44, 45 and 64, and 65 or older. |
| 2.4. | Households by Number of Workers (4 variables): the number of households with no worker, with one worker, with two workers, and with three workers or more. |
| 2.5. | Households by Household Income (4 variables): the number of households with annual household income (in 1999 dollars) of less than \$24,999, \$25,000-\$49,999, \$50,000-\$99,999, and \$100,000 or more. |
| 2.6. | Households by Type of Dwelling Unit (2 variables): the number of households living in single-family detached housing, and living in other housing. |
| 3. School Enrollment (2 variables) | |
| 3.1. | K-12 School Enrollment: the total number of K-12 (kindergarten through 12th grade) students enrolled in all public and private schools located within a zone. All elementary, middle (junior high), and high school students are included. This variable represents "students by place of attendance." |
| 3.2. | College/University Enrollment: the total number of students enrolled in any public or private post-secondary school (college or university) that grant an associate degree or higher, located within a zone. This variable also represents "students by place of attendance." |
| 4. Workers (4 variables) | |
| 4.1. | Total Workers: total number of civilian workers residing in a zone. Workers are estimated by the place of residence. |
| 4.2. | Workers by earning level (3 variables): the number of workers with earnings of less than \$24,999, \$25,000-\$49,999, \$50,000 or more. |
| 5. Median Household Income (5 variables) | |
| 5.1. | Median Household Income: Median Household Income is the median value of household income for all households within a zone. Household Income includes the income, from all sources, for all persons aged 15 years or older within a household. |



| |
|--|
| 5.2. Median Household Income by Income Categories (4 variables): The median income is estimated for each of four different income categories: less than \$24,999, \$25,000-\$49,999, \$50,000-\$99,999, and \$100,000 or more. |
| 6. Employment (17 variables) |
| 6.1. Total Employment: total number of jobs within a zone. |
| 6.2. Employment by 13 Industries: the number of total jobs for 1) agriculture & mining, 2) construction, 3) manufacturing, 4) wholesale trade, 5) retail trade, 6) transportation, warehousing, and utility, 7) information, 8) financial activities, 9) professional and business services, 10) education and health services, 11) leisure and hospitality services, 12) other services, and 13) public administration. |
| 6.3. Employment by wage level (3 variables): total number of jobs by three wage levels: of less than \$24,999, \$25,000-\$49,999, \$50,000 or more. |

Table B-2: Joint Distributions of Population/Households/Workers by Selected Attributes

| |
|---|
| 1. Joint distribution of households by |
| 1.1. Household income (less than \$24,999, \$25,000 to \$49,999, \$50,000 to \$99,999, \$100,000+), |
| 1.2. Household size (1,2,3,4+ persons in household), |
| 1.3. Number of workers (0,1,2,3+ workers in household), |
| 1.4. Type of dwelling unit (single-family detached, other) |
| 2. Joint distribution of households by |
| 2.1. Household income (less than \$24,999, \$25,000 to \$49,999, \$50,000 to \$99,999, \$100,000+) |
| 2.2. Number of workers (0,1,2,3+ workers in household), |
| 2.3. Age of head of household (18-24, 25-44, 45-66, 65+ years old) |
| 3. Joint distribution of households by |
| 3.1. Household income (less than \$24,999, \$25,000 to \$49,999, \$50,000 to \$99,999, \$100,000+) |
| 3.2. Household size (1,2,3,4+ persons in household) |
| 4. Joint distribution of persons by |
| 4.1. Number of college students (0, 1, 2+), |
| 4.2. Household income (less than \$24,999, \$25,000 to \$49,999, \$50,000 to \$99,999, \$100,000+) |
| 5. Median household income by |
| 5.1. Number of children age 5-17 (0,1,2,3+), |
| 5.2. Household income (less than \$24,999, \$25,000 to \$49,999, \$50,000 to \$99,999, \$100,000+) |
| 6. Joint distribution of households by |
| 6.1. Age (0-4, 5-17, 18-24, 25+) |
| 6.2. Household income (less than \$24,999, \$25,000 to \$49,999, \$50,000 to \$99,999, \$100,000+) |
| 7. Joint distribution of households by |
| 7.1. Worker's earnings (less than \$24,999, \$25,000-\$49,999, \$50,000+) |
| 7.2. Household income (less than \$24,999, \$25,000 to \$49,999, \$50,000 to \$99,999, \$100,000+) |

APPENDIX C HIGHWAY NETWORK CODING CONVENTIONS

Facility Type

1 – Freeways

10 – Freeway

2 – HOV

20 – HOV 2

21 – HOV 3+

22 – HOV – HOV Connector

23 – HOV Slip ramp OUT (Slip ramp from HOV to Mixed Flow)

24 – HOV Slip ramp IN (Slip Ramp from Mixed Flow to HOV)

25 – HOV-MF dummy links

3 – Expressway/Parkway

30 – Undivided

31 – Divided, Interrupted

32 – Divided, Uninterrupted

4 – Principal Arterial

40 – Undivided

41 – Divided

42 – Continuous Left Turn

5 – Minor Arterial

50 – Undivided

51 – Divided

52 – Continuous Left Turn

6 – Major Collector

60 – Undivided

61 – Divided

62 – Continuous Left Turn

7 – Minor Collector

70 – Undivided

71 – Divided

72 – Continuous Left Turn

73 – Posted Speed 25

74 – Posted Speed 15

8 – Ramps

80 – Freeway to Freeway Connector

81 – Freeway to arterial

82 – Arterial to freeway

83 – Ramp Distributor

84 – Ramp from Arterial to HOV



- 85 – Ramp from HOV to Arterial
- 86 – Collector distributor
- 87 – Shared HOV Ramps to Mixed Flow
- 89 – Truck only

9 – Trucks

- 90 – Truck only

100 – Centroid Connector

Flag Fields

FWY_Main_Lane – Through Freeway Lanes

FWY_Aux_Lane – Auxiliary Lane of Capacity Significance

FWY_Acc_Dec_Lane - Other Freeway Lane

Truck Climbing Lanes Flag

- 0 – None
- 1 – 1 Truck Climbing Lane
- 2 – 2 Truck Climbing Lane
- 3 – 3+ Truck Climbing Lane

Toll Flag

- 0 – None
- 1 – Toll road
- 2 – HOT Road

Signals Flag

- 0 – None
- 1 – Signal and progression optimized streets
- 2 – Divided and signal optimized
- 3 – Continuous left-turn Lanes

HOV Operation Flag

- 0 – Standard HOV
- 1 – HOV AM Peak Only
- 2 – HOV PM Peak Only
- 3 – HOV AM & PM Peak Only

Truck Prohibition Flag

- 0 - Truck Not Prohibited
- 1 - Trucks Prohibited



APPENDIX D SBTAM FREE-FLOW SPEED AND CAPACITY LOOKUP TABLE

Free-flow Speed Lookup Table

| Facility Type | Area Type | Posted Speed | Speed | Speed Ratio |
|---------------|-----------|--------------|-------|-------------|
| 10 | 1 | 99 | 65 | 0.38 |
| 10 | 2 | 99 | 65 | 0.49 |
| 10 | 3 | 99 | 65 | 0.54 |
| 10 | 4 | 99 | 65 | 0.59 |
| 10 | 5 | 99 | 65 | 0.73 |
| 10 | 6 | 99 | 65 | 0.84 |
| 10 | 7 | 99 | 65 | 0.66 |
| 19 | 1 | 99 | 65 | 0.38 |
| 19 | 2 | 99 | 65 | 0.49 |
| 19 | 3 | 99 | 65 | 0.54 |
| 19 | 4 | 99 | 65 | 0.59 |
| 19 | 5 | 99 | 65 | 0.73 |
| 19 | 6 | 99 | 65 | 0.84 |
| 19 | 7 | 99 | 65 | 0.66 |
| 20 | 1 | 99 | 65 | 0.70 |
| 20 | 2 | 99 | 65 | 0.70 |
| 20 | 3 | 99 | 65 | 0.63 |
| 20 | 4 | 99 | 65 | 0.67 |
| 20 | 5 | 99 | 65 | 0.72 |
| 20 | 6 | 99 | 65 | 0.78 |
| 20 | 7 | 99 | 65 | 0.78 |
| 21 | 1 | 99 | 65 | 0.81 |
| 21 | 2 | 99 | 65 | 0.81 |
| 21 | 3 | 99 | 65 | 0.70 |
| 21 | 4 | 99 | 65 | 0.65 |
| 21 | 5 | 99 | 65 | 0.65 |
| 21 | 6 | 99 | 65 | 0.65 |
| 21 | 7 | 99 | 65 | 0.65 |
| 22 | 1 | 99 | 35 | 0.76 |
| 22 | 2 | 99 | 40 | 0.76 |
| 22 | 3 | 99 | 45 | 0.76 |
| 22 | 4 | 99 | 50 | 0.68 |
| 22 | 5 | 99 | 50 | 0.68 |
| 22 | 6 | 99 | 55 | 0.68 |
| 22 | 7 | 99 | 55 | 0.68 |
| 29 | 1 | 99 | 65 | 1.00 |
| 29 | 2 | 99 | 65 | 1.00 |
| 29 | 3 | 99 | 65 | 0.71 |
| 29 | 4 | 99 | 65 | 0.65 |
| 29 | 5 | 99 | 65 | 0.51 |
| 29 | 6 | 99 | 65 | 0.98 |
| 29 | 7 | 99 | 65 | 0.98 |
| 30 | 1 | 20 | 21 | 0.28 |
| 30 | 1 | 25 | 23 | 0.28 |
| 30 | 1 | 30 | 25 | 0.28 |
| 30 | 1 | 35 | 27 | 0.28 |

| Facility Type | Area Type | Posted Speed | Speed | Speed Ratio |
|---------------|-----------|--------------|-------|-------------|
| 30 | 1 | 40 | 28 | 0.28 |
| 30 | 1 | 45 | 30 | 0.28 |
| 30 | 1 | 50 | 33 | 0.28 |
| 30 | 1 | 99 | 34 | 0.28 |
| 30 | 2 | 20 | 22 | 0.28 |
| 30 | 2 | 25 | 24 | 0.28 |
| 30 | 2 | 30 | 26 | 0.28 |
| 30 | 2 | 35 | 28 | 0.28 |
| 30 | 2 | 40 | 30 | 0.28 |
| 30 | 2 | 45 | 32 | 0.28 |
| 30 | 2 | 50 | 35 | 0.28 |
| 30 | 2 | 99 | 38 | 0.28 |
| 30 | 3 | 20 | 22 | 0.28 |
| 30 | 3 | 25 | 25 | 0.28 |
| 30 | 3 | 30 | 27 | 0.28 |
| 30 | 3 | 35 | 29 | 0.28 |
| 30 | 3 | 40 | 32 | 0.28 |
| 30 | 3 | 45 | 34 | 0.28 |
| 30 | 3 | 50 | 37 | 0.28 |
| 30 | 3 | 99 | 39 | 0.28 |
| 30 | 4 | 20 | 24 | 0.59 |
| 30 | 4 | 25 | 27 | 0.59 |
| 30 | 4 | 30 | 29 | 0.59 |
| 30 | 4 | 35 | 32 | 0.59 |
| 30 | 4 | 40 | 34 | 0.59 |
| 30 | 4 | 45 | 37 | 0.59 |
| 30 | 4 | 50 | 41 | 0.59 |
| 30 | 4 | 99 | 44 | 0.59 |
| 30 | 5 | 20 | 25 | 0.75 |
| 30 | 5 | 25 | 28 | 0.75 |
| 30 | 5 | 30 | 31 | 0.75 |
| 30 | 5 | 35 | 35 | 0.75 |
| 30 | 5 | 40 | 37 | 0.75 |
| 30 | 5 | 45 | 40 | 0.75 |
| 30 | 5 | 50 | 45 | 0.75 |
| 30 | 5 | 99 | 49 | 0.75 |
| 30 | 6 | 20 | 27 | 0.87 |
| 30 | 6 | 25 | 31 | 0.87 |
| 30 | 6 | 30 | 34 | 0.87 |
| 30 | 6 | 35 | 38 | 0.87 |
| 30 | 6 | 40 | 41 | 0.87 |
| 30 | 6 | 45 | 45 | 0.87 |
| 30 | 6 | 50 | 51 | 0.87 |
| 30 | 6 | 99 | 56 | 0.87 |
| 30 | 7 | 20 | 27 | 0.87 |
| 30 | 7 | 25 | 31 | 0.87 |

| Facility Type | Area Type | Posted Speed | Speed | Speed Ratio |
|---------------|-----------|--------------|-------|-------------|
| 30 | 7 | 30 | 34 | 0.87 |
| 30 | 7 | 35 | 38 | 0.87 |
| 30 | 7 | 40 | 41 | 0.87 |
| 30 | 7 | 45 | 45 | 0.87 |
| 30 | 7 | 50 | 51 | 0.87 |
| 30 | 7 | 99 | 56 | 0.87 |
| 31 | 1 | 20 | 21 | 0.28 |
| 31 | 1 | 25 | 23 | 0.28 |
| 31 | 1 | 30 | 25 | 0.28 |
| 31 | 1 | 35 | 27 | 0.28 |
| 31 | 1 | 40 | 28 | 0.28 |
| 31 | 1 | 45 | 30 | 0.28 |
| 31 | 1 | 50 | 33 | 0.28 |
| 31 | 1 | 99 | 34 | 0.28 |
| 31 | 2 | 20 | 22 | 0.28 |
| 31 | 2 | 25 | 24 | 0.28 |
| 31 | 2 | 30 | 26 | 0.28 |
| 31 | 2 | 35 | 28 | 0.28 |
| 31 | 2 | 40 | 30 | 0.28 |
| 31 | 2 | 45 | 32 | 0.28 |
| 31 | 2 | 50 | 35 | 0.28 |
| 31 | 2 | 99 | 38 | 0.28 |
| 31 | 3 | 20 | 22 | 0.28 |
| 31 | 3 | 25 | 25 | 0.28 |
| 31 | 3 | 30 | 27 | 0.28 |
| 31 | 3 | 35 | 29 | 0.28 |
| 31 | 3 | 40 | 32 | 0.28 |
| 31 | 3 | 45 | 34 | 0.28 |
| 31 | 3 | 50 | 37 | 0.28 |
| 31 | 3 | 99 | 39 | 0.28 |
| 31 | 4 | 20 | 24 | 0.59 |
| 31 | 4 | 25 | 27 | 0.59 |
| 31 | 4 | 30 | 29 | 0.59 |
| 31 | 4 | 35 | 32 | 0.59 |
| 31 | 4 | 40 | 34 | 0.59 |
| 31 | 4 | 45 | 37 | 0.59 |
| 31 | 4 | 50 | 41 | 0.59 |
| 31 | 4 | 99 | 44 | 0.59 |
| 31 | 5 | 20 | 25 | 0.75 |
| 31 | 5 | 25 | 28 | 0.75 |
| 31 | 5 | 30 | 31 | 0.75 |
| 31 | 5 | 35 | 35 | 0.75 |
| 31 | 5 | 40 | 37 | 0.75 |
| 31 | 5 | 45 | 40 | 0.75 |
| 31 | 5 | 50 | 45 | 0.75 |
| 31 | 5 | 99 | 49 | 0.75 |



| Facility Type | Area Type | Posted Speed | Speed | Speed Ratio |
|---------------|-----------|--------------|-------|-------------|
| 31 | 6 | 20 | 27 | 0.87 |
| 31 | 6 | 25 | 31 | 0.87 |
| 31 | 6 | 30 | 34 | 0.87 |
| 31 | 6 | 35 | 38 | 0.87 |
| 31 | 6 | 40 | 41 | 0.87 |
| 31 | 6 | 45 | 45 | 0.87 |
| 31 | 6 | 50 | 51 | 0.87 |
| 31 | 6 | 99 | 56 | 0.87 |
| 31 | 7 | 20 | 27 | 0.87 |
| 31 | 7 | 25 | 31 | 0.87 |
| 31 | 7 | 30 | 34 | 0.87 |
| 31 | 7 | 35 | 38 | 0.87 |
| 31 | 7 | 40 | 41 | 0.87 |
| 31 | 7 | 45 | 45 | 0.87 |
| 31 | 7 | 50 | 51 | 0.87 |
| 31 | 7 | 99 | 56 | 0.87 |
| 32 | 1 | 99 | 35 | 0.28 |
| 32 | 2 | 99 | 40 | 0.28 |
| 32 | 3 | 99 | 45 | 0.28 |
| 32 | 4 | 99 | 50 | 0.59 |
| 32 | 5 | 99 | 55 | 0.75 |
| 32 | 6 | 99 | 55 | 0.87 |
| 32 | 7 | 99 | 55 | 0.87 |
| 39 | 1 | 20 | 21 | 0.28 |
| 39 | 1 | 25 | 23 | 0.28 |
| 39 | 1 | 30 | 25 | 0.28 |
| 39 | 1 | 35 | 27 | 0.28 |
| 39 | 1 | 40 | 28 | 0.28 |
| 39 | 1 | 45 | 30 | 0.28 |
| 39 | 1 | 50 | 33 | 0.28 |
| 39 | 1 | 99 | 34 | 0.28 |
| 39 | 2 | 20 | 22 | 0.28 |
| 39 | 2 | 25 | 24 | 0.28 |
| 39 | 2 | 30 | 26 | 0.28 |
| 39 | 2 | 35 | 28 | 0.28 |
| 39 | 2 | 40 | 30 | 0.28 |
| 39 | 2 | 45 | 32 | 0.28 |
| 39 | 2 | 50 | 35 | 0.28 |
| 39 | 2 | 99 | 38 | 0.28 |
| 39 | 3 | 20 | 22 | 0.28 |
| 39 | 3 | 25 | 25 | 0.28 |
| 39 | 3 | 30 | 27 | 0.28 |
| 39 | 3 | 35 | 29 | 0.28 |
| 39 | 3 | 40 | 32 | 0.28 |
| 39 | 3 | 45 | 34 | 0.28 |
| 39 | 3 | 50 | 37 | 0.28 |
| 39 | 3 | 99 | 39 | 0.28 |
| 39 | 4 | 20 | 24 | 0.59 |
| 39 | 4 | 25 | 27 | 0.59 |
| 39 | 4 | 30 | 29 | 0.59 |
| 39 | 4 | 35 | 32 | 0.59 |
| 39 | 4 | 40 | 34 | 0.59 |
| 39 | 4 | 45 | 37 | 0.59 |

| Facility Type | Area Type | Posted Speed | Speed | Speed Ratio |
|---------------|-----------|--------------|-------|-------------|
| 39 | 4 | 50 | 41 | 0.59 |
| 39 | 4 | 99 | 44 | 0.59 |
| 39 | 5 | 20 | 25 | 0.75 |
| 39 | 5 | 25 | 28 | 0.75 |
| 39 | 5 | 30 | 31 | 0.75 |
| 39 | 5 | 35 | 35 | 0.75 |
| 39 | 5 | 40 | 37 | 0.75 |
| 39 | 5 | 45 | 40 | 0.75 |
| 39 | 5 | 50 | 45 | 0.75 |
| 39 | 5 | 99 | 49 | 0.75 |
| 39 | 6 | 20 | 27 | 0.87 |
| 39 | 6 | 25 | 31 | 0.87 |
| 39 | 6 | 30 | 34 | 0.87 |
| 39 | 6 | 35 | 38 | 0.87 |
| 39 | 6 | 40 | 41 | 0.87 |
| 39 | 6 | 45 | 45 | 0.87 |
| 39 | 6 | 50 | 51 | 0.87 |
| 39 | 6 | 99 | 56 | 0.87 |
| 39 | 7 | 20 | 27 | 0.87 |
| 39 | 7 | 25 | 31 | 0.87 |
| 39 | 7 | 30 | 34 | 0.87 |
| 39 | 7 | 35 | 38 | 0.87 |
| 39 | 7 | 40 | 41 | 0.87 |
| 39 | 7 | 45 | 45 | 0.87 |
| 39 | 7 | 50 | 51 | 0.87 |
| 39 | 7 | 99 | 56 | 0.87 |
| 40 | 1 | 20 | 21 | 0.71 |
| 40 | 1 | 25 | 23 | 0.71 |
| 40 | 1 | 30 | 25 | 0.71 |
| 40 | 1 | 35 | 27 | 0.71 |
| 40 | 1 | 40 | 28 | 0.71 |
| 40 | 1 | 45 | 30 | 0.71 |
| 40 | 1 | 50 | 33 | 0.71 |
| 40 | 1 | 99 | 34 | 0.71 |
| 40 | 2 | 20 | 22 | 0.73 |
| 40 | 2 | 25 | 24 | 0.73 |
| 40 | 2 | 30 | 26 | 0.73 |
| 40 | 2 | 35 | 28 | 0.73 |
| 40 | 2 | 40 | 30 | 0.73 |
| 40 | 2 | 45 | 32 | 0.73 |
| 40 | 2 | 50 | 35 | 0.73 |
| 40 | 2 | 99 | 38 | 0.73 |
| 40 | 3 | 20 | 22 | 0.71 |
| 40 | 3 | 25 | 25 | 0.71 |
| 40 | 3 | 30 | 27 | 0.71 |
| 40 | 3 | 35 | 29 | 0.71 |
| 40 | 3 | 40 | 32 | 0.71 |
| 40 | 3 | 45 | 34 | 0.71 |
| 40 | 3 | 50 | 37 | 0.71 |
| 40 | 3 | 99 | 39 | 0.71 |
| 40 | 4 | 20 | 24 | 0.78 |
| 40 | 4 | 25 | 27 | 0.78 |
| 40 | 4 | 30 | 29 | 0.78 |

| Facility Type | Area Type | Posted Speed | Speed | Speed Ratio |
|---------------|-----------|--------------|-------|-------------|
| 40 | 4 | 35 | 32 | 0.78 |
| 40 | 4 | 40 | 34 | 0.78 |
| 40 | 4 | 45 | 37 | 0.78 |
| 40 | 4 | 50 | 41 | 0.78 |
| 40 | 4 | 99 | 44 | 0.78 |
| 40 | 5 | 20 | 25 | 0.77 |
| 40 | 5 | 25 | 28 | 0.77 |
| 40 | 5 | 30 | 31 | 0.77 |
| 40 | 5 | 35 | 35 | 0.77 |
| 40 | 5 | 40 | 37 | 0.77 |
| 40 | 5 | 45 | 40 | 0.77 |
| 40 | 5 | 50 | 45 | 0.77 |
| 40 | 5 | 99 | 49 | 0.77 |
| 40 | 6 | 20 | 27 | 0.74 |
| 40 | 6 | 25 | 31 | 0.74 |
| 40 | 6 | 30 | 34 | 0.74 |
| 40 | 6 | 35 | 38 | 0.74 |
| 40 | 6 | 40 | 41 | 0.74 |
| 40 | 6 | 45 | 45 | 0.74 |
| 40 | 6 | 50 | 51 | 0.74 |
| 40 | 6 | 99 | 56 | 0.74 |
| 40 | 7 | 20 | 27 | 0.73 |
| 40 | 7 | 25 | 31 | 0.73 |
| 40 | 7 | 30 | 34 | 0.73 |
| 40 | 7 | 35 | 38 | 0.73 |
| 40 | 7 | 40 | 41 | 0.73 |
| 40 | 7 | 45 | 45 | 0.73 |
| 40 | 7 | 50 | 51 | 0.73 |
| 40 | 7 | 99 | 56 | 0.73 |
| 49 | 1 | 20 | 21 | 0.77 |
| 49 | 1 | 25 | 23 | 0.77 |
| 49 | 1 | 30 | 25 | 0.77 |
| 49 | 1 | 35 | 27 | 0.77 |
| 49 | 1 | 40 | 28 | 0.77 |
| 49 | 1 | 45 | 30 | 0.77 |
| 49 | 1 | 50 | 33 | 0.77 |
| 49 | 1 | 99 | 34 | 0.77 |
| 49 | 2 | 20 | 22 | 0.72 |
| 49 | 2 | 25 | 24 | 0.72 |
| 49 | 2 | 30 | 26 | 0.72 |
| 49 | 2 | 35 | 28 | 0.72 |
| 49 | 2 | 40 | 30 | 0.72 |
| 49 | 2 | 45 | 32 | 0.72 |
| 49 | 2 | 50 | 35 | 0.72 |
| 49 | 2 | 99 | 38 | 0.72 |
| 49 | 3 | 20 | 22 | 0.73 |
| 49 | 3 | 25 | 25 | 0.73 |
| 49 | 3 | 30 | 27 | 0.73 |
| 49 | 3 | 35 | 29 | 0.73 |
| 49 | 3 | 40 | 32 | 0.73 |
| 49 | 3 | 45 | 34 | 0.73 |
| 49 | 3 | 50 | 37 | 0.73 |
| 49 | 3 | 99 | 39 | 0.73 |



| Facility Type | Area Type | Posted Speed | Speed | Speed Ratio |
|---------------|-----------|--------------|-------|-------------|
| 49 | 4 | 20 | 24 | 0.80 |
| 49 | 4 | 25 | 27 | 0.80 |
| 49 | 4 | 30 | 29 | 0.80 |
| 49 | 4 | 35 | 32 | 0.80 |
| 49 | 4 | 40 | 34 | 0.80 |
| 49 | 4 | 45 | 37 | 0.80 |
| 49 | 4 | 50 | 41 | 0.80 |
| 49 | 4 | 99 | 44 | 0.80 |
| 49 | 5 | 20 | 25 | 0.78 |
| 49 | 5 | 25 | 28 | 0.78 |
| 49 | 5 | 30 | 31 | 0.78 |
| 49 | 5 | 35 | 35 | 0.78 |
| 49 | 5 | 40 | 37 | 0.78 |
| 49 | 5 | 45 | 40 | 0.78 |
| 49 | 5 | 50 | 45 | 0.78 |
| 49 | 5 | 99 | 49 | 0.78 |
| 49 | 6 | 20 | 27 | 0.75 |
| 49 | 6 | 25 | 31 | 0.75 |
| 49 | 6 | 30 | 34 | 0.75 |
| 49 | 6 | 35 | 38 | 0.75 |
| 49 | 6 | 40 | 41 | 0.75 |
| 49 | 6 | 45 | 45 | 0.75 |
| 49 | 6 | 50 | 51 | 0.75 |
| 49 | 6 | 99 | 56 | 0.75 |
| 49 | 7 | 20 | 27 | 0.75 |
| 49 | 7 | 25 | 31 | 0.75 |
| 49 | 7 | 30 | 34 | 0.75 |
| 49 | 7 | 35 | 38 | 0.75 |
| 49 | 7 | 40 | 41 | 0.75 |
| 49 | 7 | 45 | 45 | 0.75 |
| 49 | 7 | 50 | 51 | 0.75 |
| 49 | 7 | 99 | 56 | 0.75 |
| 50 | 1 | 20 | 19 | 0.82 |
| 50 | 1 | 25 | 21 | 0.82 |
| 50 | 1 | 30 | 22 | 0.82 |
| 50 | 1 | 35 | 24 | 0.82 |
| 50 | 1 | 40 | 25 | 0.82 |
| 50 | 1 | 45 | 27 | 0.82 |
| 50 | 1 | 50 | 29 | 0.82 |
| 50 | 1 | 99 | 30 | 0.82 |
| 50 | 2 | 20 | 20 | 0.77 |
| 50 | 2 | 25 | 22 | 0.77 |
| 50 | 2 | 30 | 24 | 0.77 |
| 50 | 2 | 35 | 26 | 0.77 |
| 50 | 2 | 40 | 28 | 0.77 |
| 50 | 2 | 45 | 29 | 0.77 |
| 50 | 2 | 50 | 32 | 0.77 |
| 50 | 2 | 99 | 33 | 0.77 |
| 50 | 3 | 20 | 21 | 0.78 |
| 50 | 3 | 25 | 23 | 0.78 |
| 50 | 3 | 30 | 25 | 0.78 |
| 50 | 3 | 35 | 27 | 0.78 |
| 50 | 3 | 40 | 29 | 0.78 |

| Facility Type | Area Type | Posted Speed | Speed | Speed Ratio |
|---------------|-----------|--------------|-------|-------------|
| 50 | 3 | 45 | 31 | 0.78 |
| 50 | 3 | 50 | 33 | 0.78 |
| 50 | 3 | 99 | 35 | 0.78 |
| 50 | 4 | 20 | 23 | 0.84 |
| 50 | 4 | 25 | 25 | 0.84 |
| 50 | 4 | 30 | 28 | 0.84 |
| 50 | 4 | 35 | 30 | 0.84 |
| 50 | 4 | 40 | 32 | 0.84 |
| 50 | 4 | 45 | 34 | 0.84 |
| 50 | 4 | 50 | 38 | 0.84 |
| 50 | 4 | 99 | 40 | 0.84 |
| 50 | 5 | 20 | 24 | 0.83 |
| 50 | 5 | 25 | 27 | 0.83 |
| 50 | 5 | 30 | 30 | 0.83 |
| 50 | 5 | 35 | 33 | 0.83 |
| 50 | 5 | 40 | 36 | 0.83 |
| 50 | 5 | 45 | 38 | 0.83 |
| 50 | 5 | 50 | 43 | 0.83 |
| 50 | 5 | 99 | 46 | 0.83 |
| 50 | 6 | 20 | 27 | 0.83 |
| 50 | 6 | 25 | 30 | 0.83 |
| 50 | 6 | 30 | 34 | 0.83 |
| 50 | 6 | 35 | 37 | 0.83 |
| 50 | 6 | 40 | 41 | 0.83 |
| 50 | 6 | 45 | 44 | 0.83 |
| 50 | 6 | 50 | 50 | 0.83 |
| 50 | 6 | 99 | 55 | 0.83 |
| 50 | 7 | 20 | 27 | 0.77 |
| 50 | 7 | 25 | 30 | 0.77 |
| 50 | 7 | 30 | 34 | 0.77 |
| 50 | 7 | 35 | 37 | 0.77 |
| 50 | 7 | 40 | 41 | 0.77 |
| 50 | 7 | 45 | 44 | 0.77 |
| 50 | 7 | 50 | 50 | 0.77 |
| 50 | 7 | 99 | 55 | 0.77 |
| 59 | 1 | 20 | 19 | 0.87 |
| 59 | 1 | 25 | 21 | 0.87 |
| 59 | 1 | 30 | 22 | 0.87 |
| 59 | 1 | 35 | 24 | 0.87 |
| 59 | 1 | 40 | 25 | 0.87 |
| 59 | 1 | 45 | 27 | 0.87 |
| 59 | 1 | 50 | 29 | 0.87 |
| 59 | 1 | 99 | 30 | 0.87 |
| 59 | 2 | 20 | 20 | 0.86 |
| 59 | 2 | 25 | 22 | 0.86 |
| 59 | 2 | 30 | 24 | 0.86 |
| 59 | 2 | 35 | 26 | 0.86 |
| 59 | 2 | 40 | 28 | 0.86 |
| 59 | 2 | 45 | 29 | 0.86 |
| 59 | 2 | 50 | 32 | 0.86 |
| 59 | 2 | 99 | 33 | 0.86 |
| 59 | 3 | 20 | 21 | 0.84 |
| 59 | 3 | 25 | 23 | 0.84 |

| Facility Type | Area Type | Posted Speed | Speed | Speed Ratio |
|---------------|-----------|--------------|-------|-------------|
| 59 | 3 | 30 | 25 | 0.84 |
| 59 | 3 | 35 | 27 | 0.84 |
| 59 | 3 | 40 | 29 | 0.84 |
| 59 | 3 | 45 | 31 | 0.84 |
| 59 | 3 | 50 | 33 | 0.84 |
| 59 | 3 | 99 | 35 | 0.84 |
| 59 | 4 | 20 | 23 | 0.80 |
| 59 | 4 | 25 | 25 | 0.80 |
| 59 | 4 | 30 | 28 | 0.80 |
| 59 | 4 | 35 | 30 | 0.80 |
| 59 | 4 | 40 | 32 | 0.80 |
| 59 | 4 | 45 | 34 | 0.80 |
| 59 | 4 | 50 | 38 | 0.80 |
| 59 | 4 | 99 | 40 | 0.80 |
| 59 | 5 | 20 | 24 | 0.84 |
| 59 | 5 | 25 | 27 | 0.84 |
| 59 | 5 | 30 | 30 | 0.84 |
| 59 | 5 | 35 | 33 | 0.84 |
| 59 | 5 | 40 | 36 | 0.84 |
| 59 | 5 | 45 | 38 | 0.84 |
| 59 | 5 | 50 | 43 | 0.84 |
| 59 | 5 | 99 | 46 | 0.84 |
| 59 | 6 | 20 | 27 | 0.92 |
| 59 | 6 | 25 | 30 | 0.92 |
| 59 | 6 | 30 | 34 | 0.92 |
| 59 | 6 | 35 | 37 | 0.92 |
| 59 | 6 | 40 | 41 | 0.92 |
| 59 | 6 | 45 | 44 | 0.92 |
| 59 | 6 | 50 | 50 | 0.92 |
| 59 | 6 | 99 | 55 | 0.92 |
| 59 | 7 | 20 | 27 | 0.94 |
| 59 | 7 | 25 | 30 | 0.94 |
| 59 | 7 | 30 | 34 | 0.94 |
| 59 | 7 | 35 | 37 | 0.94 |
| 59 | 7 | 40 | 41 | 0.94 |
| 59 | 7 | 45 | 44 | 0.94 |
| 59 | 7 | 50 | 50 | 0.94 |
| 59 | 7 | 99 | 55 | 0.94 |
| 60 | 1 | 20 | 17 | 0.70 |
| 60 | 1 | 25 | 18 | 0.70 |
| 60 | 1 | 30 | 19 | 0.70 |
| 60 | 1 | 35 | 20 | 0.70 |
| 60 | 1 | 40 | 21 | 0.70 |
| 60 | 1 | 45 | 22 | 0.70 |
| 60 | 1 | 50 | 23 | 0.70 |
| 60 | 1 | 99 | 24 | 0.70 |
| 60 | 2 | 20 | 18 | 0.78 |
| 60 | 2 | 25 | 20 | 0.78 |
| 60 | 2 | 30 | 21 | 0.78 |
| 60 | 2 | 35 | 22 | 0.78 |
| 60 | 2 | 40 | 24 | 0.78 |
| 60 | 2 | 45 | 25 | 0.78 |
| 60 | 2 | 50 | 27 | 0.78 |



| Facility Type | Area Type | Posted Speed | Speed | Speed Ratio |
|---------------|-----------|--------------|-------|-------------|
| 60 | 2 | 99 | 28 | 0.78 |
| 60 | 3 | 20 | 19 | 0.83 |
| 60 | 3 | 25 | 21 | 0.83 |
| 60 | 3 | 30 | 22 | 0.83 |
| 60 | 3 | 35 | 24 | 0.83 |
| 60 | 3 | 40 | 25 | 0.83 |
| 60 | 3 | 45 | 26 | 0.83 |
| 60 | 3 | 50 | 28 | 0.83 |
| 60 | 3 | 99 | 30 | 0.83 |
| 60 | 4 | 20 | 21 | 0.91 |
| 60 | 4 | 25 | 23 | 0.91 |
| 60 | 4 | 30 | 25 | 0.91 |
| 60 | 4 | 35 | 27 | 0.91 |
| 60 | 4 | 40 | 28 | 0.91 |
| 60 | 4 | 45 | 30 | 0.91 |
| 60 | 4 | 50 | 33 | 0.91 |
| 60 | 4 | 99 | 35 | 0.91 |
| 60 | 5 | 20 | 23 | 0.86 |
| 60 | 5 | 25 | 26 | 0.86 |
| 60 | 5 | 30 | 28 | 0.86 |
| 60 | 5 | 35 | 31 | 0.86 |
| 60 | 5 | 40 | 33 | 0.86 |
| 60 | 5 | 45 | 35 | 0.86 |
| 60 | 5 | 50 | 39 | 0.86 |
| 60 | 5 | 99 | 42 | 0.86 |
| 60 | 6 | 20 | 26 | 0.89 |
| 60 | 6 | 25 | 30 | 0.89 |
| 60 | 6 | 30 | 33 | 0.89 |
| 60 | 6 | 35 | 36 | 0.89 |
| 60 | 6 | 40 | 39 | 0.89 |
| 60 | 6 | 45 | 43 | 0.89 |
| 60 | 6 | 50 | 48 | 0.89 |
| 60 | 6 | 99 | 52 | 0.89 |
| 60 | 7 | 20 | 26 | 0.87 |
| 60 | 7 | 25 | 30 | 0.87 |
| 60 | 7 | 30 | 33 | 0.87 |
| 60 | 7 | 35 | 36 | 0.87 |
| 60 | 7 | 40 | 39 | 0.87 |
| 60 | 7 | 45 | 43 | 0.87 |
| 60 | 7 | 50 | 48 | 0.87 |
| 60 | 7 | 99 | 52 | 0.87 |
| 69 | 1 | 20 | 17 | 0.86 |
| 69 | 1 | 25 | 18 | 0.86 |
| 69 | 1 | 30 | 19 | 0.86 |
| 69 | 1 | 35 | 20 | 0.86 |
| 69 | 1 | 40 | 21 | 0.86 |
| 69 | 1 | 45 | 22 | 0.86 |
| 69 | 1 | 50 | 23 | 0.86 |
| 69 | 1 | 99 | 24 | 0.86 |
| 69 | 2 | 20 | 18 | 0.86 |
| 69 | 2 | 25 | 20 | 0.86 |
| 69 | 2 | 30 | 21 | 0.86 |
| 69 | 2 | 35 | 22 | 0.86 |

| Facility Type | Area Type | Posted Speed | Speed | Speed Ratio |
|---------------|-----------|--------------|-------|-------------|
| 69 | 2 | 40 | 24 | 0.86 |
| 69 | 2 | 45 | 25 | 0.86 |
| 69 | 2 | 50 | 27 | 0.86 |
| 69 | 2 | 99 | 28 | 0.86 |
| 69 | 3 | 20 | 19 | 0.76 |
| 69 | 3 | 25 | 21 | 0.76 |
| 69 | 3 | 30 | 22 | 0.76 |
| 69 | 3 | 35 | 24 | 0.76 |
| 69 | 3 | 40 | 25 | 0.76 |
| 69 | 3 | 45 | 26 | 0.76 |
| 69 | 3 | 50 | 28 | 0.76 |
| 69 | 3 | 99 | 30 | 0.76 |
| 69 | 4 | 20 | 21 | 0.89 |
| 69 | 4 | 25 | 23 | 0.89 |
| 69 | 4 | 30 | 25 | 0.89 |
| 69 | 4 | 35 | 27 | 0.89 |
| 69 | 4 | 40 | 28 | 0.89 |
| 69 | 4 | 45 | 30 | 0.89 |
| 69 | 4 | 50 | 33 | 0.89 |
| 69 | 4 | 99 | 35 | 0.89 |
| 69 | 5 | 20 | 23 | 0.89 |
| 69 | 5 | 25 | 26 | 0.89 |
| 69 | 5 | 30 | 28 | 0.89 |
| 69 | 5 | 35 | 31 | 0.89 |
| 69 | 5 | 40 | 33 | 0.89 |
| 69 | 5 | 45 | 35 | 0.89 |
| 69 | 5 | 50 | 39 | 0.89 |
| 69 | 5 | 99 | 42 | 0.89 |
| 69 | 6 | 20 | 26 | 0.96 |
| 69 | 6 | 25 | 30 | 0.96 |
| 69 | 6 | 30 | 33 | 0.96 |
| 69 | 6 | 35 | 36 | 0.96 |
| 69 | 6 | 40 | 39 | 0.96 |
| 69 | 6 | 45 | 43 | 0.96 |
| 69 | 6 | 50 | 48 | 0.96 |
| 69 | 6 | 99 | 52 | 0.96 |
| 69 | 7 | 20 | 26 | 0.96 |
| 69 | 7 | 25 | 30 | 0.96 |
| 69 | 7 | 30 | 33 | 0.96 |
| 69 | 7 | 35 | 36 | 0.96 |
| 69 | 7 | 40 | 39 | 0.96 |
| 69 | 7 | 45 | 43 | 0.96 |
| 69 | 7 | 50 | 48 | 0.96 |
| 69 | 7 | 99 | 52 | 0.96 |
| 70 | 1 | 20 | 17 | 0.68 |
| 70 | 1 | 25 | 18 | 0.68 |
| 70 | 1 | 30 | 19 | 0.68 |
| 70 | 1 | 35 | 20 | 0.68 |
| 70 | 1 | 40 | 21 | 0.68 |
| 70 | 1 | 45 | 22 | 0.68 |
| 70 | 1 | 50 | 23 | 0.68 |
| 70 | 1 | 99 | 24 | 0.68 |
| 70 | 2 | 20 | 18 | 0.68 |

| Facility Type | Area Type | Posted Speed | Speed | Speed Ratio |
|---------------|-----------|--------------|-------|-------------|
| 70 | 2 | 25 | 20 | 0.68 |
| 70 | 2 | 30 | 21 | 0.68 |
| 70 | 2 | 35 | 22 | 0.68 |
| 70 | 2 | 40 | 24 | 0.68 |
| 70 | 2 | 45 | 25 | 0.68 |
| 70 | 2 | 50 | 27 | 0.68 |
| 70 | 2 | 99 | 28 | 0.68 |
| 70 | 3 | 20 | 19 | 0.72 |
| 70 | 3 | 25 | 21 | 0.72 |
| 70 | 3 | 30 | 22 | 0.72 |
| 70 | 3 | 35 | 24 | 0.72 |
| 70 | 3 | 40 | 25 | 0.72 |
| 70 | 3 | 45 | 26 | 0.72 |
| 70 | 3 | 50 | 28 | 0.72 |
| 70 | 3 | 99 | 30 | 0.72 |
| 70 | 4 | 20 | 21 | 0.86 |
| 70 | 4 | 25 | 23 | 0.86 |
| 70 | 4 | 30 | 25 | 0.86 |
| 70 | 4 | 35 | 27 | 0.86 |
| 70 | 4 | 40 | 28 | 0.86 |
| 70 | 4 | 45 | 30 | 0.86 |
| 70 | 4 | 50 | 33 | 0.86 |
| 70 | 4 | 99 | 35 | 0.86 |
| 70 | 5 | 20 | 23 | 0.83 |
| 70 | 5 | 25 | 26 | 0.83 |
| 70 | 5 | 30 | 28 | 0.83 |
| 70 | 5 | 35 | 31 | 0.83 |
| 70 | 5 | 40 | 33 | 0.83 |
| 70 | 5 | 45 | 35 | 0.83 |
| 70 | 5 | 50 | 39 | 0.83 |
| 70 | 5 | 99 | 42 | 0.83 |
| 70 | 6 | 20 | 26 | 0.97 |
| 70 | 6 | 25 | 30 | 0.97 |
| 70 | 6 | 30 | 33 | 0.97 |
| 70 | 6 | 35 | 36 | 0.97 |
| 70 | 6 | 40 | 39 | 0.97 |
| 70 | 6 | 45 | 43 | 0.97 |
| 70 | 6 | 50 | 48 | 0.97 |
| 70 | 6 | 99 | 52 | 0.97 |
| 70 | 7 | 20 | 26 | 0.97 |
| 70 | 7 | 25 | 30 | 0.97 |
| 70 | 7 | 30 | 33 | 0.97 |
| 70 | 7 | 35 | 36 | 0.97 |
| 70 | 7 | 40 | 39 | 0.97 |
| 70 | 7 | 45 | 43 | 0.97 |
| 70 | 7 | 50 | 48 | 0.97 |
| 70 | 7 | 99 | 52 | 0.97 |
| 79 | 1 | 20 | 17 | 0.50 |
| 79 | 1 | 25 | 18 | 0.50 |
| 79 | 1 | 30 | 19 | 0.50 |
| 79 | 1 | 35 | 20 | 0.50 |
| 79 | 1 | 40 | 21 | 0.50 |
| 79 | 1 | 45 | 22 | 0.50 |



| Facility Type | Area Type | Posted Speed | Speed | Speed Ratio |
|---------------|-----------|--------------|-------|-------------|
| 79 | 1 | 50 | 23 | 0.50 |
| 79 | 1 | 99 | 24 | 0.50 |
| 79 | 2 | 20 | 18 | 0.50 |
| 79 | 2 | 25 | 20 | 0.50 |
| 79 | 2 | 30 | 21 | 0.50 |
| 79 | 2 | 35 | 22 | 0.50 |
| 79 | 2 | 40 | 24 | 0.50 |
| 79 | 2 | 45 | 25 | 0.50 |
| 79 | 2 | 50 | 27 | 0.50 |
| 79 | 2 | 99 | 28 | 0.50 |
| 79 | 3 | 20 | 19 | 0.50 |
| 79 | 3 | 25 | 21 | 0.50 |
| 79 | 3 | 30 | 22 | 0.50 |
| 79 | 3 | 35 | 24 | 0.50 |
| 79 | 3 | 40 | 25 | 0.50 |
| 79 | 3 | 45 | 26 | 0.50 |
| 79 | 3 | 50 | 28 | 0.50 |
| 79 | 3 | 99 | 30 | 0.50 |
| 79 | 4 | 20 | 21 | 0.50 |
| 79 | 4 | 25 | 23 | 0.50 |
| 79 | 4 | 30 | 25 | 0.50 |
| 79 | 4 | 35 | 27 | 0.50 |
| 79 | 4 | 40 | 28 | 0.50 |
| 79 | 4 | 45 | 30 | 0.50 |
| 79 | 4 | 50 | 33 | 0.50 |
| 79 | 4 | 99 | 35 | 0.50 |
| 79 | 5 | 20 | 23 | 0.50 |
| 79 | 5 | 25 | 26 | 0.50 |
| 79 | 5 | 30 | 28 | 0.50 |
| 79 | 5 | 35 | 31 | 0.50 |
| 79 | 5 | 40 | 33 | 0.50 |
| 79 | 5 | 45 | 35 | 0.50 |
| 79 | 5 | 50 | 39 | 0.50 |
| 79 | 5 | 99 | 42 | 0.50 |
| 79 | 6 | 20 | 26 | 0.50 |
| 79 | 6 | 25 | 30 | 0.50 |
| 79 | 6 | 30 | 33 | 0.50 |
| 79 | 6 | 35 | 36 | 0.50 |
| 79 | 6 | 40 | 39 | 0.50 |
| 79 | 6 | 45 | 43 | 0.50 |
| 79 | 6 | 50 | 48 | 0.50 |
| 79 | 6 | 99 | 52 | 0.50 |
| 79 | 7 | 20 | 26 | 0.99 |
| 79 | 7 | 25 | 30 | 0.99 |

| Facility Type | Area Type | Posted Speed | Speed | Speed Ratio |
|---------------|-----------|--------------|-------|-------------|
| 79 | 7 | 30 | 33 | 0.99 |
| 79 | 7 | 35 | 36 | 0.99 |
| 79 | 7 | 40 | 39 | 0.99 |
| 79 | 7 | 45 | 43 | 0.99 |
| 79 | 7 | 50 | 48 | 0.99 |
| 79 | 7 | 99 | 52 | 0.99 |
| 80 | 1 | 99 | 35 | 0.58 |
| 80 | 2 | 99 | 40 | 0.66 |
| 80 | 3 | 99 | 45 | 0.62 |
| 80 | 4 | 99 | 50 | 0.68 |
| 80 | 5 | 99 | 50 | 0.67 |
| 80 | 6 | 99 | 55 | 0.84 |
| 80 | 7 | 99 | 55 | 0.84 |
| 81 | 1 | 99 | 25 | 0.52 |
| 81 | 2 | 99 | 25 | 0.47 |
| 81 | 3 | 99 | 30 | 0.49 |
| 81 | 4 | 99 | 30 | 0.63 |
| 81 | 5 | 99 | 35 | 0.65 |
| 81 | 6 | 99 | 35 | 0.75 |
| 81 | 7 | 99 | 35 | 0.66 |
| 82 | 1 | 99 | 15 | 0.82 |
| 82 | 2 | 99 | 15 | 0.86 |
| 82 | 3 | 99 | 20 | 0.67 |
| 82 | 4 | 99 | 20 | 0.71 |
| 82 | 5 | 99 | 30 | 0.83 |
| 82 | 6 | 99 | 35 | 0.67 |
| 82 | 7 | 99 | 35 | 0.79 |
| 83 | 1 | 99 | 20 | 0.73 |
| 83 | 2 | 99 | 25 | 0.73 |
| 83 | 3 | 99 | 30 | 0.79 |
| 83 | 4 | 99 | 30 | 0.78 |
| 83 | 5 | 99 | 35 | 0.83 |
| 83 | 6 | 99 | 40 | 0.84 |
| 83 | 7 | 99 | 40 | 0.84 |
| 84 | 1 | 99 | 25 | 0.60 |
| 84 | 2 | 99 | 30 | 0.60 |
| 84 | 3 | 99 | 35 | 0.95 |
| 84 | 4 | 99 | 35 | 0.59 |
| 84 | 5 | 99 | 35 | 0.96 |
| 84 | 6 | 99 | 35 | 0.96 |
| 84 | 7 | 99 | 35 | 0.96 |
| 85 | 1 | 99 | 25 | 0.37 |
| 85 | 2 | 99 | 25 | 0.37 |
| 85 | 3 | 99 | 30 | 0.89 |

| Facility Type | Area Type | Posted Speed | Speed | Speed Ratio |
|---------------|-----------|--------------|-------|-------------|
| 85 | 4 | 99 | 30 | 0.92 |
| 85 | 5 | 99 | 35 | 0.97 |
| 85 | 6 | 99 | 35 | 0.97 |
| 85 | 7 | 99 | 35 | 0.97 |
| 86 | 1 | 99 | 40 | 0.71 |
| 86 | 2 | 99 | 45 | 0.71 |
| 86 | 3 | 99 | 45 | 0.71 |
| 86 | 4 | 99 | 50 | 0.63 |
| 86 | 5 | 99 | 55 | 0.84 |
| 86 | 6 | 99 | 55 | 0.98 |
| 86 | 7 | 99 | 55 | 0.98 |
| 89 | 1 | 99 | 15 | 0.71 |
| 89 | 2 | 99 | 15 | 0.71 |
| 89 | 3 | 99 | 20 | 0.71 |
| 89 | 4 | 99 | 20 | 0.63 |
| 89 | 5 | 99 | 30 | 0.84 |
| 89 | 6 | 99 | 35 | 0.98 |
| 89 | 7 | 99 | 35 | 0.98 |
| 90 | 1 | 99 | 65 | 0.38 |
| 90 | 2 | 99 | 65 | 0.49 |
| 90 | 3 | 99 | 65 | 0.54 |
| 90 | 4 | 99 | 65 | 0.59 |
| 90 | 5 | 99 | 65 | 0.73 |
| 90 | 6 | 99 | 65 | 0.84 |
| 90 | 7 | 99 | 65 | 0.66 |
| 99 | 1 | 99 | 65 | 0.38 |
| 99 | 2 | 99 | 65 | 0.49 |
| 99 | 3 | 99 | 65 | 0.54 |
| 99 | 4 | 99 | 65 | 0.59 |
| 99 | 5 | 99 | 65 | 0.73 |
| 99 | 6 | 99 | 65 | 0.84 |
| 99 | 7 | 99 | 65 | 0.66 |
| 100 | 1 | 99 | 20 | 1.00 |
| 100 | 2 | 99 | 20 | 1.00 |
| 100 | 3 | 99 | 20 | 1.00 |
| 100 | 4 | 99 | 20 | 1.00 |
| 100 | 5 | 99 | 20 | 1.00 |
| 100 | 6 | 99 | 20 | 1.00 |
| 100 | 7 | 99 | 20 | 1.00 |



Capacity Lookup Table

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity | Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity | Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|---------------|-----------|---------------------|------------|----------|---------------|-----------|---------------------|------------|----------|
| 10 | 1 | 99 | 99 | 2000 | 25 | 3 | 99 | 99 | 1000 | 30 | 3 | 4 | 2 | 450 |
| 10 | 2 | 99 | 99 | 2000 | 25 | 4 | 99 | 99 | 1000 | 30 | 3 | 4 | 4 | 625 |
| 10 | 3 | 99 | 99 | 2000 | 25 | 5 | 99 | 99 | 1000 | 30 | 3 | 4 | 6 | 750 |
| 10 | 4 | 99 | 99 | 2000 | 25 | 6 | 99 | 99 | 1000 | 30 | 3 | 4 | 99 | 750 |
| 10 | 5 | 99 | 99 | 2000 | 25 | 7 | 99 | 99 | 1000 | 30 | 3 | 6 | 2 | 400 |
| 10 | 6 | 99 | 99 | 2000 | 29 | 1 | 99 | 99 | 2000 | 30 | 3 | 6 | 4 | 525 |
| 10 | 7 | 99 | 99 | 2000 | 29 | 2 | 99 | 99 | 2000 | 30 | 3 | 6 | 6 | 650 |
| 19 | 1 | 99 | 99 | 2000 | 29 | 3 | 99 | 99 | 2000 | 30 | 3 | 6 | 99 | 700 |
| 19 | 2 | 99 | 99 | 2000 | 29 | 4 | 99 | 99 | 2000 | 30 | 3 | 99 | 2 | 400 |
| 19 | 3 | 99 | 99 | 2000 | 29 | 5 | 99 | 99 | 2000 | 30 | 3 | 99 | 4 | 525 |
| 19 | 4 | 99 | 99 | 2000 | 29 | 6 | 99 | 99 | 2000 | 30 | 3 | 99 | 6 | 600 |
| 19 | 5 | 99 | 99 | 2000 | 29 | 7 | 99 | 99 | 2000 | 30 | 3 | 99 | 99 | 650 |
| 19 | 6 | 99 | 99 | 2000 | 30 | 1 | 0 | 99 | 600 | 30 | 4 | 0 | 99 | 700 |
| 19 | 7 | 99 | 99 | 2000 | 30 | 1 | 2 | 2 | 475 | 30 | 4 | 2 | 2 | 550 |
| 20 | 1 | 99 | 99 | 2000 | 30 | 1 | 2 | 4 | 650 | 30 | 4 | 2 | 4 | 750 |
| 20 | 2 | 99 | 99 | 2000 | 30 | 1 | 2 | 6 | 825 | 30 | 4 | 2 | 6 | 925 |
| 20 | 3 | 99 | 99 | 2000 | 30 | 1 | 2 | 99 | 825 | 30 | 4 | 2 | 99 | 925 |
| 20 | 4 | 99 | 99 | 2000 | 30 | 1 | 4 | 2 | 425 | 30 | 4 | 4 | 2 | 475 |
| 20 | 5 | 99 | 99 | 2000 | 30 | 1 | 4 | 4 | 600 | 30 | 4 | 4 | 4 | 675 |
| 20 | 6 | 99 | 99 | 2000 | 30 | 1 | 4 | 6 | 700 | 30 | 4 | 4 | 6 | 800 |
| 20 | 7 | 99 | 99 | 2000 | 30 | 1 | 4 | 99 | 700 | 30 | 4 | 4 | 99 | 800 |
| 21 | 1 | 99 | 99 | 2000 | 30 | 1 | 6 | 2 | 375 | 30 | 4 | 6 | 2 | 425 |
| 21 | 2 | 99 | 99 | 2000 | 30 | 1 | 6 | 4 | 500 | 30 | 4 | 6 | 4 | 550 |
| 21 | 3 | 99 | 99 | 2000 | 30 | 1 | 6 | 6 | 600 | 30 | 4 | 6 | 6 | 675 |
| 21 | 4 | 99 | 99 | 2000 | 30 | 1 | 6 | 99 | 650 | 30 | 4 | 6 | 99 | 750 |
| 21 | 5 | 99 | 99 | 2000 | 30 | 1 | 99 | 2 | 375 | 30 | 4 | 99 | 2 | 425 |
| 21 | 6 | 99 | 99 | 2000 | 30 | 1 | 99 | 4 | 500 | 30 | 4 | 99 | 4 | 550 |
| 21 | 7 | 99 | 99 | 2000 | 30 | 1 | 99 | 6 | 550 | 30 | 4 | 99 | 6 | 625 |
| 22 | 1 | 99 | 99 | 1700 | 30 | 1 | 99 | 99 | 600 | 30 | 4 | 99 | 99 | 675 |
| 22 | 2 | 99 | 99 | 1700 | 30 | 2 | 0 | 99 | 650 | 30 | 5 | 0 | 99 | 725 |
| 22 | 3 | 99 | 99 | 1700 | 30 | 2 | 2 | 2 | 500 | 30 | 5 | 2 | 2 | 575 |
| 22 | 4 | 99 | 99 | 1700 | 30 | 2 | 2 | 4 | 675 | 30 | 5 | 2 | 4 | 750 |
| 22 | 5 | 99 | 99 | 1700 | 30 | 2 | 2 | 6 | 850 | 30 | 5 | 2 | 6 | 925 |
| 22 | 6 | 99 | 99 | 1700 | 30 | 2 | 2 | 99 | 850 | 30 | 5 | 2 | 99 | 925 |
| 22 | 7 | 99 | 99 | 1700 | 30 | 2 | 4 | 2 | 450 | 30 | 5 | 4 | 2 | 500 |
| 23 | 1 | 99 | 99 | 1000 | 30 | 2 | 4 | 4 | 625 | 30 | 5 | 4 | 4 | 675 |
| 23 | 2 | 99 | 99 | 1000 | 30 | 2 | 4 | 6 | 725 | 30 | 5 | 4 | 6 | 800 |
| 23 | 3 | 99 | 99 | 1000 | 30 | 2 | 4 | 99 | 725 | 30 | 5 | 4 | 99 | 800 |
| 23 | 4 | 99 | 99 | 1000 | 30 | 2 | 6 | 2 | 400 | 30 | 5 | 6 | 2 | 425 |
| 23 | 5 | 99 | 99 | 1000 | 30 | 2 | 6 | 4 | 500 | 30 | 5 | 6 | 4 | 550 |
| 23 | 6 | 99 | 99 | 1000 | 30 | 2 | 6 | 6 | 625 | 30 | 5 | 6 | 6 | 700 |
| 23 | 7 | 99 | 99 | 1000 | 30 | 2 | 6 | 99 | 675 | 30 | 5 | 6 | 99 | 750 |
| 23 | 1 | 99 | 99 | 1000 | 30 | 2 | 99 | 2 | 400 | 30 | 5 | 99 | 2 | 425 |
| 23 | 2 | 99 | 99 | 1000 | 30 | 2 | 99 | 4 | 500 | 30 | 5 | 99 | 4 | 550 |
| 23 | 3 | 99 | 99 | 1000 | 30 | 2 | 99 | 6 | 575 | 30 | 5 | 99 | 6 | 625 |
| 23 | 4 | 99 | 99 | 1000 | 30 | 2 | 99 | 99 | 625 | 30 | 5 | 99 | 99 | 700 |
| 23 | 5 | 99 | 99 | 1000 | 30 | 3 | 0 | 99 | 675 | 30 | 6 | 0 | 99 | 750 |
| 23 | 6 | 99 | 99 | 1000 | 30 | 3 | 2 | 2 | 525 | 30 | 6 | 2 | 2 | 575 |
| 23 | 7 | 99 | 99 | 1000 | 30 | 3 | 2 | 4 | 700 | 30 | 6 | 2 | 4 | 750 |
| 25 | 1 | 99 | 99 | 1000 | 30 | 3 | 2 | 6 | 875 | 30 | 6 | 2 | 6 | 925 |
| 25 | 2 | 99 | 99 | 1000 | 30 | 3 | 2 | 99 | 875 | 30 | 6 | 2 | 99 | 925 |



| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 30 | 6 | 4 | 2 | 500 |
| 30 | 6 | 4 | 4 | 675 |
| 30 | 6 | 4 | 6 | 800 |
| 30 | 6 | 4 | 99 | 800 |
| 30 | 6 | 6 | 2 | 425 |
| 30 | 6 | 6 | 4 | 550 |
| 30 | 6 | 6 | 6 | 700 |
| 30 | 6 | 6 | 99 | 750 |
| 30 | 6 | 99 | 2 | 425 |
| 30 | 6 | 99 | 4 | 550 |
| 30 | 6 | 99 | 6 | 625 |
| 30 | 6 | 99 | 99 | 700 |
| 30 | 7 | 0 | 99 | 625 |
| 30 | 7 | 2 | 2 | 575 |
| 30 | 7 | 2 | 4 | 750 |
| 30 | 7 | 2 | 6 | 925 |
| 30 | 7 | 2 | 99 | 925 |
| 30 | 7 | 4 | 2 | 500 |
| 30 | 7 | 4 | 4 | 675 |
| 30 | 7 | 4 | 6 | 800 |
| 30 | 7 | 4 | 99 | 800 |
| 30 | 7 | 6 | 2 | 425 |
| 30 | 7 | 6 | 4 | 550 |
| 30 | 7 | 6 | 6 | 700 |
| 30 | 7 | 6 | 99 | 750 |
| 30 | 7 | 99 | 2 | 425 |
| 30 | 7 | 99 | 4 | 550 |
| 30 | 7 | 99 | 6 | 625 |
| 30 | 7 | 99 | 99 | 700 |
| 31 | 1 | 0 | 99 | 600 |
| 31 | 1 | 2 | 2 | 475 |
| 31 | 1 | 2 | 4 | 650 |
| 31 | 1 | 2 | 6 | 825 |
| 31 | 1 | 2 | 99 | 825 |
| 31 | 1 | 4 | 2 | 425 |
| 31 | 1 | 4 | 4 | 600 |
| 31 | 1 | 4 | 6 | 700 |
| 31 | 1 | 4 | 99 | 700 |
| 31 | 1 | 6 | 2 | 375 |
| 31 | 1 | 6 | 4 | 500 |
| 31 | 1 | 6 | 6 | 600 |
| 31 | 1 | 6 | 99 | 650 |
| 31 | 1 | 99 | 2 | 375 |
| 31 | 1 | 99 | 4 | 500 |
| 31 | 1 | 99 | 6 | 550 |
| 31 | 1 | 99 | 99 | 600 |
| 31 | 2 | 0 | 99 | 650 |
| 31 | 2 | 2 | 2 | 500 |
| 31 | 2 | 2 | 4 | 675 |
| 31 | 2 | 2 | 6 | 850 |
| 31 | 2 | 2 | 99 | 850 |
| 31 | 2 | 4 | 2 | 450 |
| 31 | 2 | 4 | 4 | 625 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 31 | 2 | 4 | 6 | 725 |
| 31 | 2 | 4 | 99 | 725 |
| 31 | 2 | 6 | 2 | 400 |
| 31 | 2 | 6 | 4 | 500 |
| 31 | 2 | 6 | 6 | 625 |
| 31 | 2 | 6 | 99 | 675 |
| 31 | 2 | 99 | 2 | 400 |
| 31 | 2 | 99 | 4 | 500 |
| 31 | 2 | 99 | 6 | 575 |
| 31 | 2 | 99 | 99 | 625 |
| 31 | 3 | 0 | 99 | 675 |
| 31 | 3 | 2 | 2 | 525 |
| 31 | 3 | 2 | 4 | 700 |
| 31 | 3 | 2 | 6 | 875 |
| 31 | 3 | 2 | 99 | 875 |
| 31 | 3 | 4 | 2 | 450 |
| 31 | 3 | 4 | 4 | 625 |
| 31 | 3 | 4 | 6 | 750 |
| 31 | 3 | 4 | 99 | 750 |
| 31 | 3 | 6 | 2 | 400 |
| 31 | 3 | 6 | 4 | 525 |
| 31 | 3 | 6 | 6 | 650 |
| 31 | 3 | 6 | 99 | 700 |
| 31 | 3 | 99 | 2 | 400 |
| 31 | 3 | 99 | 4 | 525 |
| 31 | 3 | 99 | 6 | 600 |
| 31 | 3 | 99 | 99 | 650 |
| 31 | 4 | 0 | 99 | 700 |
| 31 | 4 | 2 | 2 | 550 |
| 31 | 4 | 2 | 4 | 750 |
| 31 | 4 | 2 | 6 | 925 |
| 31 | 4 | 2 | 99 | 925 |
| 31 | 4 | 4 | 2 | 475 |
| 31 | 4 | 4 | 4 | 675 |
| 31 | 4 | 4 | 6 | 800 |
| 31 | 4 | 4 | 99 | 800 |
| 31 | 4 | 6 | 2 | 425 |
| 31 | 4 | 6 | 4 | 550 |
| 31 | 4 | 6 | 6 | 675 |
| 31 | 4 | 6 | 99 | 750 |
| 31 | 4 | 99 | 2 | 425 |
| 31 | 4 | 99 | 4 | 550 |
| 31 | 4 | 99 | 6 | 625 |
| 31 | 4 | 99 | 99 | 675 |
| 31 | 5 | 0 | 99 | 725 |
| 31 | 5 | 2 | 2 | 575 |
| 31 | 5 | 2 | 4 | 750 |
| 31 | 5 | 2 | 6 | 925 |
| 31 | 5 | 2 | 99 | 925 |
| 31 | 5 | 4 | 2 | 500 |
| 31 | 5 | 4 | 4 | 675 |
| 31 | 5 | 4 | 6 | 800 |
| 31 | 5 | 4 | 99 | 800 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 31 | 5 | 6 | 2 | 425 |
| 31 | 5 | 6 | 4 | 550 |
| 31 | 5 | 6 | 6 | 700 |
| 31 | 5 | 6 | 99 | 750 |
| 31 | 5 | 99 | 2 | 425 |
| 31 | 5 | 99 | 4 | 550 |
| 31 | 5 | 99 | 6 | 625 |
| 31 | 5 | 99 | 99 | 700 |
| 31 | 6 | 0 | 99 | 750 |
| 31 | 6 | 2 | 2 | 575 |
| 31 | 6 | 2 | 4 | 750 |
| 31 | 6 | 2 | 6 | 925 |
| 31 | 6 | 2 | 99 | 925 |
| 31 | 6 | 4 | 2 | 500 |
| 31 | 6 | 4 | 4 | 675 |
| 31 | 6 | 4 | 6 | 800 |
| 31 | 6 | 4 | 99 | 800 |
| 31 | 6 | 6 | 2 | 425 |
| 31 | 6 | 6 | 4 | 550 |
| 31 | 6 | 6 | 6 | 700 |
| 31 | 6 | 6 | 99 | 750 |
| 31 | 6 | 99 | 2 | 425 |
| 31 | 6 | 99 | 4 | 550 |
| 31 | 6 | 99 | 6 | 625 |
| 31 | 6 | 99 | 99 | 700 |
| 31 | 7 | 0 | 99 | 625 |
| 31 | 7 | 2 | 2 | 575 |
| 31 | 7 | 2 | 4 | 750 |
| 31 | 7 | 2 | 6 | 925 |
| 31 | 7 | 2 | 99 | 925 |
| 31 | 7 | 4 | 2 | 500 |
| 31 | 7 | 4 | 4 | 675 |
| 31 | 7 | 4 | 6 | 800 |
| 31 | 7 | 4 | 99 | 800 |
| 31 | 7 | 6 | 2 | 425 |
| 31 | 7 | 6 | 4 | 550 |
| 31 | 7 | 6 | 6 | 700 |
| 31 | 7 | 6 | 99 | 750 |
| 31 | 7 | 99 | 2 | 425 |
| 31 | 7 | 99 | 4 | 550 |
| 31 | 7 | 99 | 6 | 625 |
| 31 | 7 | 99 | 99 | 700 |
| 32 | 1 | 99 | 99 | 1800 |
| 32 | 2 | 99 | 99 | 1800 |
| 32 | 3 | 99 | 99 | 1800 |
| 32 | 4 | 99 | 99 | 1800 |
| 32 | 5 | 99 | 99 | 1800 |
| 32 | 6 | 99 | 99 | 1800 |
| 32 | 7 | 99 | 99 | 1800 |
| 39 | 1 | 99 | 99 | 1800 |
| 39 | 2 | 99 | 99 | 1800 |
| 39 | 3 | 99 | 99 | 1800 |
| 39 | 4 | 99 | 99 | 1800 |



| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 39 | 5 | 99 | 99 | 1800 |
| 39 | 6 | 99 | 99 | 1800 |
| 39 | 7 | 99 | 99 | 1800 |
| 40 | 1 | 0 | 99 | 600 |
| 40 | 1 | 2 | 2 | 475 |
| 40 | 1 | 2 | 4 | 650 |
| 40 | 1 | 2 | 6 | 825 |
| 40 | 1 | 2 | 99 | 825 |
| 40 | 1 | 4 | 2 | 425 |
| 40 | 1 | 4 | 4 | 600 |
| 40 | 1 | 4 | 6 | 700 |
| 40 | 1 | 4 | 99 | 700 |
| 40 | 1 | 6 | 2 | 375 |
| 40 | 1 | 6 | 4 | 500 |
| 40 | 1 | 6 | 6 | 600 |
| 40 | 1 | 6 | 99 | 650 |
| 40 | 1 | 99 | 2 | 375 |
| 40 | 1 | 99 | 4 | 500 |
| 40 | 1 | 99 | 6 | 550 |
| 40 | 1 | 99 | 99 | 600 |
| 40 | 2 | 0 | 99 | 650 |
| 40 | 2 | 2 | 2 | 500 |
| 40 | 2 | 2 | 4 | 675 |
| 40 | 2 | 2 | 6 | 850 |
| 40 | 2 | 2 | 99 | 850 |
| 40 | 2 | 4 | 2 | 450 |
| 40 | 2 | 4 | 4 | 625 |
| 40 | 2 | 4 | 6 | 725 |
| 40 | 2 | 4 | 99 | 725 |
| 40 | 2 | 6 | 2 | 400 |
| 40 | 2 | 6 | 4 | 500 |
| 40 | 2 | 6 | 6 | 625 |
| 40 | 2 | 6 | 99 | 675 |
| 40 | 2 | 99 | 2 | 400 |
| 40 | 2 | 99 | 4 | 500 |
| 40 | 2 | 99 | 6 | 575 |
| 40 | 2 | 99 | 99 | 625 |
| 40 | 3 | 0 | 99 | 675 |
| 40 | 3 | 2 | 2 | 525 |
| 40 | 3 | 2 | 4 | 700 |
| 40 | 3 | 2 | 6 | 875 |
| 40 | 3 | 2 | 99 | 875 |
| 40 | 3 | 4 | 2 | 450 |
| 40 | 3 | 4 | 4 | 625 |
| 40 | 3 | 4 | 6 | 750 |
| 40 | 3 | 4 | 99 | 750 |
| 40 | 3 | 6 | 2 | 400 |
| 40 | 3 | 6 | 4 | 525 |
| 40 | 3 | 6 | 6 | 650 |
| 40 | 3 | 6 | 99 | 700 |
| 40 | 3 | 99 | 2 | 400 |
| 40 | 3 | 99 | 4 | 525 |
| 40 | 3 | 99 | 6 | 600 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 40 | 3 | 99 | 99 | 650 |
| 40 | 4 | 0 | 99 | 700 |
| 40 | 4 | 2 | 2 | 550 |
| 40 | 4 | 2 | 4 | 750 |
| 40 | 4 | 2 | 6 | 925 |
| 40 | 4 | 2 | 99 | 925 |
| 40 | 4 | 4 | 2 | 475 |
| 40 | 4 | 4 | 4 | 675 |
| 40 | 4 | 4 | 6 | 800 |
| 40 | 4 | 4 | 99 | 800 |
| 40 | 4 | 6 | 2 | 425 |
| 40 | 4 | 6 | 4 | 550 |
| 40 | 4 | 6 | 6 | 675 |
| 40 | 4 | 6 | 99 | 750 |
| 40 | 4 | 99 | 2 | 425 |
| 40 | 4 | 99 | 4 | 550 |
| 40 | 4 | 99 | 6 | 625 |
| 40 | 4 | 99 | 99 | 675 |
| 40 | 5 | 0 | 99 | 725 |
| 40 | 5 | 2 | 2 | 575 |
| 40 | 5 | 2 | 4 | 750 |
| 40 | 5 | 2 | 6 | 925 |
| 40 | 5 | 2 | 99 | 925 |
| 40 | 5 | 4 | 2 | 500 |
| 40 | 5 | 4 | 4 | 675 |
| 40 | 5 | 4 | 6 | 800 |
| 40 | 5 | 4 | 99 | 800 |
| 40 | 5 | 6 | 2 | 425 |
| 40 | 5 | 6 | 4 | 550 |
| 40 | 5 | 6 | 6 | 700 |
| 40 | 5 | 6 | 99 | 750 |
| 40 | 5 | 99 | 2 | 425 |
| 40 | 5 | 99 | 4 | 550 |
| 40 | 5 | 99 | 6 | 625 |
| 40 | 5 | 99 | 99 | 700 |
| 40 | 6 | 0 | 99 | 750 |
| 40 | 6 | 2 | 2 | 575 |
| 40 | 6 | 2 | 4 | 750 |
| 40 | 6 | 2 | 6 | 925 |
| 40 | 6 | 2 | 99 | 925 |
| 40 | 6 | 4 | 2 | 500 |
| 40 | 6 | 4 | 4 | 675 |
| 40 | 6 | 4 | 6 | 800 |
| 40 | 6 | 4 | 99 | 800 |
| 40 | 6 | 6 | 2 | 425 |
| 40 | 6 | 6 | 4 | 550 |
| 40 | 6 | 6 | 6 | 700 |
| 40 | 6 | 6 | 99 | 750 |
| 40 | 6 | 99 | 2 | 425 |
| 40 | 6 | 99 | 4 | 550 |
| 40 | 6 | 99 | 6 | 625 |
| 40 | 6 | 99 | 99 | 700 |
| 40 | 7 | 0 | 99 | 625 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 40 | 7 | 2 | 2 | 575 |
| 40 | 7 | 2 | 4 | 750 |
| 40 | 7 | 2 | 6 | 925 |
| 40 | 7 | 2 | 99 | 925 |
| 40 | 7 | 4 | 2 | 500 |
| 40 | 7 | 4 | 4 | 675 |
| 40 | 7 | 4 | 6 | 800 |
| 40 | 7 | 4 | 99 | 800 |
| 40 | 7 | 6 | 2 | 425 |
| 40 | 7 | 6 | 4 | 550 |
| 40 | 7 | 6 | 6 | 700 |
| 40 | 7 | 6 | 99 | 750 |
| 40 | 7 | 99 | 2 | 425 |
| 40 | 7 | 99 | 4 | 550 |
| 40 | 7 | 99 | 6 | 625 |
| 40 | 7 | 99 | 99 | 700 |
| 49 | 1 | 0 | 99 | 600 |
| 49 | 1 | 2 | 2 | 475 |
| 49 | 1 | 2 | 4 | 650 |
| 49 | 1 | 2 | 6 | 825 |
| 49 | 1 | 2 | 99 | 825 |
| 49 | 1 | 4 | 2 | 425 |
| 49 | 1 | 4 | 4 | 600 |
| 49 | 1 | 4 | 6 | 700 |
| 49 | 1 | 4 | 99 | 700 |
| 49 | 1 | 6 | 2 | 375 |
| 49 | 1 | 6 | 4 | 500 |
| 49 | 1 | 6 | 6 | 600 |
| 49 | 1 | 6 | 99 | 650 |
| 49 | 1 | 99 | 2 | 375 |
| 49 | 1 | 99 | 4 | 500 |
| 49 | 1 | 99 | 6 | 550 |
| 49 | 1 | 99 | 99 | 600 |
| 49 | 2 | 0 | 99 | 650 |
| 49 | 2 | 2 | 2 | 500 |
| 49 | 2 | 2 | 4 | 675 |
| 49 | 2 | 2 | 6 | 850 |
| 49 | 2 | 2 | 99 | 850 |
| 49 | 2 | 4 | 2 | 450 |
| 49 | 2 | 4 | 4 | 625 |
| 49 | 2 | 4 | 6 | 725 |
| 49 | 2 | 4 | 99 | 725 |
| 49 | 2 | 6 | 2 | 400 |
| 49 | 2 | 6 | 4 | 500 |
| 49 | 2 | 6 | 6 | 625 |
| 49 | 2 | 6 | 99 | 675 |
| 49 | 2 | 99 | 2 | 400 |
| 49 | 2 | 99 | 4 | 500 |
| 49 | 2 | 99 | 6 | 575 |
| 49 | 2 | 99 | 99 | 625 |
| 49 | 3 | 0 | 99 | 675 |
| 49 | 3 | 2 | 2 | 525 |
| 49 | 3 | 2 | 4 | 700 |



| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 49 | 3 | 2 | 6 | 875 |
| 49 | 3 | 2 | 99 | 875 |
| 49 | 3 | 4 | 2 | 450 |
| 49 | 3 | 4 | 4 | 625 |
| 49 | 3 | 4 | 6 | 750 |
| 49 | 3 | 4 | 99 | 750 |
| 49 | 3 | 6 | 2 | 400 |
| 49 | 3 | 6 | 4 | 525 |
| 49 | 3 | 6 | 6 | 650 |
| 49 | 3 | 6 | 99 | 700 |
| 49 | 3 | 99 | 2 | 400 |
| 49 | 3 | 99 | 4 | 525 |
| 49 | 3 | 99 | 6 | 600 |
| 49 | 3 | 99 | 99 | 650 |
| 49 | 4 | 0 | 99 | 700 |
| 49 | 4 | 2 | 2 | 550 |
| 49 | 4 | 2 | 4 | 750 |
| 49 | 4 | 2 | 6 | 925 |
| 49 | 4 | 2 | 99 | 925 |
| 49 | 4 | 4 | 2 | 475 |
| 49 | 4 | 4 | 4 | 675 |
| 49 | 4 | 4 | 6 | 800 |
| 49 | 4 | 4 | 99 | 800 |
| 49 | 4 | 6 | 2 | 425 |
| 49 | 4 | 6 | 4 | 550 |
| 49 | 4 | 6 | 6 | 675 |
| 49 | 4 | 6 | 99 | 750 |
| 49 | 4 | 99 | 2 | 425 |
| 49 | 4 | 99 | 4 | 550 |
| 49 | 4 | 99 | 6 | 625 |
| 49 | 4 | 99 | 99 | 675 |
| 49 | 5 | 0 | 99 | 725 |
| 49 | 5 | 2 | 2 | 575 |
| 49 | 5 | 2 | 4 | 750 |
| 49 | 5 | 2 | 6 | 925 |
| 49 | 5 | 2 | 99 | 925 |
| 49 | 5 | 4 | 2 | 500 |
| 49 | 5 | 4 | 4 | 675 |
| 49 | 5 | 4 | 6 | 800 |
| 49 | 5 | 4 | 99 | 800 |
| 49 | 5 | 6 | 2 | 425 |
| 49 | 5 | 6 | 4 | 550 |
| 49 | 5 | 6 | 6 | 700 |
| 49 | 5 | 6 | 99 | 750 |
| 49 | 5 | 99 | 2 | 425 |
| 49 | 5 | 99 | 4 | 550 |
| 49 | 5 | 99 | 6 | 625 |
| 49 | 5 | 99 | 99 | 700 |
| 49 | 6 | 0 | 99 | 750 |
| 49 | 6 | 2 | 2 | 575 |
| 49 | 6 | 2 | 4 | 750 |
| 49 | 6 | 2 | 6 | 925 |
| 49 | 6 | 2 | 99 | 925 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 49 | 6 | 4 | 2 | 500 |
| 49 | 6 | 4 | 4 | 675 |
| 49 | 6 | 4 | 6 | 800 |
| 49 | 6 | 4 | 99 | 800 |
| 49 | 6 | 6 | 2 | 425 |
| 49 | 6 | 6 | 4 | 550 |
| 49 | 6 | 6 | 6 | 700 |
| 49 | 6 | 6 | 99 | 750 |
| 49 | 6 | 99 | 2 | 425 |
| 49 | 6 | 99 | 4 | 550 |
| 49 | 6 | 99 | 6 | 625 |
| 49 | 6 | 99 | 99 | 700 |
| 49 | 7 | 0 | 99 | 625 |
| 49 | 7 | 2 | 2 | 575 |
| 49 | 7 | 2 | 4 | 750 |
| 49 | 7 | 2 | 6 | 925 |
| 49 | 7 | 2 | 99 | 925 |
| 49 | 7 | 4 | 2 | 500 |
| 49 | 7 | 4 | 4 | 675 |
| 49 | 7 | 4 | 6 | 800 |
| 49 | 7 | 4 | 99 | 800 |
| 49 | 7 | 6 | 2 | 425 |
| 49 | 7 | 6 | 4 | 550 |
| 49 | 7 | 6 | 6 | 700 |
| 49 | 7 | 6 | 99 | 750 |
| 49 | 7 | 99 | 2 | 425 |
| 49 | 7 | 99 | 4 | 550 |
| 49 | 7 | 99 | 6 | 625 |
| 49 | 7 | 99 | 99 | 700 |
| 50 | 1 | 0 | 99 | 550 |
| 50 | 1 | 2 | 2 | 475 |
| 50 | 1 | 2 | 4 | 650 |
| 50 | 1 | 2 | 6 | 825 |
| 50 | 1 | 2 | 99 | 825 |
| 50 | 1 | 4 | 2 | 425 |
| 50 | 1 | 4 | 4 | 600 |
| 50 | 1 | 4 | 6 | 700 |
| 50 | 1 | 4 | 99 | 700 |
| 50 | 1 | 6 | 2 | 375 |
| 50 | 1 | 6 | 4 | 500 |
| 50 | 1 | 6 | 6 | 600 |
| 50 | 1 | 6 | 99 | 650 |
| 50 | 1 | 99 | 2 | 375 |
| 50 | 1 | 99 | 4 | 500 |
| 50 | 1 | 99 | 6 | 550 |
| 50 | 1 | 99 | 99 | 600 |
| 50 | 2 | 0 | 99 | 575 |
| 50 | 2 | 2 | 2 | 500 |
| 50 | 2 | 2 | 4 | 675 |
| 50 | 2 | 2 | 6 | 850 |
| 50 | 2 | 2 | 99 | 850 |
| 50 | 2 | 4 | 2 | 450 |
| 50 | 2 | 4 | 4 | 625 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 50 | 2 | 4 | 6 | 725 |
| 50 | 2 | 4 | 99 | 725 |
| 50 | 2 | 6 | 2 | 400 |
| 50 | 2 | 6 | 4 | 500 |
| 50 | 2 | 6 | 6 | 625 |
| 50 | 2 | 6 | 99 | 675 |
| 50 | 2 | 99 | 2 | 400 |
| 50 | 2 | 99 | 4 | 500 |
| 50 | 2 | 99 | 6 | 575 |
| 50 | 2 | 99 | 99 | 625 |
| 50 | 3 | 0 | 99 | 625 |
| 50 | 3 | 2 | 2 | 525 |
| 50 | 3 | 2 | 4 | 700 |
| 50 | 3 | 2 | 6 | 875 |
| 50 | 3 | 2 | 99 | 875 |
| 50 | 3 | 4 | 2 | 450 |
| 50 | 3 | 4 | 4 | 625 |
| 50 | 3 | 4 | 6 | 750 |
| 50 | 3 | 4 | 99 | 750 |
| 50 | 3 | 6 | 2 | 400 |
| 50 | 3 | 6 | 4 | 525 |
| 50 | 3 | 6 | 6 | 650 |
| 50 | 3 | 6 | 99 | 700 |
| 50 | 3 | 99 | 2 | 400 |
| 50 | 3 | 99 | 4 | 525 |
| 50 | 3 | 99 | 6 | 600 |
| 50 | 3 | 99 | 99 | 650 |
| 50 | 4 | 0 | 99 | 575 |
| 50 | 4 | 2 | 2 | 550 |
| 50 | 4 | 2 | 4 | 750 |
| 50 | 4 | 2 | 6 | 925 |
| 50 | 4 | 2 | 99 | 925 |
| 50 | 4 | 4 | 2 | 475 |
| 50 | 4 | 4 | 4 | 675 |
| 50 | 4 | 4 | 6 | 800 |
| 50 | 4 | 4 | 99 | 800 |
| 50 | 4 | 6 | 2 | 425 |
| 50 | 4 | 6 | 4 | 550 |
| 50 | 4 | 6 | 6 | 675 |
| 50 | 4 | 6 | 99 | 750 |
| 50 | 4 | 99 | 2 | 425 |
| 50 | 4 | 99 | 4 | 550 |
| 50 | 4 | 99 | 6 | 625 |
| 50 | 4 | 99 | 99 | 675 |
| 50 | 5 | 0 | 99 | 675 |
| 50 | 5 | 2 | 2 | 575 |
| 50 | 5 | 2 | 4 | 750 |
| 50 | 5 | 2 | 6 | 925 |
| 50 | 5 | 2 | 99 | 925 |
| 50 | 5 | 4 | 2 | 500 |
| 50 | 5 | 4 | 4 | 675 |
| 50 | 5 | 4 | 6 | 800 |
| 50 | 5 | 4 | 99 | 800 |



| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 50 | 5 | 6 | 2 | 425 |
| 50 | 5 | 6 | 4 | 550 |
| 50 | 5 | 6 | 6 | 700 |
| 50 | 5 | 6 | 99 | 750 |
| 50 | 5 | 99 | 2 | 425 |
| 50 | 5 | 99 | 4 | 550 |
| 50 | 5 | 99 | 6 | 625 |
| 50 | 5 | 99 | 99 | 700 |
| 50 | 6 | 0 | 99 | 700 |
| 50 | 6 | 2 | 2 | 575 |
| 50 | 6 | 2 | 4 | 750 |
| 50 | 6 | 2 | 6 | 925 |
| 50 | 6 | 2 | 99 | 925 |
| 50 | 6 | 4 | 2 | 500 |
| 50 | 6 | 4 | 4 | 675 |
| 50 | 6 | 4 | 6 | 800 |
| 50 | 6 | 4 | 99 | 800 |
| 50 | 6 | 6 | 2 | 425 |
| 50 | 6 | 6 | 4 | 550 |
| 50 | 6 | 6 | 6 | 700 |
| 50 | 6 | 6 | 99 | 750 |
| 50 | 6 | 99 | 2 | 425 |
| 50 | 6 | 99 | 4 | 550 |
| 50 | 6 | 99 | 6 | 625 |
| 50 | 6 | 99 | 99 | 700 |
| 50 | 7 | 0 | 99 | 600 |
| 50 | 7 | 2 | 2 | 575 |
| 50 | 7 | 2 | 4 | 750 |
| 50 | 7 | 2 | 6 | 925 |
| 50 | 7 | 2 | 99 | 925 |
| 50 | 7 | 4 | 2 | 500 |
| 50 | 7 | 4 | 4 | 675 |
| 50 | 7 | 4 | 6 | 800 |
| 50 | 7 | 4 | 99 | 800 |
| 50 | 7 | 6 | 2 | 425 |
| 50 | 7 | 6 | 4 | 550 |
| 50 | 7 | 6 | 6 | 700 |
| 50 | 7 | 6 | 99 | 750 |
| 50 | 7 | 99 | 2 | 425 |
| 50 | 7 | 99 | 4 | 550 |
| 50 | 7 | 99 | 6 | 625 |
| 50 | 7 | 99 | 99 | 700 |
| 59 | 1 | 0 | 99 | 550 |
| 59 | 1 | 2 | 2 | 475 |
| 59 | 1 | 2 | 4 | 650 |
| 59 | 1 | 2 | 6 | 825 |
| 59 | 1 | 2 | 99 | 825 |
| 59 | 1 | 4 | 2 | 425 |
| 59 | 1 | 4 | 4 | 600 |
| 59 | 1 | 4 | 6 | 700 |
| 59 | 1 | 4 | 99 | 700 |
| 59 | 1 | 6 | 2 | 375 |
| 59 | 1 | 6 | 4 | 500 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 59 | 1 | 6 | 6 | 600 |
| 59 | 1 | 6 | 99 | 650 |
| 59 | 1 | 99 | 2 | 375 |
| 59 | 1 | 99 | 4 | 500 |
| 59 | 1 | 99 | 6 | 550 |
| 59 | 1 | 99 | 99 | 600 |
| 59 | 2 | 0 | 99 | 575 |
| 59 | 2 | 2 | 2 | 500 |
| 59 | 2 | 2 | 4 | 675 |
| 59 | 2 | 2 | 6 | 850 |
| 59 | 2 | 2 | 99 | 850 |
| 59 | 2 | 4 | 2 | 450 |
| 59 | 2 | 4 | 4 | 625 |
| 59 | 2 | 4 | 6 | 725 |
| 59 | 2 | 4 | 99 | 725 |
| 59 | 2 | 6 | 2 | 400 |
| 59 | 2 | 6 | 4 | 500 |
| 59 | 2 | 6 | 6 | 625 |
| 59 | 2 | 6 | 99 | 675 |
| 59 | 2 | 99 | 2 | 400 |
| 59 | 2 | 99 | 4 | 500 |
| 59 | 2 | 99 | 6 | 575 |
| 59 | 2 | 99 | 99 | 625 |
| 59 | 3 | 0 | 99 | 625 |
| 59 | 3 | 2 | 2 | 525 |
| 59 | 3 | 2 | 4 | 700 |
| 59 | 3 | 2 | 6 | 875 |
| 59 | 3 | 2 | 99 | 875 |
| 59 | 3 | 4 | 2 | 450 |
| 59 | 3 | 4 | 4 | 625 |
| 59 | 3 | 4 | 6 | 750 |
| 59 | 3 | 4 | 99 | 750 |
| 59 | 3 | 6 | 2 | 400 |
| 59 | 3 | 6 | 4 | 525 |
| 59 | 3 | 6 | 6 | 650 |
| 59 | 3 | 6 | 99 | 700 |
| 59 | 3 | 99 | 2 | 400 |
| 59 | 3 | 99 | 4 | 525 |
| 59 | 3 | 99 | 6 | 600 |
| 59 | 3 | 99 | 99 | 650 |
| 59 | 4 | 0 | 99 | 575 |
| 59 | 4 | 2 | 2 | 550 |
| 59 | 4 | 2 | 4 | 750 |
| 59 | 4 | 2 | 6 | 925 |
| 59 | 4 | 2 | 99 | 925 |
| 59 | 4 | 4 | 2 | 475 |
| 59 | 4 | 4 | 4 | 675 |
| 59 | 4 | 4 | 6 | 800 |
| 59 | 4 | 4 | 99 | 800 |
| 59 | 4 | 6 | 2 | 425 |
| 59 | 4 | 6 | 4 | 550 |
| 59 | 4 | 6 | 6 | 675 |
| 59 | 4 | 6 | 99 | 750 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 59 | 4 | 99 | 2 | 425 |
| 59 | 4 | 99 | 4 | 550 |
| 59 | 4 | 99 | 6 | 625 |
| 59 | 4 | 99 | 99 | 675 |
| 59 | 5 | 0 | 99 | 675 |
| 59 | 5 | 2 | 2 | 575 |
| 59 | 5 | 2 | 4 | 750 |
| 59 | 5 | 2 | 6 | 925 |
| 59 | 5 | 2 | 99 | 925 |
| 59 | 5 | 4 | 2 | 500 |
| 59 | 5 | 4 | 4 | 675 |
| 59 | 5 | 4 | 6 | 800 |
| 59 | 5 | 4 | 99 | 800 |
| 59 | 5 | 6 | 2 | 425 |
| 59 | 5 | 6 | 4 | 550 |
| 59 | 5 | 6 | 6 | 700 |
| 59 | 5 | 6 | 99 | 750 |
| 59 | 5 | 99 | 2 | 425 |
| 59 | 5 | 99 | 4 | 550 |
| 59 | 5 | 99 | 6 | 625 |
| 59 | 5 | 99 | 99 | 700 |
| 59 | 6 | 0 | 99 | 700 |
| 59 | 6 | 2 | 2 | 575 |
| 59 | 6 | 2 | 4 | 750 |
| 59 | 6 | 2 | 6 | 925 |
| 59 | 6 | 2 | 99 | 925 |
| 59 | 6 | 4 | 2 | 500 |
| 59 | 6 | 4 | 4 | 675 |
| 59 | 6 | 4 | 6 | 800 |
| 59 | 6 | 4 | 99 | 800 |
| 59 | 6 | 6 | 2 | 425 |
| 59 | 6 | 6 | 4 | 550 |
| 59 | 6 | 6 | 6 | 700 |
| 59 | 6 | 6 | 99 | 750 |
| 59 | 6 | 99 | 2 | 425 |
| 59 | 6 | 99 | 4 | 550 |
| 59 | 6 | 99 | 6 | 625 |
| 59 | 6 | 99 | 99 | 700 |
| 59 | 7 | 0 | 99 | 600 |
| 59 | 7 | 2 | 2 | 575 |
| 59 | 7 | 2 | 4 | 750 |
| 59 | 7 | 2 | 6 | 925 |
| 59 | 7 | 2 | 99 | 925 |
| 59 | 7 | 4 | 2 | 500 |
| 59 | 7 | 4 | 4 | 675 |
| 59 | 7 | 4 | 6 | 800 |
| 59 | 7 | 4 | 99 | 800 |
| 59 | 7 | 6 | 2 | 425 |
| 59 | 7 | 6 | 4 | 550 |
| 59 | 7 | 6 | 6 | 700 |
| 59 | 7 | 6 | 99 | 750 |
| 59 | 7 | 99 | 2 | 425 |
| 59 | 7 | 99 | 4 | 550 |



| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 59 | 7 | 99 | 6 | 625 |
| 59 | 7 | 99 | 99 | 700 |
| 60 | 1 | 0 | 99 | 500 |
| 60 | 1 | 2 | 2 | 475 |
| 60 | 1 | 2 | 4 | 650 |
| 60 | 1 | 2 | 6 | 825 |
| 60 | 1 | 2 | 99 | 825 |
| 60 | 1 | 4 | 2 | 425 |
| 60 | 1 | 4 | 4 | 600 |
| 60 | 1 | 4 | 6 | 700 |
| 60 | 1 | 4 | 99 | 700 |
| 60 | 1 | 6 | 2 | 375 |
| 60 | 1 | 6 | 4 | 500 |
| 60 | 1 | 6 | 6 | 600 |
| 60 | 1 | 6 | 99 | 650 |
| 60 | 1 | 99 | 2 | 375 |
| 60 | 1 | 99 | 4 | 500 |
| 60 | 1 | 99 | 6 | 550 |
| 60 | 1 | 99 | 99 | 600 |
| 60 | 2 | 0 | 99 | 525 |
| 60 | 2 | 2 | 2 | 500 |
| 60 | 2 | 2 | 4 | 675 |
| 60 | 2 | 2 | 6 | 850 |
| 60 | 2 | 2 | 99 | 850 |
| 60 | 2 | 4 | 2 | 450 |
| 60 | 2 | 4 | 4 | 625 |
| 60 | 2 | 4 | 6 | 725 |
| 60 | 2 | 4 | 99 | 725 |
| 60 | 2 | 6 | 2 | 400 |
| 60 | 2 | 6 | 4 | 500 |
| 60 | 2 | 6 | 6 | 625 |
| 60 | 2 | 6 | 99 | 675 |
| 60 | 2 | 99 | 2 | 400 |
| 60 | 2 | 99 | 4 | 500 |
| 60 | 2 | 99 | 6 | 575 |
| 60 | 2 | 99 | 99 | 625 |
| 60 | 3 | 0 | 99 | 550 |
| 60 | 3 | 2 | 2 | 525 |
| 60 | 3 | 2 | 4 | 700 |
| 60 | 3 | 2 | 6 | 875 |
| 60 | 3 | 2 | 99 | 875 |
| 60 | 3 | 4 | 2 | 450 |
| 60 | 3 | 4 | 4 | 625 |
| 60 | 3 | 4 | 6 | 750 |
| 60 | 3 | 4 | 99 | 750 |
| 60 | 3 | 6 | 2 | 400 |
| 60 | 3 | 6 | 4 | 525 |
| 60 | 3 | 6 | 6 | 650 |
| 60 | 3 | 6 | 99 | 700 |
| 60 | 3 | 99 | 2 | 400 |
| 60 | 3 | 99 | 4 | 525 |
| 60 | 3 | 99 | 6 | 600 |
| 60 | 3 | 99 | 99 | 650 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 60 | 4 | 0 | 99 | 575 |
| 60 | 4 | 2 | 2 | 550 |
| 60 | 4 | 2 | 4 | 750 |
| 60 | 4 | 2 | 6 | 925 |
| 60 | 4 | 2 | 99 | 925 |
| 60 | 4 | 4 | 2 | 475 |
| 60 | 4 | 4 | 4 | 675 |
| 60 | 4 | 4 | 6 | 800 |
| 60 | 4 | 4 | 99 | 800 |
| 60 | 4 | 6 | 2 | 425 |
| 60 | 4 | 6 | 4 | 550 |
| 60 | 4 | 6 | 6 | 675 |
| 60 | 4 | 6 | 99 | 750 |
| 60 | 4 | 99 | 2 | 425 |
| 60 | 4 | 99 | 4 | 550 |
| 60 | 4 | 99 | 6 | 625 |
| 60 | 4 | 99 | 99 | 675 |
| 60 | 5 | 0 | 99 | 600 |
| 60 | 5 | 2 | 2 | 575 |
| 60 | 5 | 2 | 4 | 750 |
| 60 | 5 | 2 | 6 | 925 |
| 60 | 5 | 2 | 99 | 925 |
| 60 | 5 | 4 | 2 | 500 |
| 60 | 5 | 4 | 4 | 675 |
| 60 | 5 | 4 | 6 | 800 |
| 60 | 5 | 4 | 99 | 800 |
| 60 | 5 | 6 | 2 | 425 |
| 60 | 5 | 6 | 4 | 550 |
| 60 | 5 | 6 | 6 | 700 |
| 60 | 5 | 6 | 99 | 750 |
| 60 | 5 | 99 | 2 | 425 |
| 60 | 5 | 99 | 4 | 550 |
| 60 | 5 | 99 | 6 | 625 |
| 60 | 5 | 99 | 99 | 700 |
| 60 | 6 | 0 | 99 | 625 |
| 60 | 6 | 2 | 2 | 575 |
| 60 | 6 | 2 | 4 | 750 |
| 60 | 6 | 2 | 6 | 925 |
| 60 | 6 | 2 | 99 | 925 |
| 60 | 6 | 4 | 2 | 500 |
| 60 | 6 | 4 | 4 | 675 |
| 60 | 6 | 4 | 6 | 800 |
| 60 | 6 | 4 | 99 | 800 |
| 60 | 6 | 6 | 2 | 425 |
| 60 | 6 | 6 | 4 | 550 |
| 60 | 6 | 6 | 6 | 700 |
| 60 | 6 | 6 | 99 | 750 |
| 60 | 6 | 99 | 2 | 425 |
| 60 | 6 | 99 | 4 | 550 |
| 60 | 6 | 99 | 6 | 625 |
| 60 | 6 | 99 | 99 | 700 |
| 60 | 7 | 0 | 99 | 575 |
| 60 | 7 | 2 | 2 | 575 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 60 | 7 | 2 | 4 | 750 |
| 60 | 7 | 2 | 6 | 925 |
| 60 | 7 | 2 | 99 | 925 |
| 60 | 7 | 4 | 2 | 500 |
| 60 | 7 | 4 | 4 | 675 |
| 60 | 7 | 4 | 6 | 800 |
| 60 | 7 | 4 | 99 | 800 |
| 60 | 7 | 6 | 2 | 425 |
| 60 | 7 | 6 | 4 | 550 |
| 60 | 7 | 6 | 6 | 700 |
| 60 | 7 | 6 | 99 | 750 |
| 60 | 7 | 99 | 2 | 425 |
| 60 | 7 | 99 | 4 | 550 |
| 60 | 7 | 99 | 6 | 625 |
| 60 | 7 | 99 | 99 | 700 |
| 69 | 1 | 0 | 99 | 500 |
| 69 | 1 | 2 | 2 | 475 |
| 69 | 1 | 2 | 4 | 650 |
| 69 | 1 | 2 | 6 | 825 |
| 69 | 1 | 2 | 99 | 825 |
| 69 | 1 | 4 | 2 | 425 |
| 69 | 1 | 4 | 4 | 600 |
| 69 | 1 | 4 | 6 | 700 |
| 69 | 1 | 4 | 99 | 700 |
| 69 | 1 | 6 | 2 | 375 |
| 69 | 1 | 6 | 4 | 500 |
| 69 | 1 | 6 | 6 | 600 |
| 69 | 1 | 6 | 99 | 650 |
| 69 | 1 | 99 | 2 | 375 |
| 69 | 1 | 99 | 4 | 500 |
| 69 | 1 | 99 | 6 | 550 |
| 69 | 1 | 99 | 99 | 600 |
| 69 | 2 | 0 | 99 | 525 |
| 69 | 2 | 2 | 2 | 500 |
| 69 | 2 | 2 | 4 | 675 |
| 69 | 2 | 2 | 6 | 850 |
| 69 | 2 | 2 | 99 | 850 |
| 69 | 2 | 4 | 2 | 450 |
| 69 | 2 | 4 | 4 | 625 |
| 69 | 2 | 4 | 6 | 725 |
| 69 | 2 | 4 | 99 | 725 |
| 69 | 2 | 6 | 2 | 400 |
| 69 | 2 | 6 | 4 | 500 |
| 69 | 2 | 6 | 6 | 625 |
| 69 | 2 | 6 | 99 | 675 |
| 69 | 2 | 99 | 2 | 400 |
| 69 | 2 | 99 | 4 | 500 |
| 69 | 2 | 99 | 6 | 575 |
| 69 | 2 | 99 | 99 | 625 |
| 69 | 3 | 0 | 99 | 550 |
| 69 | 3 | 2 | 2 | 525 |
| 69 | 3 | 2 | 4 | 700 |
| 69 | 3 | 2 | 6 | 875 |
| 69 | 3 | 2 | 99 | 875 |



| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 69 | 3 | 2 | 99 | 875 |
| 69 | 3 | 4 | 2 | 450 |
| 69 | 3 | 4 | 4 | 625 |
| 69 | 3 | 4 | 6 | 750 |
| 69 | 3 | 4 | 99 | 750 |
| 69 | 3 | 6 | 2 | 400 |
| 69 | 3 | 6 | 4 | 525 |
| 69 | 3 | 6 | 6 | 650 |
| 69 | 3 | 6 | 99 | 700 |
| 69 | 3 | 99 | 2 | 400 |
| 69 | 3 | 99 | 4 | 525 |
| 69 | 3 | 99 | 6 | 600 |
| 69 | 3 | 99 | 99 | 650 |
| 69 | 4 | 0 | 99 | 575 |
| 69 | 4 | 2 | 2 | 550 |
| 69 | 4 | 2 | 4 | 750 |
| 69 | 4 | 2 | 6 | 925 |
| 69 | 4 | 2 | 99 | 925 |
| 69 | 4 | 4 | 2 | 475 |
| 69 | 4 | 4 | 4 | 675 |
| 69 | 4 | 4 | 6 | 800 |
| 69 | 4 | 4 | 99 | 800 |
| 69 | 4 | 6 | 2 | 425 |
| 69 | 4 | 6 | 4 | 550 |
| 69 | 4 | 6 | 6 | 675 |
| 69 | 4 | 6 | 99 | 750 |
| 69 | 4 | 99 | 2 | 425 |
| 69 | 4 | 99 | 4 | 550 |
| 69 | 4 | 99 | 6 | 625 |
| 69 | 4 | 99 | 99 | 675 |
| 69 | 5 | 0 | 99 | 600 |
| 69 | 5 | 2 | 2 | 575 |
| 69 | 5 | 2 | 4 | 750 |
| 69 | 5 | 2 | 6 | 925 |
| 69 | 5 | 2 | 99 | 925 |
| 69 | 5 | 4 | 2 | 500 |
| 69 | 5 | 4 | 4 | 675 |
| 69 | 5 | 4 | 6 | 800 |
| 69 | 5 | 4 | 99 | 800 |
| 69 | 5 | 6 | 2 | 425 |
| 69 | 5 | 6 | 4 | 550 |
| 69 | 5 | 6 | 6 | 700 |
| 69 | 5 | 6 | 99 | 750 |
| 69 | 5 | 99 | 2 | 425 |
| 69 | 5 | 99 | 4 | 550 |
| 69 | 5 | 99 | 6 | 625 |
| 69 | 5 | 99 | 99 | 700 |
| 69 | 6 | 0 | 99 | 625 |
| 69 | 6 | 2 | 2 | 575 |
| 69 | 6 | 2 | 4 | 750 |
| 69 | 6 | 2 | 6 | 925 |
| 69 | 6 | 2 | 99 | 925 |
| 69 | 6 | 4 | 2 | 500 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 69 | 6 | 4 | 4 | 675 |
| 69 | 6 | 4 | 6 | 800 |
| 69 | 6 | 4 | 99 | 800 |
| 69 | 6 | 6 | 2 | 425 |
| 69 | 6 | 6 | 4 | 550 |
| 69 | 6 | 6 | 6 | 700 |
| 69 | 6 | 6 | 99 | 750 |
| 69 | 6 | 99 | 2 | 425 |
| 69 | 6 | 99 | 4 | 550 |
| 69 | 6 | 99 | 6 | 625 |
| 69 | 6 | 99 | 99 | 700 |
| 69 | 7 | 0 | 99 | 575 |
| 69 | 7 | 2 | 2 | 575 |
| 69 | 7 | 2 | 4 | 750 |
| 69 | 7 | 2 | 6 | 925 |
| 69 | 7 | 2 | 99 | 925 |
| 69 | 7 | 4 | 2 | 500 |
| 69 | 7 | 4 | 4 | 675 |
| 69 | 7 | 4 | 6 | 800 |
| 69 | 7 | 4 | 99 | 800 |
| 69 | 7 | 6 | 2 | 425 |
| 69 | 7 | 6 | 4 | 550 |
| 69 | 7 | 6 | 6 | 700 |
| 69 | 7 | 6 | 99 | 750 |
| 69 | 7 | 99 | 2 | 425 |
| 69 | 7 | 99 | 4 | 550 |
| 69 | 7 | 99 | 6 | 625 |
| 69 | 7 | 99 | 99 | 700 |
| 70 | 1 | 0 | 99 | 500 |
| 70 | 1 | 2 | 2 | 475 |
| 70 | 1 | 2 | 4 | 650 |
| 70 | 1 | 2 | 6 | 825 |
| 70 | 1 | 2 | 99 | 825 |
| 70 | 1 | 4 | 2 | 425 |
| 70 | 1 | 4 | 4 | 600 |
| 70 | 1 | 4 | 6 | 700 |
| 70 | 1 | 4 | 99 | 700 |
| 70 | 1 | 6 | 2 | 375 |
| 70 | 1 | 6 | 4 | 500 |
| 70 | 1 | 6 | 6 | 600 |
| 70 | 1 | 6 | 99 | 650 |
| 70 | 1 | 99 | 2 | 375 |
| 70 | 1 | 99 | 4 | 500 |
| 70 | 1 | 99 | 6 | 550 |
| 70 | 1 | 99 | 99 | 600 |
| 70 | 2 | 0 | 99 | 525 |
| 70 | 2 | 2 | 2 | 500 |
| 70 | 2 | 2 | 4 | 675 |
| 70 | 2 | 2 | 6 | 850 |
| 70 | 2 | 2 | 99 | 850 |
| 70 | 2 | 4 | 2 | 450 |
| 70 | 2 | 4 | 4 | 625 |
| 70 | 2 | 4 | 6 | 725 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 70 | 2 | 4 | 99 | 725 |
| 70 | 2 | 6 | 2 | 400 |
| 70 | 2 | 6 | 4 | 500 |
| 70 | 2 | 6 | 6 | 625 |
| 70 | 2 | 6 | 99 | 675 |
| 70 | 2 | 99 | 2 | 400 |
| 70 | 2 | 99 | 4 | 500 |
| 70 | 2 | 99 | 6 | 575 |
| 70 | 2 | 99 | 99 | 625 |
| 70 | 3 | 0 | 99 | 550 |
| 70 | 3 | 2 | 2 | 525 |
| 70 | 3 | 2 | 4 | 700 |
| 70 | 3 | 2 | 6 | 875 |
| 70 | 3 | 2 | 99 | 875 |
| 70 | 3 | 4 | 2 | 450 |
| 70 | 3 | 4 | 4 | 625 |
| 70 | 3 | 4 | 6 | 750 |
| 70 | 3 | 4 | 99 | 750 |
| 70 | 3 | 6 | 2 | 400 |
| 70 | 3 | 6 | 4 | 525 |
| 70 | 3 | 6 | 6 | 650 |
| 70 | 3 | 6 | 99 | 700 |
| 70 | 3 | 99 | 2 | 400 |
| 70 | 3 | 99 | 4 | 525 |
| 70 | 3 | 99 | 6 | 600 |
| 70 | 3 | 99 | 99 | 650 |
| 70 | 4 | 0 | 99 | 575 |
| 70 | 4 | 2 | 2 | 550 |
| 70 | 4 | 2 | 4 | 750 |
| 70 | 4 | 2 | 6 | 925 |
| 70 | 4 | 2 | 99 | 925 |
| 70 | 4 | 4 | 2 | 475 |
| 70 | 4 | 4 | 4 | 675 |
| 70 | 4 | 4 | 6 | 800 |
| 70 | 4 | 4 | 99 | 800 |
| 70 | 4 | 6 | 2 | 425 |
| 70 | 4 | 6 | 4 | 550 |
| 70 | 4 | 6 | 6 | 675 |
| 70 | 4 | 6 | 99 | 750 |
| 70 | 4 | 99 | 2 | 425 |
| 70 | 4 | 99 | 4 | 550 |
| 70 | 4 | 99 | 6 | 625 |
| 70 | 4 | 99 | 99 | 675 |
| 70 | 5 | 0 | 99 | 600 |
| 70 | 5 | 2 | 2 | 575 |
| 70 | 5 | 2 | 4 | 750 |
| 70 | 5 | 2 | 6 | 925 |
| 70 | 5 | 2 | 99 | 925 |
| 70 | 5 | 4 | 2 | 500 |
| 70 | 5 | 4 | 4 | 675 |
| 70 | 5 | 4 | 6 | 800 |
| 70 | 5 | 4 | 99 | 800 |
| 70 | 5 | 4 | 6 | 725 |



| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 70 | 5 | 6 | 4 | 550 |
| 70 | 5 | 6 | 6 | 700 |
| 70 | 5 | 6 | 99 | 750 |
| 70 | 5 | 99 | 2 | 425 |
| 70 | 5 | 99 | 4 | 550 |
| 70 | 5 | 99 | 6 | 625 |
| 70 | 5 | 99 | 99 | 700 |
| 70 | 6 | 0 | 99 | 625 |
| 70 | 6 | 2 | 2 | 575 |
| 70 | 6 | 2 | 4 | 750 |
| 70 | 6 | 2 | 6 | 925 |
| 70 | 6 | 2 | 99 | 925 |
| 70 | 6 | 4 | 2 | 500 |
| 70 | 6 | 4 | 4 | 675 |
| 70 | 6 | 4 | 6 | 800 |
| 70 | 6 | 4 | 99 | 800 |
| 70 | 6 | 6 | 2 | 425 |
| 70 | 6 | 6 | 4 | 550 |
| 70 | 6 | 6 | 6 | 700 |
| 70 | 6 | 6 | 99 | 750 |
| 70 | 6 | 99 | 2 | 425 |
| 70 | 6 | 99 | 4 | 550 |
| 70 | 6 | 99 | 6 | 625 |
| 70 | 6 | 99 | 99 | 700 |
| 70 | 7 | 0 | 99 | 575 |
| 70 | 7 | 2 | 2 | 575 |
| 70 | 7 | 2 | 4 | 750 |
| 70 | 7 | 2 | 6 | 925 |
| 70 | 7 | 2 | 99 | 925 |
| 70 | 7 | 4 | 2 | 500 |
| 70 | 7 | 4 | 4 | 675 |
| 70 | 7 | 4 | 6 | 800 |
| 70 | 7 | 4 | 99 | 800 |
| 70 | 7 | 6 | 2 | 425 |
| 70 | 7 | 6 | 4 | 550 |
| 70 | 7 | 6 | 6 | 700 |
| 70 | 7 | 6 | 99 | 750 |
| 70 | 7 | 99 | 2 | 425 |
| 70 | 7 | 99 | 4 | 550 |
| 70 | 7 | 99 | 6 | 625 |
| 70 | 7 | 99 | 99 | 700 |
| 79 | 1 | 0 | 99 | 500 |
| 79 | 1 | 2 | 2 | 475 |
| 79 | 1 | 2 | 4 | 650 |
| 79 | 1 | 2 | 6 | 825 |
| 79 | 1 | 2 | 99 | 825 |
| 79 | 1 | 4 | 2 | 425 |
| 79 | 1 | 4 | 4 | 600 |
| 79 | 1 | 4 | 6 | 700 |
| 79 | 1 | 4 | 99 | 700 |
| 79 | 1 | 6 | 2 | 375 |
| 79 | 1 | 6 | 4 | 500 |
| 79 | 1 | 6 | 6 | 600 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 79 | 1 | 6 | 99 | 650 |
| 79 | 1 | 99 | 2 | 375 |
| 79 | 1 | 99 | 4 | 500 |
| 79 | 1 | 99 | 6 | 550 |
| 79 | 1 | 99 | 99 | 600 |
| 79 | 2 | 0 | 99 | 525 |
| 79 | 2 | 2 | 2 | 500 |
| 79 | 2 | 2 | 4 | 675 |
| 79 | 2 | 2 | 6 | 850 |
| 79 | 2 | 2 | 99 | 850 |
| 79 | 2 | 4 | 2 | 450 |
| 79 | 2 | 4 | 4 | 625 |
| 79 | 2 | 4 | 6 | 725 |
| 79 | 2 | 4 | 99 | 725 |
| 79 | 2 | 6 | 2 | 400 |
| 79 | 2 | 6 | 4 | 500 |
| 79 | 2 | 6 | 6 | 625 |
| 79 | 2 | 6 | 99 | 675 |
| 79 | 2 | 99 | 2 | 400 |
| 79 | 2 | 99 | 4 | 500 |
| 79 | 2 | 99 | 6 | 575 |
| 79 | 2 | 99 | 99 | 625 |
| 79 | 3 | 0 | 99 | 550 |
| 79 | 3 | 2 | 2 | 525 |
| 79 | 3 | 2 | 4 | 700 |
| 79 | 3 | 2 | 6 | 875 |
| 79 | 3 | 2 | 99 | 875 |
| 79 | 3 | 4 | 2 | 450 |
| 79 | 3 | 4 | 4 | 625 |
| 79 | 3 | 4 | 6 | 750 |
| 79 | 3 | 4 | 99 | 750 |
| 79 | 3 | 6 | 2 | 400 |
| 79 | 3 | 6 | 4 | 525 |
| 79 | 3 | 6 | 6 | 650 |
| 79 | 3 | 6 | 99 | 700 |
| 79 | 3 | 99 | 2 | 400 |
| 79 | 3 | 99 | 4 | 525 |
| 79 | 3 | 99 | 6 | 600 |
| 79 | 3 | 99 | 99 | 650 |
| 79 | 4 | 0 | 99 | 575 |
| 79 | 4 | 2 | 2 | 550 |
| 79 | 4 | 2 | 4 | 750 |
| 79 | 4 | 2 | 6 | 925 |
| 79 | 4 | 2 | 99 | 925 |
| 79 | 4 | 4 | 2 | 475 |
| 79 | 4 | 4 | 4 | 675 |
| 79 | 4 | 4 | 6 | 800 |
| 79 | 4 | 4 | 99 | 800 |
| 79 | 4 | 6 | 2 | 425 |
| 79 | 4 | 6 | 4 | 550 |
| 79 | 4 | 6 | 6 | 675 |
| 79 | 4 | 6 | 99 | 750 |
| 79 | 4 | 99 | 2 | 425 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 79 | 4 | 99 | 4 | 550 |
| 79 | 4 | 99 | 6 | 625 |
| 79 | 4 | 99 | 99 | 675 |
| 79 | 5 | 0 | 99 | 600 |
| 79 | 5 | 2 | 2 | 575 |
| 79 | 5 | 2 | 4 | 750 |
| 79 | 5 | 2 | 6 | 925 |
| 79 | 5 | 2 | 99 | 925 |
| 79 | 5 | 4 | 2 | 500 |
| 79 | 5 | 4 | 4 | 675 |
| 79 | 5 | 4 | 6 | 800 |
| 79 | 5 | 4 | 99 | 800 |
| 79 | 5 | 6 | 2 | 425 |
| 79 | 5 | 6 | 4 | 550 |
| 79 | 5 | 6 | 6 | 700 |
| 79 | 5 | 6 | 99 | 750 |
| 79 | 5 | 99 | 2 | 425 |
| 79 | 5 | 99 | 4 | 550 |
| 79 | 5 | 99 | 6 | 625 |
| 79 | 5 | 99 | 99 | 700 |
| 79 | 6 | 0 | 99 | 625 |
| 79 | 6 | 2 | 2 | 575 |
| 79 | 6 | 2 | 4 | 750 |
| 79 | 6 | 2 | 6 | 925 |
| 79 | 6 | 2 | 99 | 925 |
| 79 | 6 | 4 | 4 | 500 |
| 79 | 6 | 4 | 6 | 675 |
| 79 | 6 | 4 | 99 | 800 |
| 79 | 6 | 4 | 99 | 800 |
| 79 | 6 | 6 | 2 | 425 |
| 79 | 6 | 6 | 4 | 550 |
| 79 | 6 | 6 | 6 | 700 |
| 79 | 6 | 6 | 99 | 750 |
| 79 | 6 | 99 | 2 | 425 |
| 79 | 6 | 99 | 4 | 550 |
| 79 | 6 | 99 | 6 | 625 |
| 79 | 6 | 99 | 99 | 700 |
| 79 | 7 | 0 | 99 | 575 |
| 79 | 7 | 2 | 2 | 575 |
| 79 | 7 | 2 | 4 | 750 |
| 79 | 7 | 2 | 6 | 925 |
| 79 | 7 | 2 | 99 | 925 |
| 79 | 7 | 4 | 2 | 500 |
| 79 | 7 | 4 | 4 | 675 |
| 79 | 7 | 4 | 6 | 800 |
| 79 | 7 | 4 | 99 | 800 |
| 79 | 7 | 6 | 2 | 425 |
| 79 | 7 | 6 | 4 | 550 |
| 79 | 7 | 6 | 6 | 700 |
| 79 | 7 | 6 | 99 | 750 |
| 79 | 7 | 99 | 2 | 425 |
| 79 | 7 | 99 | 4 | 550 |
| 79 | 7 | 99 | 6 | 625 |



| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 79 | 7 | 99 | 99 | 700 |
| 80 | 1 | 99 | 99 | 1700 |
| 80 | 2 | 99 | 99 | 1700 |
| 80 | 3 | 99 | 99 | 1700 |
| 80 | 4 | 99 | 99 | 1700 |
| 80 | 5 | 99 | 99 | 1700 |
| 80 | 6 | 99 | 99 | 1700 |
| 80 | 7 | 99 | 99 | 1700 |
| 81 | 1 | 0 | 99 | 600 |
| 81 | 1 | 2 | 2 | 475 |
| 81 | 1 | 2 | 4 | 650 |
| 81 | 1 | 2 | 6 | 825 |
| 81 | 1 | 2 | 99 | 825 |
| 81 | 1 | 4 | 2 | 425 |
| 81 | 1 | 4 | 4 | 600 |
| 81 | 1 | 4 | 6 | 700 |
| 81 | 1 | 4 | 99 | 700 |
| 81 | 1 | 6 | 2 | 375 |
| 81 | 1 | 6 | 4 | 500 |
| 81 | 1 | 6 | 6 | 600 |
| 81 | 1 | 6 | 99 | 650 |
| 81 | 1 | 99 | 2 | 375 |
| 81 | 1 | 99 | 4 | 500 |
| 81 | 1 | 99 | 6 | 550 |
| 81 | 1 | 99 | 99 | 600 |
| 81 | 2 | 0 | 99 | 650 |
| 81 | 2 | 2 | 2 | 500 |
| 81 | 2 | 2 | 4 | 675 |
| 81 | 2 | 2 | 6 | 850 |
| 81 | 2 | 2 | 99 | 850 |
| 81 | 2 | 4 | 2 | 450 |
| 81 | 2 | 4 | 4 | 625 |
| 81 | 2 | 4 | 6 | 725 |
| 81 | 2 | 4 | 99 | 725 |
| 81 | 2 | 6 | 2 | 400 |
| 81 | 2 | 6 | 4 | 500 |
| 81 | 2 | 6 | 6 | 625 |
| 81 | 2 | 6 | 99 | 675 |
| 81 | 2 | 99 | 2 | 400 |
| 81 | 2 | 99 | 4 | 500 |
| 81 | 2 | 99 | 6 | 575 |
| 81 | 2 | 99 | 99 | 625 |
| 81 | 3 | 0 | 99 | 675 |
| 81 | 3 | 2 | 2 | 525 |
| 81 | 3 | 2 | 4 | 700 |
| 81 | 3 | 2 | 6 | 875 |
| 81 | 3 | 2 | 99 | 875 |
| 81 | 3 | 4 | 2 | 450 |
| 81 | 3 | 4 | 4 | 625 |
| 81 | 3 | 4 | 6 | 750 |
| 81 | 3 | 4 | 99 | 750 |
| 81 | 3 | 6 | 2 | 400 |
| 81 | 3 | 6 | 4 | 525 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 81 | 3 | 6 | 6 | 650 |
| 81 | 3 | 6 | 99 | 700 |
| 81 | 3 | 99 | 2 | 400 |
| 81 | 3 | 99 | 4 | 525 |
| 81 | 3 | 99 | 6 | 600 |
| 81 | 3 | 99 | 99 | 650 |
| 81 | 4 | 0 | 99 | 700 |
| 81 | 4 | 2 | 2 | 550 |
| 81 | 4 | 2 | 4 | 750 |
| 81 | 4 | 2 | 6 | 925 |
| 81 | 4 | 2 | 99 | 925 |
| 81 | 4 | 4 | 2 | 475 |
| 81 | 4 | 4 | 4 | 675 |
| 81 | 4 | 4 | 6 | 800 |
| 81 | 4 | 4 | 99 | 800 |
| 81 | 4 | 6 | 2 | 425 |
| 81 | 4 | 6 | 4 | 550 |
| 81 | 4 | 6 | 6 | 675 |
| 81 | 4 | 6 | 99 | 750 |
| 81 | 4 | 99 | 2 | 425 |
| 81 | 4 | 99 | 4 | 550 |
| 81 | 4 | 99 | 6 | 625 |
| 81 | 4 | 99 | 99 | 675 |
| 81 | 5 | 0 | 99 | 725 |
| 81 | 5 | 2 | 2 | 575 |
| 81 | 5 | 2 | 4 | 750 |
| 81 | 5 | 2 | 6 | 925 |
| 81 | 5 | 2 | 99 | 925 |
| 81 | 5 | 4 | 2 | 500 |
| 81 | 5 | 4 | 4 | 675 |
| 81 | 5 | 4 | 6 | 800 |
| 81 | 5 | 4 | 99 | 800 |
| 81 | 5 | 6 | 2 | 425 |
| 81 | 5 | 6 | 4 | 550 |
| 81 | 5 | 6 | 6 | 700 |
| 81 | 5 | 6 | 99 | 750 |
| 81 | 5 | 99 | 2 | 425 |
| 81 | 5 | 99 | 4 | 550 |
| 81 | 5 | 99 | 6 | 625 |
| 81 | 5 | 99 | 99 | 700 |
| 81 | 6 | 0 | 99 | 750 |
| 81 | 6 | 2 | 2 | 575 |
| 81 | 6 | 2 | 4 | 750 |
| 81 | 6 | 2 | 6 | 925 |
| 81 | 6 | 2 | 99 | 925 |
| 81 | 6 | 4 | 2 | 500 |
| 81 | 6 | 4 | 4 | 675 |
| 81 | 6 | 4 | 6 | 800 |
| 81 | 6 | 4 | 99 | 800 |
| 81 | 6 | 6 | 2 | 425 |
| 81 | 6 | 6 | 4 | 550 |
| 81 | 6 | 6 | 6 | 700 |
| 81 | 6 | 6 | 99 | 750 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 81 | 6 | 99 | 2 | 425 |
| 81 | 6 | 99 | 4 | 550 |
| 81 | 6 | 99 | 6 | 625 |
| 81 | 6 | 99 | 99 | 700 |
| 81 | 7 | 0 | 99 | 625 |
| 81 | 7 | 2 | 2 | 575 |
| 81 | 7 | 2 | 4 | 750 |
| 81 | 7 | 2 | 6 | 925 |
| 81 | 7 | 2 | 99 | 925 |
| 81 | 7 | 4 | 2 | 500 |
| 81 | 7 | 4 | 4 | 675 |
| 81 | 7 | 4 | 6 | 800 |
| 81 | 7 | 4 | 99 | 800 |
| 81 | 7 | 6 | 2 | 425 |
| 81 | 7 | 6 | 4 | 550 |
| 81 | 7 | 6 | 6 | 700 |
| 81 | 7 | 6 | 99 | 750 |
| 81 | 7 | 99 | 2 | 425 |
| 81 | 7 | 99 | 4 | 550 |
| 81 | 7 | 99 | 6 | 625 |
| 81 | 7 | 99 | 99 | 700 |
| 82 | 1 | 99 | 99 | 720 |
| 82 | 2 | 99 | 99 | 720 |
| 82 | 3 | 99 | 99 | 720 |
| 82 | 4 | 99 | 99 | 720 |
| 82 | 5 | 99 | 99 | 1400 |
| 82 | 6 | 99 | 99 | 1400 |
| 82 | 7 | 99 | 99 | 1400 |
| 83 | 1 | 99 | 99 | 1000 |
| 83 | 2 | 99 | 99 | 1000 |
| 83 | 3 | 99 | 99 | 1000 |
| 83 | 4 | 99 | 99 | 1000 |
| 83 | 5 | 99 | 99 | 1000 |
| 83 | 6 | 99 | 99 | 1000 |
| 83 | 7 | 99 | 99 | 1000 |
| 84 | 1 | 99 | 99 | 1300 |
| 84 | 2 | 99 | 99 | 1300 |
| 84 | 3 | 99 | 99 | 1300 |
| 84 | 4 | 99 | 99 | 1300 |
| 84 | 5 | 99 | 99 | 1400 |
| 84 | 6 | 99 | 99 | 1400 |
| 84 | 7 | 99 | 99 | 1400 |
| 85 | 1 | 0 | 99 | 600 |
| 85 | 1 | 2 | 2 | 475 |
| 85 | 1 | 2 | 4 | 650 |
| 85 | 1 | 2 | 6 | 825 |
| 85 | 1 | 2 | 99 | 825 |
| 85 | 1 | 4 | 2 | 425 |
| 85 | 1 | 4 | 4 | 600 |
| 85 | 1 | 4 | 6 | 700 |
| 85 | 1 | 4 | 99 | 700 |
| 85 | 1 | 6 | 2 | 375 |
| 85 | 1 | 6 | 4 | 500 |



| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 85 | 1 | 6 | 6 | 600 |
| 85 | 1 | 6 | 99 | 650 |
| 85 | 1 | 99 | 2 | 375 |
| 85 | 1 | 99 | 4 | 500 |
| 85 | 1 | 99 | 6 | 550 |
| 85 | 1 | 99 | 99 | 600 |
| 85 | 2 | 0 | 99 | 650 |
| 85 | 2 | 2 | 2 | 500 |
| 85 | 2 | 2 | 4 | 675 |
| 85 | 2 | 2 | 6 | 850 |
| 85 | 2 | 2 | 99 | 850 |
| 85 | 2 | 4 | 2 | 450 |
| 85 | 2 | 4 | 4 | 625 |
| 85 | 2 | 4 | 6 | 725 |
| 85 | 2 | 4 | 99 | 725 |
| 85 | 2 | 6 | 2 | 400 |
| 85 | 2 | 6 | 4 | 500 |
| 85 | 2 | 6 | 6 | 625 |
| 85 | 2 | 6 | 99 | 675 |
| 85 | 2 | 99 | 2 | 400 |
| 85 | 2 | 99 | 4 | 500 |
| 85 | 2 | 99 | 6 | 575 |
| 85 | 2 | 99 | 99 | 625 |
| 85 | 3 | 0 | 99 | 675 |
| 85 | 3 | 2 | 2 | 525 |
| 85 | 3 | 2 | 4 | 700 |
| 85 | 3 | 2 | 6 | 875 |
| 85 | 3 | 2 | 99 | 875 |
| 85 | 3 | 4 | 2 | 450 |
| 85 | 3 | 4 | 4 | 625 |
| 85 | 3 | 4 | 6 | 750 |
| 85 | 3 | 4 | 99 | 750 |
| 85 | 3 | 6 | 2 | 400 |
| 85 | 3 | 6 | 4 | 525 |
| 85 | 3 | 6 | 6 | 650 |
| 85 | 3 | 6 | 99 | 700 |
| 85 | 3 | 99 | 2 | 400 |
| 85 | 3 | 99 | 4 | 525 |
| 85 | 3 | 99 | 6 | 600 |
| 85 | 3 | 99 | 99 | 650 |
| 85 | 4 | 0 | 99 | 700 |
| 85 | 4 | 2 | 2 | 550 |
| 85 | 4 | 2 | 4 | 750 |
| 85 | 4 | 2 | 6 | 925 |
| 85 | 4 | 2 | 99 | 925 |
| 85 | 4 | 4 | 2 | 475 |
| 85 | 4 | 4 | 4 | 675 |
| 85 | 4 | 4 | 6 | 800 |
| 85 | 4 | 4 | 99 | 800 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 85 | 4 | 6 | 2 | 425 |
| 85 | 4 | 6 | 4 | 550 |
| 85 | 4 | 6 | 6 | 675 |
| 85 | 4 | 6 | 99 | 750 |
| 85 | 4 | 99 | 2 | 425 |
| 85 | 4 | 99 | 4 | 550 |
| 85 | 4 | 99 | 6 | 625 |
| 85 | 4 | 99 | 99 | 675 |
| 85 | 5 | 0 | 99 | 725 |
| 85 | 5 | 2 | 2 | 575 |
| 85 | 5 | 2 | 4 | 750 |
| 85 | 5 | 2 | 6 | 925 |
| 85 | 5 | 2 | 99 | 925 |
| 85 | 5 | 4 | 2 | 500 |
| 85 | 5 | 4 | 4 | 675 |
| 85 | 5 | 4 | 6 | 800 |
| 85 | 5 | 4 | 99 | 800 |
| 85 | 5 | 6 | 2 | 425 |
| 85 | 5 | 6 | 4 | 550 |
| 85 | 5 | 6 | 6 | 700 |
| 85 | 5 | 6 | 99 | 750 |
| 85 | 5 | 99 | 2 | 425 |
| 85 | 5 | 99 | 4 | 550 |
| 85 | 5 | 99 | 6 | 625 |
| 85 | 5 | 99 | 99 | 700 |
| 85 | 6 | 0 | 99 | 750 |
| 85 | 6 | 2 | 2 | 575 |
| 85 | 6 | 2 | 4 | 750 |
| 85 | 6 | 2 | 6 | 925 |
| 85 | 6 | 2 | 99 | 925 |
| 85 | 6 | 4 | 2 | 500 |
| 85 | 6 | 4 | 4 | 675 |
| 85 | 6 | 4 | 6 | 800 |
| 85 | 6 | 4 | 99 | 800 |
| 85 | 6 | 6 | 2 | 425 |
| 85 | 6 | 6 | 4 | 550 |
| 85 | 6 | 6 | 6 | 700 |
| 85 | 6 | 6 | 99 | 750 |
| 85 | 6 | 99 | 2 | 425 |
| 85 | 6 | 99 | 4 | 550 |
| 85 | 6 | 99 | 6 | 625 |
| 85 | 6 | 99 | 99 | 700 |
| 85 | 7 | 0 | 99 | 625 |
| 85 | 7 | 2 | 2 | 575 |
| 85 | 7 | 2 | 4 | 750 |
| 85 | 7 | 2 | 99 | 925 |
| 85 | 7 | 2 | 6 | 925 |
| 85 | 7 | 4 | 2 | 500 |
| 85 | 7 | 4 | 4 | 675 |

| Facility Type | Area Type | Crossing # of Lanes | # of Lanes | Capacity |
|---------------|-----------|---------------------|------------|----------|
| 85 | 7 | 4 | 6 | 800 |
| 85 | 7 | 4 | 99 | 800 |
| 85 | 7 | 6 | 2 | 425 |
| 85 | 7 | 6 | 4 | 550 |
| 85 | 7 | 6 | 6 | 700 |
| 85 | 7 | 6 | 99 | 750 |
| 85 | 7 | 99 | 2 | 425 |
| 85 | 7 | 99 | 4 | 550 |
| 85 | 7 | 99 | 6 | 625 |
| 85 | 7 | 99 | 99 | 700 |
| 86 | 1 | 99 | 99 | 1400 |
| 86 | 2 | 99 | 99 | 1400 |
| 86 | 3 | 99 | 99 | 1400 |
| 86 | 4 | 99 | 99 | 1400 |
| 86 | 5 | 99 | 99 | 1400 |
| 86 | 6 | 99 | 99 | 1400 |
| 86 | 7 | 99 | 99 | 1400 |
| 89 | 1 | 99 | 99 | 720 |
| 89 | 2 | 99 | 99 | 720 |
| 89 | 3 | 99 | 99 | 720 |
| 89 | 4 | 99 | 99 | 720 |
| 89 | 5 | 99 | 99 | 1400 |
| 89 | 6 | 99 | 99 | 1400 |
| 89 | 7 | 99 | 99 | 1400 |
| 90 | 1 | 99 | 99 | 2000 |
| 90 | 2 | 99 | 99 | 2000 |
| 90 | 3 | 99 | 99 | 2000 |
| 90 | 4 | 99 | 99 | 2000 |
| 90 | 5 | 99 | 99 | 2000 |
| 90 | 6 | 99 | 99 | 2000 |
| 90 | 7 | 99 | 99 | 2000 |
| 99 | 1 | 99 | 99 | 2000 |
| 99 | 2 | 99 | 99 | 2000 |
| 99 | 3 | 99 | 99 | 2000 |
| 99 | 4 | 99 | 99 | 2000 |
| 99 | 5 | 99 | 99 | 2000 |
| 99 | 6 | 99 | 99 | 2000 |
| 99 | 7 | 99 | 99 | 2000 |
| 100 | 99 | 99 | 99 | 99999 |



APPENDIX E MODE SHARE ADJUSTMENT

| Time Period | Trip Purpose | From County | To County | Mode From | Mode To | Percent Shift |
|-------------|--------------|----------------|----------------|---|------------|---------------|
| PK | HBWD1 | San Bernardino | | NM-Walk,NM-Bike | DA | 24.00 |
| PK | HBWD1 | San Bernardino | | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | DA | 68.90 |
| PK | HBWD1 | | San Bernardino | NM-Walk,NM-Bike | DA | 14.00 |
| PK | HBWD1 | | San Bernardino | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | DA | 55.00 |
| PK | HBWD2 | San Bernardino | | NM-Walk,NM-Bike | DA | 63.00 |
| PK | HBWD2 | San Bernardino | | NM-Walk,NM-Bike | SR2,SR3 | 8.00 |
| PK | HBWD2 | San Bernardino | | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | DA | 1.00 |
| PK | HBWD2 | San Bernardino | | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | SR2,SR3 | 66.00 |
| PK | HBWD2 | | San Bernardino | NM-Walk,NM-Bike | DA | 35.00 |
| PK | HBWD2 | | San Bernardino | NM-Walk,NM-Bike | SR2,SR3 | 9.00 |
| PK | HBWD2 | | San Bernardino | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | DA | 37.00 |
| PK | HBWD2 | | San Bernardino | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | SR2,SR3 | 54.00 |
| PK | HBWD3 | San Bernardino | | NM-Walk,NM-Bike | DA | 72.00 |
| PK | HBWD3 | San Bernardino | | NM-Walk,NM-Bike | SR2,SR3 | 18.00 |
| PK | HBWD3 | San Bernardino | | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | DA | 3.00 |
| PK | HBWD3 | San Bernardino | | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | SR2,SR3 | 80.00 |
| PK | HBWD3 | | San Bernardino | NM-Walk,NM-Bike | DA | 61.00 |
| PK | HBWD3 | | San Bernardino | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | DA | 89.00 |
| PK | HBWS1 | San Bernardino | | NM-Walk | DA,SR2,SR3 | 22.00 |
| PK | HBWS1 | | San Bernardino | NM-Walk | DA,SR2,SR3 | 15.00 |
| PK | HBWS2 | San Bernardino | | NM-Walk | DA | 53.00 |
| PK | HBWS2 | San Bernardino | | NM-Walk | SR2,SR3 | 8.00 |
| PK | HBWS2 | | San Bernardino | NM-Walk | DA | 26.00 |
| PK | HBWS2 | | San Bernardino | NM-Walk | SR2,SR3 | 31.00 |
| PK | HBWS3 | San Bernardino | | NM-Walk | DA | 62.00 |
| PK | HBWS3 | San Bernardino | | NM-Walk | SR2,SR3 | 20.00 |
| PK | HBWS3 | | San Bernardino | NM-Walk | DA | 50.00 |
| PK | HBWS3 | | San Bernardino | NM-Walk | SR2,SR3 | 29.00 |
| PK | HBSC | San Bernardino | | NM-Walk,NM-Bike | SR2,SR3 | 2.00 |
| PK | HBSC | San Bernardino | | Generic | SR2,SR3 | 9.00 |
| PK | HBSC | | San Bernardino | NM-Walk,NM-Bike | SR2,SR3 | 1.00 |
| PK | HBSC | | San Bernardino | Generic | SR2,SR3 | 8.00 |
| PK | HBSB | San Bernardino | | NM-Walk,NM-Bike | DA,SR2,SR3 | 0.00 |
| PK | HBSB | | San Bernardino | NM-Walk,NM-Bike | DA,SR2,SR3 | 0.00 |
| PK | HBSH | San Bernardino | | NM-Walk,NM-Bike | SR2,SR3 | 59.00 |
| PK | HBSH | San Bernardino | | Generic | SR2,SR3 | 95.00 |
| PK | HBSH | | San Bernardino | NM-Walk,NM-Bike | SR2,SR3 | 30.00 |
| PK | HBSH | | San Bernardino | Generic | SR2,SR3 | 86.00 |
| PK | HBCU | San Bernardino | | NM-Walk,NM-Bike | DA,SR2,SR3 | 3.00 |
| PK | HBCU | San Bernardino | | Generic | DA,SR2,SR3 | 75.00 |
| PK | HBCU | | San Bernardino | NM-Walk,NM-Bike | DA | 0.00 |



| Time Period | Trip Purpose | From County | To County | Mode From | Mode To | Percent Shift |
|-------------|--------------|----------------|----------------|---|------------|---------------|
| PK | HBCU | | San Bernardino | Generic | DA | 100.00 |
| PK | HBOALL | San Bernardino | | NM-Walk,NM-Bike | DA,SR2,SR3 | 21.00 |
| PK | HBOALL | San Bernardino | | Generic | DA,SR2,SR3 | 72.00 |
| PK | HBOALL | | San Bernardino | NM-Walk,NM-Bike | DA,SR2,SR3 | 9.00 |
| PK | HBOALL | | San Bernardino | Generic | DA,SR2,SR3 | 83.00 |
| PK | WBO | San Bernardino | | NM-Walk,NM-Bike | DA,SR2,SR3 | 81.00 |
| PK | WBO | San Bernardino | | Generic | DA,SR2,SR3 | 93.00 |
| PK | WBO | | San Bernardino | NM-Walk,NM-Bike | DA,SR2,SR3 | 40.00 |
| PK | WBO | | San Bernardino | Generic | DA,SR2,SR3 | 92.00 |
| PK | OBO | San Bernardino | | NM-Walk,NM-Bike | DA | 22.00 |
| PK | OBO | San Bernardino | | NM-Walk,NM-Bike | SR2,SR3 | 53.00 |
| PK | OBO | San Bernardino | | Generic | DA | 18.00 |
| PK | OBO | San Bernardino | | Generic | SR2,SR3 | 73.00 |
| PK | OBO | | San Bernardino | NM-Walk,NM-Bike | SR2,SR3 | 3.00 |
| PK | OBO | | San Bernardino | Generic | SR2,SR3 | 96.00 |
| OP | HBWD1 | San Bernardino | | NM-Walk,NM-Bike | DA | 29.00 |
| OP | HBWD1 | San Bernardino | | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | DA | 69.90 |
| OP | HBWD1 | | San Bernardino | NM-Walk,NM-Bike | DA | 15.00 |
| OP | HBWD1 | | San Bernardino | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | DA | 43.00 |
| OP | HBWD2 | San Bernardino | | NM-Walk,NM-Bike | DA | 65.00 |
| OP | HBWD2 | San Bernardino | | NM-Walk,NM-Bike | SR2,SR3 | 3.00 |
| OP | HBWD2 | San Bernardino | | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | DA | 25.00 |
| OP | HBWD2 | San Bernardino | | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | SR2,SR3 | 58.00 |
| OP | HBWD2 | | San Bernardino | NM-Walk,NM-Bike | DA | 24.00 |
| OP | HBWD2 | | San Bernardino | NM-Walk,NM-Bike | SR2,SR3 | 21.00 |
| OP | HBWD2 | | San Bernardino | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | DA | 34.00 |
| OP | HBWD2 | | San Bernardino | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | SR2,SR3 | 58.00 |
| OP | HBWD3 | San Bernardino | | NM-Walk,NM-Bike | DA | 72.00 |
| OP | HBWD3 | San Bernardino | | NM-Walk,NM-Bike | SR2,SR3 | 15.00 |
| OP | HBWD3 | San Bernardino | | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | DA | 22.90 |
| OP | HBWD3 | San Bernardino | | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | SR2,SR3 | 61.00 |
| OP | HBWD3 | | San Bernardino | NM-Walk,NM-Bike | DA | 69.00 |
| OP | HBWD3 | | San Bernardino | NM-Walk,NM-Bike | SR2,SR3 | 10.00 |
| OP | HBWD3 | | San Bernardino | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | DA | 66.00 |
| OP | HBWD3 | | San Bernardino | LB-Walk,LB-Auto,EB-Walk,EB-Auto,UR-Walk,UR-Auto,CR-Walk-Walk,CR-Auto-Walk,CR-Walk-Auto,CR-Auto-Auto | SR2,SR3 | 32.00 |
| OP | HBWS1 | San Bernardino | | NM-Walk | DA,SR2,SR3 | 27.00 |
| OP | HBWS1 | | San Bernardino | NM-Walk | DA,SR2,SR3 | 17.00 |
| OP | HBWS2 | San Bernardino | | NM-Walk | DA | 49.00 |
| OP | HBWS2 | San Bernardino | | NM-Walk | SR2,SR3 | 7.00 |
| OP | HBWS2 | | San Bernardino | NM-Walk | DA | 27.00 |



| Time Period | Trip Purpose | From County | To County | Mode From | Mode To | Percent Shift |
|-------------|--------------|----------------|----------------|-----------------|------------|---------------|
| OP | HBWS2 | | San Bernardino | NM-Walk | SR2,SR3 | 25.00 |
| OP | HBWS3 | San Bernardino | | NM-Walk | DA | 62.00 |
| OP | HBWS3 | San Bernardino | | NM-Walk | SR2,SR3 | 18.00 |
| OP | HBWS3 | | San Bernardino | NM-Walk | DA | 45.00 |
| OP | HBWS3 | | San Bernardino | NM-Walk | SR2,SR3 | 32.00 |
| OP | HBSC | San Bernardino | | NM-Walk,NM-Bike | DA,SR2,SR3 | 1.00 |
| OP | HBSC | San Bernardino | | Generic | DA,SR2,SR3 | 4.00 |
| OP | HBSC | | San Bernardino | NM-Walk,NM-Bike | SR2,SR3 | 1.00 |
| OP | HBSC | | San Bernardino | Generic | SR2,SR3 | 3.00 |
| OP | HBSP | San Bernardino | | NM-Walk,NM-Bike | DA,SR2,SR3 | 0.00 |
| OP | HBSP | | San Bernardino | NM-Walk,NM-Bike | DA,SR2,SR3 | 0.00 |
| OP | HBSH | San Bernardino | | NM-Walk,NM-Bike | DA | 22.00 |
| OP | HBSH | San Bernardino | | NM-Walk,NM-Bike | SR2,SR3 | 41.00 |
| OP | HBSH | San Bernardino | | Generic | DA | 1.00 |
| OP | HBSH | San Bernardino | | Generic | SR2,SR3 | 94.00 |
| OP | HBSH | | San Bernardino | NM-Walk,NM-Bike | SR2,SR3 | 31.00 |
| OP | HBSH | | San Bernardino | Generic | SR2,SR3 | 86.00 |
| OP | HBCU | San Bernardino | | NM-Walk,NM-Bike | DA,SR2,SR3 | 0.00 |
| OP | HBCU | San Bernardino | | Generic | DA,SR2,SR3 | 82.00 |
| OP | HBCU | | San Bernardino | NM-Walk,NM-Bike | DA,SR2,SR3 | 0.00 |
| OP | HBCU | | San Bernardino | Generic | DA,SR2,SR3 | 100.00 |
| OP | HBOALL | San Bernardino | | NM-Walk,NM-Bike | DA | 20.00 |
| OP | HBOALL | San Bernardino | | Generic | DA | 84.00 |
| OP | HBOALL | | San Bernardino | NM-Walk,NM-Bike | DA | 10.00 |
| OP | HBOALL | | San Bernardino | Generic | DA | 83.00 |
| OP | WBO | San Bernardino | | NM-Walk,NM-Bike | DA,SR2,SR3 | 65.00 |
| OP | WBO | San Bernardino | | Generic | DA,SR2,SR3 | 100.00 |
| OP | WBO | | San Bernardino | NM-Walk,NM-Bike | SR2,SR3 | 23.00 |
| OP | WBO | | San Bernardino | Generic | SR2,SR3 | 100.00 |
| OP | OBO | San Bernardino | | NM-Walk,NM-Bike | DA,SR2,SR3 | 65.00 |
| OP | OBO | San Bernardino | | Generic | DA,SR2,SR3 | 99.00 |
| OP | OBO | | San Bernardino | NM-Walk,NM-Bike | DA | 3.00 |
| OP | OBO | | San Bernardino | Generic | DA | 92.00 |

APPENDIX F SBTAM ACCESS GUIDELINES

San Bernardino County Transportation Analysis Model (SBTAM)

Access Guidelines

September 2012

Overall Principles of SBTAM Maintenance and Access:

- Provide easy, timely, and inexpensive access to SBTAM for planning and project work in San Bernardino County
- Provide a process for improving SBTAM networks, demographic data, and functionality over time
- Protect the integrity of the modeling process for individual projects
- Continue coordination with the SCAG model improvement program
- Maintain a set of master files containing the most current and accurate modeling data.

Three Levels of Access

- Obtaining SBTAM outputs (no new modeling runs)
- Modeling requests processed by SANBAG (new modeling runs)
- Agency/consultant access to SBTAM files

Obtaining SBTAM outputs (with or without new modeling runs)

- Requesting agency will fill out SBTAM Request for Data or Analysis Form. Request will include: project sponsor; name of consulting firm; name of person making request and associated contact information; name and location of project; purpose and scope of the project; specific data/outputs required (e.g. volume data and year); project information and modeling instructions (where new modeling runs are required); geographic area to be included; timeline by which the information is needed, etc.
- SANBAG staff will provide an estimate of cost to service the request and provide the estimate to the requesting agency
- Requesting agency will return the signed request form, committing to payment for the requested model output/services
- SANBAG may provide intermediate data for review by the requesting agency prior to the modeling runs, to ensure accuracy
- SANBAG will provide electronic output files (e.g. PDF files, loaded TransCAD networks, etc.) containing the requested results, plus any additional files containing necessary background information for interpretation of results (e.g. socioeconomic data for zones in the area).

Agency/Consultant Access to SBTAM files

- Access to SBTAM modeling files will be granted on a project-by-project basis for planning and project development work in San Bernardino County. Use of SBTAM on a project will require submittal and SANBAG approval of an SBTAM Request for Data or Analysis Form. The form will contain the following: Project sponsor; name of project for which SBTAM is to be used; purpose and scope of the project; specific products to be generated; expected duration of the project; responsible modeler(s); responsible principal and contact information; office location(s) where the model will be used; and agreement to the Acknowledgments.
- An estimated cost for acquisition of modeling files, which includes accommodations for periodically updated network and growth forecast files is \$500.
- Approval of the request will be by the SANBAG Director of Planning. SANBAG retains the right to approve or deny any request for use of model data.
- Requesting agency will receive files upon payment of the fee.
- Each additional project will require submission and approval of a separate request form. However, modeling files can be retained for the next project.
- Agencies/consultants may recommend changes to master network and TAZ data. SANBAG will maintain a log of the recommended changes, will review the changes, and will make appropriate changes to the SBTAM master files periodically.

The cost for SBTAM services has been developed through an evaluation of typical staff time required to complete the specified task. The fees represent estimates for typical modeling tasks. The fee associated with modeling requests requiring specialized analysis will be determined based on specific project requirements and associated staff level of effort to service the request.



APPENDIX G REQUEST FOR MODELING DATA OR ANALYSIS FROM SANBAG

San Bernardino County Transportation Analysis Model (SBTAM)

- Request for Model Data or Analysis from SANBAG -

Please email signed copy to Cameron Brown at SANBAG when completed: cbrown@sanbag.ca.gov. SANBAG will provide an estimate of cost for data or services and return to requesting agency. Agency will return signed form, with attached cost estimate, to SANBAG. Scanned copies are acceptable. Once SANBAG has received payment, data will be released or services initiated. A request must be filled out for each individual project/model application along with a signed agreement for use of SBTAM.

This form can be filled out electronically and automatically submitted to SANBAG through the following link:
http://maps.sanbag.ca.gov/website/Modeling/sbtam_request.aspx

Date of request: _____

Name and address of agency requesting data ("Requesting Agency"): _____

Name, phone number, and email address of contact person: _____

If requesting agency is consultant, list name of client, contact person, phone number, and email address:

Jurisdiction(s) in which project is located: _____

Briefly describe the project and what you need from SANBAG or what you need SANBAG to do:

Describe specific data or services requested: List geographic area being covered, model year (2008 and/or 2035), time periods (e.g. daily, AM/PM peak period), project-specific model runs, etc. Attach backup information as appropriate:

Date by which information is needed: ___/___/___ Expected end date of project: ___/___/___

If a full set of modeling files is being requested, provide the name, location, and email address of the Responsible Modeler? (Please attach resume of Responsible Modeler describing travel demand forecasting experience and include experience with the SCAG regional model.)

For SANBAG Use Only:

Date request was approved: _____ Cost estimate, if any: _____

Estimated completion date: _____

Date data were delivered: _____ SBTAM version being used: _____



APPENDIX H SBTAM USER'S AGREEMENT

AGREEMENT OF REQUESTING AGENCY FOR USE OF SBTAM

Requesting agency understands and agrees that the extent to which modeling requests can be processed by SANBAG depends on the nature and timing of the request and the resources available at the time. SANBAG will inform the requestor if a cost-based fee is associated with the requested data or analysis and will provide an estimate of costs prior to the requesting agency signing this Agreement. The cost of a full SBTAM DVD set with all modeling files for both 2008 and 2035 will be established in the SBTAM Modeling Guidelines. Periodic updates of master files will be provided at no cost until a new version of SBTAM becomes available.

Requesting Agency agrees to the following:

1. Model data will be used only for the project(s) listed on the request form.
2. Requesting agency agrees to pay the model data fee, if such fee is required, to SANBAG as a condition of receipt of the model data. SANBAG will not release the requested data if payment has not been received.
3. If the agency wishes to use model data for other projects, a separate request form will be required.
4. Requesting agency is responsible for reviewing model data and for proper application of model results for the specific application of SBTAM listed in this request. The agency agrees to bear the cost of updating SBTAM for its own purposes. While SANBAG endeavors to maintain current and accurate growth forecast and transportation data, requesting agency is ultimately responsible for ensuring the validity of the data and proper application of SBTAM, and SANBAG makes no representations or warranties as to SBTAM's or the SBTAM modeling fitness for a particular purpose.
5. Requesting agency shall not distribute SBTAM modeling files (excluding output files) to other parties or to offices not listed as requiring SBTAM access in the request form.
6. Requesting agency shall not perform modeling runs for third parties, except for those listed as clients on the SBTAM data request form, without written consent from SANBAG.
7. Requesting agency will communicate to SANBAG at the completion of the modeling portion of its project, or at intermediate points as appropriate, any corrections or enhancements to the model network, socio-economic data, or other factors and data that will contribute to the improvement of SBTAM. SANBAG will review the proposed corrections or enhancements and make a determination regarding whether those changes should be incorporated into the master files. SANBAG will notify agencies on SANBAG's modeling contact list when updated versions of SBTAM files are available and what the revisions entail.
8. Requesting agency shall not use, release, reproduce, distribute, publish, adapt for future use or otherwise use the modeling information for the purposes not consistent with the terms of this Agreement, without the prior written permission of SANBAG.
9. SANBAG shall not be responsible for any damage or liability occurring by reason of anything done or omitted to be done under, or in connection with this Agreement. Requesting agency agrees to defend, indemnify and hold harmless SANBAG, its officers and employees, from and against any and all actions, damages, costs, liabilities, claims, demands, losses, judgments, penalties, costs and expenses including attorney's fees ("Liabilities") arising out of or in any way connected with anything done or omitted to be done in connection with the Agreement or with the SBTAM, except for those Liabilities arising out of the sole negligence or willful misconduct of SANBAG.
10. Failure to use SBTAM modeling data consistent with the Agreement may result in the agency not receiving permission for use of SBTAM data for other projects.

Signature of Requesting Agency/Consultant Representative

Date: _____

Print Name