LOS ANGELES COUNTY STRATEGIC GOODS MOVEMENT ARTERIAL PLAN

DRAFT FINAL REPORT

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Introduction

Goods movement plays a prominent role in the southern California landscape. The region, and in particular Los Angeles County, is home to major trade gateways, a significant manufacturing base, and a population base of 10 million people (*1),* all of which drive the demand for goods movement. The most prominent of those trade gateways are the Ports of Los Angeles and Long Beach, which combined are the largest container port in the United States and eighth largest in the world as of 2011 (*2*). In 2012, the Ports combined handled 35 percent of the containerized waterborne imports and exports in the United States (*3*) and are projected to handle three times as much trade by 2035 (*4*). In addition to the Ports, Los Angeles International Airport handled 2.1 million tons of cargo in 2012 making it the seventh largest airport for freight in the U.S. by landed volume (*5*).

Within Los Angeles County ("County") are also numerous goods movement dependent industries such as manufacturing, retail/wholesale trade, warehousing and construction. According to the Southern California Association of Governments (SCAG), the County was ranked as the top manufacturing center in the country in terms of shipment volume in 2009 (*4*). Goods movement dependent industries generated $137.7 billion in economic benefits such as wages and taxes and 1,623,000 jobs in the County in 2010 (*4*).

Also driving goods movement is the demand for consumer goods from the County's ten million residents spread across a land area of 4,084 square miles and eighty-nine local jurisdictions ranging from densely urban areas to rural and wilderness areas (Figure 1). Los Angeles County is the most populous county in the United States and serving the daily needs of such a large population base requires freight transportation to and from freight facilities, retail stores, warehouse and distribution centers, businesses, and homes.

Supporting the goods movement system is an extensive landside transportation system consisting of rail track infrastructure and intermodal facilities, 837 million square feet of warehouse and distribution center space scattered throughout southern California (Figure 2), and a roadway network consisting of 640 centerline miles of freeways and 7,200 centerline miles of arterials. (*6*)

This roadway network enables trucks to transport goods between the widely disbursed system of freight facilities, industry, and customers and provide the "first and last mile" of freight transportation. In addition, trucks also provide short haul transportation where other modes are economically or physically infeasible. While the heavy trucks that are the focus of this effort are most often engaged in goods movement, there are also a large number of heavy trucks engaged in the service, utility, and construction sectors. These trucks have similar impacts and requirements as freight trucks and are also an important element of the trucking industry.

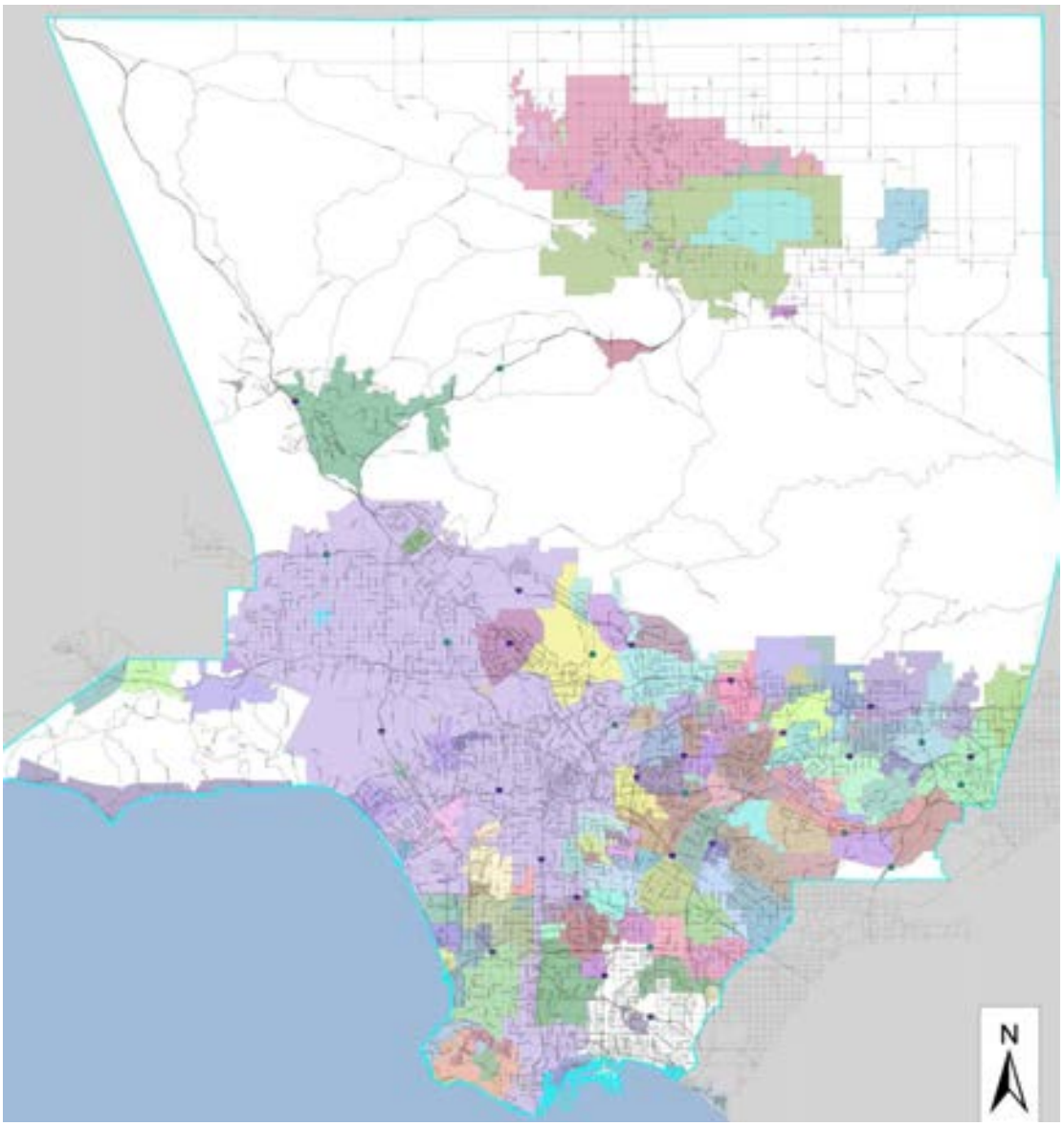
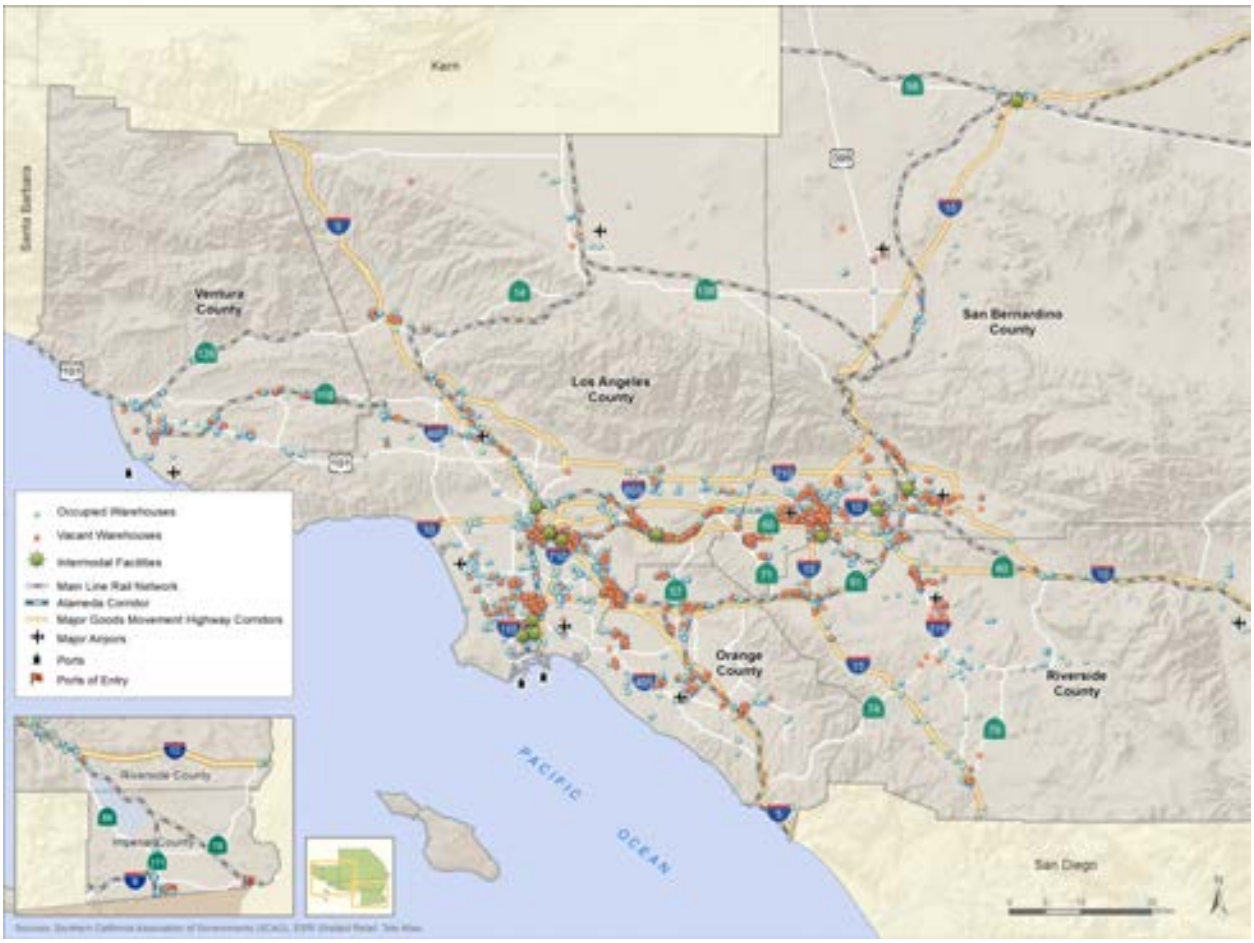


FIGURE 1 Los Angeles County



Source: SCAG

FIGURE 2: Locations of Warehousing in Southern California

The significance of truck volume in the County is reflected in the draft Federal Primary Freight Network (PFN), which included 68 percent of the 640 centerline freeway miles in the County (*7*). Some of the highest truck volume freeways in the County include the I-710, SR-91, SR-60, and I-5, all of which have segments carrying over 20,000 trucks per day. By 2035, SCAG projects that the I-710 will carry over 50,000 trucks per day, the SR-60 over 40,000 trucks per day, and the SR-91 and I-5 over 30,000 trucks per day. Furthermore, annual truck travel overall is projected to grow from 12.2 million miles per year in 2008 to 18.9 million miles per year in 2035 (*6*).

Though roadways are essential for goods movement, they also serve a variety of other uses including general vehicular travel, transit service, and pedestrian and bicycle travel. In California, the Complete Streets Act of 2008 requires local jurisdictions, when updating their circulation element to plan for a balanced, multimodal transportation network meeting the needs of all roadway users, defined to include motorists, pedestrians, bicyclists, children, persons with disabilities, seniors, movers of commercial goods, and public transportation. As a result, local jurisdictions are studying how to implement street infrastructure associated with Complete

Streets policies such as bike lanes, wide sidewalks, bus shelters, and narrower arterials and intersections. Due to arterial right of way constraints, however it can be difficult to implement features that accommodate the needs of all of these users. Furthermore, while these features can increase pedestrian friendliness they can also conflict with goods movement since trucks require wider lane and intersection width and adequate provision for parking/loading zones to deliver their goods. The increasing implementation of Complete Street elements, combined with the need for goods movement have resulted in growing conflicts that local jurisdictions are now beginning to recognize and address.

Anticipating the necessity and projected growth of goods movement and the potential conflicts on the arterial system with other uses, the Los Angeles County Metropolitan Transportation Authority (Metro) undertook an effort to analyze truck travel on the County's arterial system and designate a Countywide Strategic Truck Arterial Network (CSTAN) for Los Angeles County.

This analysis is focused on the arterial network and did not include the freeway system for two reasons. First, freeways are restricted to motorized vehicles and therefore do not have the same conflicts with rail, transit, pedestrian, or bicycle modes that arterials do. Second, FHWA has already identified the draft PFN for the freeway system as required by Moving Ahead for Progress in the Twenty First Century (MAP-21). The PFN is a component of the National Freight Network (NFN) that is intended to "assist States in strategically directing resources toward improved system performance for efficient movement of freight on the highway portion of the Nation's freight transportation system." (8) The NFN comprises the PFN and Critical Rural Freight Corridors designated by the states, of which the PFN consists of 27,000 centerline freeway miles and 3,000 additional centerline miles nationwide. Of this total, 434 miles of the County's freeway system are included in the PFN.(7)

Format of this Report

This report describes the goals of the CSTAN, stakeholder outreach, and process used to develop the CSTAN. The data and maps prepared for this study, including truck counts, maps and a list of arterials on the CSTAN, and maps of other supporting data such as truck accident locations and designated truck routes can be found in the appendices to this report.

Goals of CSTAN

The CSTAN is a planning tool that is intended to accomplish six goals: 1) Identify truck arterial system needs and connectivity gaps; 2) Prioritize funding to projects showing the greatest expected benefits; 3) Minimize truck and pedestrian/bicycle conflicts**;** 4) Establish a database of arterial truck data that can be used by industry as well as for planning purposes; 5) Assist trucking industry in identifying designated truck routes; and 6) Support the development of the Federal PFN.

One of the main goals of the CSTAN is to assist Metro and local jurisdictions in identifying system needs for goods movement and directing funding to projects with the greatest expected

benefit. The CSTAN will be based on truck volume, locations and number of truck accidents, industrial land use, and designated truck routes. This data can be used by local jurisdictions to identify arterials that may require capacity or operational improvements to reduce truck related congestion, improve safety, and/or reduce community and environmental impacts.

After these improvements have been identified, funding can then be prioritized for projects showing the greatest expected benefit. For example, Metro intends to provide funding preference in future Calls for Projects to those projects located on the CSTAN. The biennial Call for Projects is a competitive application process that provides funds to local jurisdictions for transportation infrastructure projects. The Call has six modal subcomponents, one of which is Goods Movement Improvements (GMI). In 2013, Metro awarded $30.1 million in the GMI category to a variety of capacity and operational enhancement projects aimed at improving truck circulation (*9*).

Minimizing truck and pedestrian/bicycle conflicts is another important goal of the CSTAN. As previously discussed, local jurisdictions have been increasingly implementing bicycle and pedestrian projects on arterials. Though these projects could improve travel on arterial corridors, they could also inadvertently create and/or increase conflicts on arterials with heavy truck volume. By identifying a network of strategic truck arterials, local jurisdictions will be able to better identify where such conflicts might occur and plan accordingly.

Currently, there is no centralized source for arterial truck data in the County. Unfortunately, many local jurisdictions do not collect truck counts and the truck data that does exist is scattered between locally collected traffic counts, studies, SCAG, and Caltrans. CSTAN will address this issue by establishing a database of arterial truck data collected and developed for this project. Collection and dissemination of this data will assist cities to identify areas of heavy truck volume, gaps in designated truck routes, and potential infrastructure improvement projects. Furthermore, analyzing truck volumes and truck routes at a countywide level can encourage collaboration among local jurisdictions by identifying goods movement related infrastructure needs and system gaps that cross local jurisdiction and county boundaries.

Data collection for the CSTAN development will also provide other interrelated benefits. For example, trucking companies and the California Trucking Association (CTA) have voiced concerns regarding the patchwork network of designated truck routes in the County, potentially resulting in inefficient operations and citations for truckers. By compiling information on city and state designated truck routes, the CSTAN can benefit both cities and truckers in clarifying where such routes are located.

As described earlier, FHWA recently identified the draft PFN for the freeway system as required by MAP-21. Should the Federal government decide to expand the PFN in the future to include non-highway facilities, the CSTAN would provide a basis by which Metro and local jurisdictions can recommend arterials for inclusion in the PFN. In fact, according to the draft California Freight Mobility Plan, “FHWA has solicited advice from States on how to designate these urban freight routes. The urban freight routes will be added to this plan, via an amendment, once the federal designation process is completed” (*10*). Furthermore, if federal funding is allocated to

projects on the PFN, Metro and local jurisdictions would be able to apply for such funds to improve arterials on the CSTAN and in the PFN.

While Metro anticipates the CSTAN to be an important planning tool, it is also necessary to clarify what the CSTAN is not intended to do. As the CSTAN is a 'snapshot' of the existing arterial system used by trucks, it is intended to inform planners and decision makers regarding potential infrastructure improvements. However, the CSTAN will not include a regulatory component, meaning Metro does not intend for cities to restrict trucks to the CSTAN network. Metro also does not intend to request jurisdictions to add any of the CSTAN routes to their designated truck route system which are not already on the city/county adopted truck route plan map. Nor will Metro develop or impose design standards for CSTAN arterials. Furthermore, since Metro does not have land use authority, it will allow local jurisdictions to implement the CSTAN in a manner most appropriate for their jurisdiction.

CSTAN Criteria, Thresholds and Development Process

Development of the CSTAN entailed four steps: 1) development of screening criteria and thresholds; 2) data collection; 3) application of the data and criteria to establish draft scenarios; and 4) refinement of the draft CSTAN to create a continuous and logical network. Throughout the process, stakeholder outreach was utilized to communicate study progress, solicit feedback, and ensure consistency with local plans.

The screening criteria was applied in two phases. The first phase identified roadways that would meet the minimum qualifications for CSTAN designation using geospatial data (Table 1). The screening criteria used roadway capacity, truck demand, truck collision, and administrative definitions of truck routes and classification to identify potential CSTAN roadways.

The second phase involved stakeholder review and comment and application of refinement criteria to remove fragments, close gaps, and create as continuous of a network as possible. The refinement criteria (Table 2) include relationships of roadways to the freeway system, land use, and other transportation modes and were used to identify roadways with specific traits that may result in its inclusion (or exclusion) from CSTAN based on qualitative means and stakeholder input.

TABLE 1 CSTAN Screening Criteria

#	Criteria	Data Source	Threshold	Purpose/Discussion
1	Number of Lanes	SCAG GIS	More than two lanes in each direction	Minimum capacity
2	Functional Classification	FHWA, Caltrans, SCAG GIS, LA County Master Plan of Highways	FHWA or Caltrans Arterial Classification	Arterial classification
3	CSAN Roadways	Metro CSAN Routes	On CSAN route	Previously designated significant arterials
4	Municipal Truck Routes	Municipal ordinance	Defined truck route--or truck prohibition	Locally-defined truck network
5	STAA Truck Routes	Caltrans Surface Transportation Assistance Act (STAA) routes	STAA truck route	State-defined truck network
6	Traffic Volume	Traffic counts	More than 20,000 vehicles per day	Meets minimum volume/demand of overall traffic
7	Truck Traffic Volume	SCAG travel demand model (2012 estimates), traffic counts	Heavy duty truck volumes over 750 per day	Meets minimum volume/demand for trucks
8	Truck-Related Collisions	California Highway Patrol Statewide Integrated Traffic Records System (SWITRS)	Arterial Segments with more than three truck-related collisions 2008-2011	Areas of heavy truck volume, and potentially significant truck arterial corridors
9	Land Uses	GIS land use files	Industrial Land Uses	Ensures appropriate land uses are served

TABLE 2 CSTAN Refinement Criteria

#	Category	Data Source	Draft performance Criteria	Purpose/Discussion
10	Freeway Access	Geographic location	Direct freeway access from truck-generators	Access to the freeway system is key for truck operators
11	Traffic Operations and ITS	ITS plans and deployment	On a priority ITS corridor	Assists in the overall flow and accommodate truck-specific needs
12	Multi-jurisdictional Connectivity and Continuity	Geographic location	Truck route network gaps will be identified	Truckers are generally not aware of jurisdictional boundaries
13	Use as Freeway Alternative	Geographic location	Parallel roadways to be identified	Adequate arterial alternatives to freeway congestion
14	Goods Movement Activity Centers	SCAG, American Transportation Research Institute	ATRI (American Transportation Research Institute) truck production and attraction data by SCAG TAZ	Ensure an adequate CSTAN network near truck generators
15	Warehouse and Distribution Center Locations	2010 MISTER (Management Information System for Terminals) database of domiciled trucks	Adjacent to large numbers of registered truck fleets by zip code	Ensure an adequate CSTAN network near truck generators
16	Gap Closures	Geographic location	Gaps in the CSTAN network	Review for unintentional gaps in the CSTAN network
17	Bicycle and Pedestrian Facilities	Bicycle and pedestrian plans	Potential to exclude roadway segments from CSTAN	Major bicycle facilities may have conflicts with truck usage and may require nearby parallel routing or design treatments to minimize or eliminate conflicts. Consideration for pedestrian crossing enhancements.
18	Transit Routes	Metro transit map, SCAG travel demand model	Potential to exclude roadway segments from CSTAN	Roadways with major transit service may conflict with truck usage

Stakeholder Outreach

Stakeholder outreach was essential in developing the CSTAN and included three components: 1) a Technical Advisory Committee (TAC) consisting of appropriate agency (city, county, subregional agency, airport and seaport) staff and representatives from industry (California Trucking Association (CTA)); 2) presentations to relevant public committees and Boards; and 3) outreach to private industry. The TAC was the primary method of stakeholder participation and was convened at key points in the study and tasked with reviewing and providing feedback on

project deliverables, recommending specific network additions and deletions to the CSTAN, and approving the final CSTAN.

TAC meetings were held on March 12, 2013, November 18, 2013, and July 9, 2014. TAC participants included the following stakeholders:

- Alameda Corridor East Construction Authority
- California Trucking Association
- City of Industry
- City of Los Angeles
- City of Diamond Bar
- City of Palmdale
- County of Los Angeles
- Gateway Cities Council of Governments
- Port of Los Angeles
- Port of Long Beach
- San Gabriel Valley Council of Governments
- South Bay Cities Council of Governments
- Southern California Association of Governments
- University of Southern California

In addition, presentations were also made to other relevant committees in the County. Presentations were made to Metro's Streets and Freeways Subcommittee and Technical Advisory Committee that reviews plans, programs, and projects related to the County's transportation network. In addition, Metro staff presented to the San Gabriel Valley Council of Governments Transportation Committee, which represents elected officials from the thirty one cities of the San Gabriel Valley subregion in eastern Los Angeles County, the North County Transportation Coalition that represents cities in northern Los Angeles County, and the California Trucking Association. The Metro Technical Advisory Committee approved this report on _____, 2015.

The outreach effort to the commercial trucking community to help guide CSTAN development was two-fold: person to person executive interviews and distribution of a short questionnaire to the target community such as private fleet operators, long-haul truckload carriers and less-than-truckload (LTL) carriers which make local deliveries. Eight executive interviews and five questionnaires were completed with private industry representatives. The trucking industry involvement produced some robust findings that informed the criteria used and the types of data collected to develop CSTAN.

Feedback from the trucking industry included a number of salient points.

Route Choice. Truckers generally use the most direct routes to/from customer sites regardless of roadway classification and prefer freeways and major arterials, using local streets primarily for site access. Company drivers use a combination of dispatcher instructions and their own choices in routing. Drivers covering regular routes or serving repeat customers (e.g. city drivers picking up or delivering goods or parcels) usually know their routes. Owner-operator drivers are

generally responsible for figuring out their route, and Global Positioning System (GPS) applications on cell phones have become the most common routing tools in the last few years. When drivers get a new customer and/or a customer relocates, there usually is a written notice posted or available for drivers from the trucking dispatcher.

Congestion. Chronic congestion locations and times are well known and predicable, and are typically seen as resulting from insufficient roadway capacity. Dispatchers and drivers either avoid these congested times and locations, or allow for them in scheduling. For example, local LTL delivery trips often start after the morning peak and end, if possible, before the evening peak. Truckers with customer appointments in the morning may arrive in the early morning and wait rather than attempting to make the appointment by driving during rush hour.

Incidents. Unpredictable incidents cause significant disruption. Freeway facilities typically lack the capacity to deal with crashes or construction incidents. Any incident will add a half hour to one hour delay (or more depending on severity) for truck drivers. Road closures or restrictions due to construction are problematic; sometimes advanced information is not available.

Arterials and local streets. On surface streets, two issues dominate – heavy traffic and rough surfaces. Trucks both contribute to surface street traffic and suffer from it. Poor pavement condition on heavily used truck routes reduces operating speeds, damages trucks and freight, and creates safety hazards. Specific arterials of importance and those roadways with difficult conditions of traffic flow, signage, and pavement conditions were identified. Truck parking is a problem in many areas, including commercial districts and industrial areas. Where trucks cannot park off the street to make a pickup or delivery they will block part of the street to do so. The lack of sufficient overhead clearance for large trucks in some older industrial areas was also mentioned.

Truck Routes. None of the stakeholder interviews or questionnaires mentioned the intentional use of roadways designated as truck routes. This finding indicates a disconnect between administrative truck route designation of an arterial and its actual use by trucks. Drivers will honor truck route designations where known and feasible, but signage on truck routes is very inconsistent and there are numerous discontinuities over and within local jurisdictions. The development and application of CSTAN is an opportunity to raise the profile of designated truck routes and minimize enforcement conflicts for the trucking industry.

Development of the CSTAN

The CSTAN is based on measurable, comparative criteria. The project compiled and collected all relevant and currently available data and (whenever possible) transferred that data into geographic information system (GIS) layers. The screening criteria and thresholds were applied to the data to create draft CSTAN scenarios. A working draft CSTAN was then selected by the TAC and refined by stakeholder review and refinement criteria. The following sections describe data collected that correspond to the screening criteria listed in Table 1 including the existing arterial network, designated truck routes and prohibitions, truck volumes, truck-related collisions, and zoning/land use data.

The CSTAN Base Network

The starting point for identifying the CSTAN was a Geographic Information Systems (GIS) database of arterial roadways in Los Angeles County developed for the SCAG Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) network. The 2012 SCAG RTP/SCS shapefiles include roadway lane and classification data as well as 2012 modeled traffic volume. The SCAG roadway shapefile is composed of 1,422 miles of limited access roadways and 6,956 miles of full access roadways. This set of roadways was compared to the County of Los Angeles Master Plan of Arterial Highways to ensure all roadways included in the Master Plan of Highways are included in the base network for CSTAN. In addition, the SCAG network was compared against the existing Metro Countywide Significant Arterial Network (CSAN). A number of roadways in the Master Plan of Highways were missing from the SCAG GIS file and were added to the CSTAN base network. These roadway segments are:

- Bluff Road and Florence Place in Montebello
- Southern Avenue in South Gate
- East 26th Street in Vernon
- Colorado Street in Long Beach
- Flower Street in Bellflower
- Dominguez Street in Torrance
- Compton Avenue and Stockwell Street/Piru Street in Compton
- Henrietta Street, Esplanade Avenue, Broadway, 166th Street, Phelan Lane and Emerald Street in Redondo Beach
- Mariposa Avenue in El Segundo
- Foreman Avenue in Burbank
- Sanborn Avenue in Los Angeles
- E Avenue South in Palmdale

These arterials added 17 miles to the SCAG roadway network. This "universe" of arterials, consisting of the SCAG Regional Transportation Plan (RTP) network, County of Los Angeles Master Plan of Highways, and Metro Countywide Significant Arterial Network (CSAN) constitutes the base network from which the CSTAN was developed. In total, the CSTAN base network consists of 6,973 miles of arterial roads in the County.

For comparison purposes, there are 1,400 miles of limited access roadways in the County. The CSTAN base network also includes data on number of lanes (Screening criteria #1), roadway classification (Screening criteria #2), and the Countywide Significant Arterial (CSAN) network designation (Screening criteria #3).

Designated Truck Routes and Prohibitions

Many local jurisdictions within the County define truck routes or truck prohibited routes. The project team compiled ordinances, general plans, and truck route maps describing these routes and input them into the CSTAN GIS database. Maps of designated truck routes can be found in Appendix C.

Of the 89 local jurisdictions in the County, 65 have defined truck routes, another three allow trucks on designated roadways based on weight and 24 have defined truck prohibitions. Per the California Vehicle Code, trucks are allowed to use most streets as needed for deliveries, but local jurisdictions can restrict non-local, "through" truck trips to selected facilities or enforce land use controls on sites without adequate truck access permits. Truck routes are often created by local jurisdictions in an attempt to channelize "through" truck traffic which is otherwise permitted on roadways, and it is this truck "prioritization" that is analyzed for the purposes of CSTAN development. Municipal truck routes on arterial segments were indicated as meeting CSTAN criterion #4 (On a Municipal Truck Route).

In California, Caltrans defines a truck route network that serves truck tractor-semitrailers (or doubles) that conforms to the requirements of the federal Surface Transportation Assistance Act of 1982 (STAA). In addition Caltrans classifies California Legal Truck Routes and Advisory Routes which were also included in the CSTAN base GIS file. The STAA and California Legal truck routes composed the roadways meeting the CSTAN criterion #5 (STAA truck routes).

Truck Volume

The volume of trucks on a roadway is a primary determination of the intensity of truck usage and was one of the primary criteria for CSTAN inclusion. However, truck counts were not available on all roadways nor were the parameters of truck classification or time periods of the available truck counts standardized. Because of this, 65 additional manual truck counts were conducted in strategically chosen locations. For purposes of this study, truck counts include all trucks defined as FHWA Class 6 and larger. A Class 6 truck is defined as a three-axle, single-unit truck.

Truck count data were obtained from four sources:

- Existing count data from local jurisdictions and previous studies. This includes a variety of truck counts from local jurisdictions, SCAG, transportation studies, and environmental impact reports.

- Caltrans collects traffic counts based on the number of vehicle axles on interstate highways and state highways, including full-access arterial state highways. Data was collected for 108 arterial state route locations.

- The scope of this effort included 65 truck classification counts at locations where gaps in existing available count data were observed. This gap analysis is further described below.

- SCAG 2012 Regional Transportation Plan (RTP) travel demand model truck and auto traffic volumes were obtained for all modeled roadways and used for roadways with no traffic counts collected. While these are model estimates of current truck volumes, they can be used as a reasonable facsimile of likely truck flows on most routes as they are derived from the validated regional truck model.

971 truck counts were collected and broken down as follows:

- Los Angeles Department of Transportation Traffic Counts: 353
- SCAG Screenline Counts: 113
- Caltrans Counts: 92
- SR 91/I-605/I-405 Congestion Hot Spots: 59
- CSAN Screenline Counts: 52
- North LA County Truck Studies: 44
- Southern California International Gateway EIR: 12
- ACE Phase 2 Traffic Study: 34
- City of Lancaster: 27
- South Bay Goods Movement Study: 15
- SR-710 Alternatives Analysis - Truck Data Collection: 6
- I-710 DEIR/DEIS: 3
- La Cienega Expressway Study: 2
- City of South Gate: 2
- I-210 Truck Origin and Destination Study: 20
- Gateway Cities Strategic Transportation Plan: 71
- Castaic Lake Hughes Road Environmental Impact Report: 1
- New CSTAN counts: 65

Of the 971 counts collected, the average daily total traffic (all vehicle types) of all the count locations was 24,100 vehicles per day and the average daily truck traffic was 650 trucks per day, for an average truck percentage of 2.7 percent trucks (FHWA Class 6 and above). A chart of truck count locations and results can be found in Appendix A.

Project Truck Counts Truck count data from existing sources provided good coverage of major streets in some sections of the County, however there were other sections of the County with few truck counts. As a result, 65 new truck counts were conducted for this effort. The count locations were identified based on the following factors:

- Conflicting model volume and other data, where two or more sources of truck data indicated very different truck flows or truck movement characteristics. For example, a location with high truck-related collisions adjacent to industrial land uses with very low SCAG travel demand model truck volumes.
- Very high travel demand model truck volumes, but no truck counts available to verify the model estimates.
- Truck-related land uses, but no truck counts to determine if those land uses generate large numbers of trucks.

The data collection plan (October 25, 2013) summarized the data collected as part of the Task 2 review of studies and data sources with a focus on truck traffic volume counts. Truck count data gaps were identified at 70 locations and provided for review by Metro and the TAC. Upon review by Metro and the TAC, the data collection location list was refined to 65 locations.

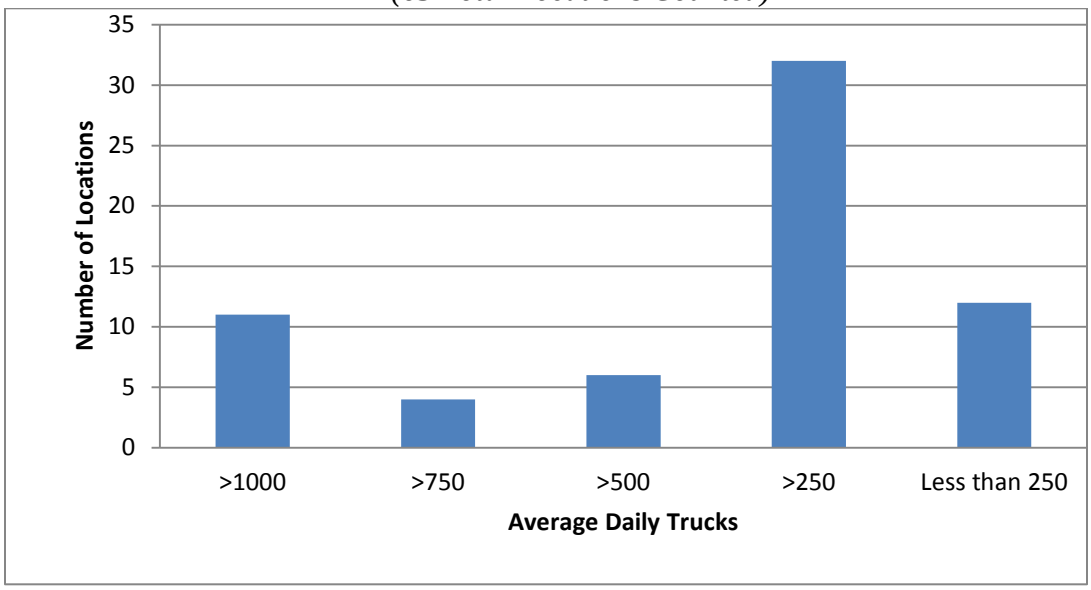
Traffic counts classifying autos, light trucks and heavy trucks (the main focus of this effort) were conducted in March 2014 from 7 AM to 9 AM and from 4 PM to 6 PM. These peak hour counts

were converted into daily values by using conversion factors from existing sources collected in Task 2. These factors were determined by hourly Caltrans Freeway Performance Monitoring System (PeMS) data for the Los Angeles County hourly volume of I-405, I-10, I-110, and I-5 during the week of September 6-13, 2013. Each hour was assigned an average percentage of daily traffic. The specific hours of a truck count was factored by each hour's average percent of daily traffic.

The 65 counts were conducted in 31 different cities, and had an average of 470 trucks per day and 48,000 vehicles per day at each location—15 locations had more than 750 trucks per day, and 34 had 250 or fewer trucks per day as shown in Figure 1. This is compared to 650 trucks per day and 24,100 vehicles per day average for the previously available truck counts and the 390 trucks per day and 20,700 vehicles per day from 2012 SCAG travel demand model volumes. The results had higher average daily truck volume for roadway segments as compared to the county as a whole. Those variable results were expected as the count locations were picked both for their potential to have high truck volumes, locations without truck volume information, and locations where the SCAG travel demand model returned unexpected volume results.

For purposes of understanding and presenting the data, two GIS shapefiles for the truck counts were created for use in Task 4: one of "point" data showing the exact location of the 971 truck counts from the existing sources (collected in Task 2) and the CSTAN project truck counts (collected in Task 3), and a second "line" data file that used these data points to "smooth" the 2012 SCAG RTP/SCS travel demand model volumes. The resulting line shapefile contains truck counts at roadways where data was collected in the field and SCAG travel demand model volume where gaps in the field data occurred. The "line" shapefile was integrated into the CSTAN base shapefile that is used to perform the CSTAN screening criteria.

Figure 3: Distribution of Daily Truck Volume Values from Task 3 Data Collection (65 Total Locations Counted)



Observations from Truck Data Collected

Based on the review of the truck volume data several observations about truck travel patterns were observed (all counts and thresholds are for FHWA Class 6 trucks and larger):

- Arterial truck volumes are highly correlated to industrial land uses and their access to freeways. The trucking industry stakeholder interviews conducted in Task 2 revealed that truck-oriented businesses explicitly locate near freeways and major roadways for access to the freeway system.
    - Half of the arterial roadway miles with 750 or more trucks and 60 percent of arterials with 1,000 or more trucks are located directly adjacent to industrial land uses.
    - Including roadways that *connect industrial land uses to a freeway ramp*, this group includes 60 percent of arterial miles with 750 or more trucks and 70 percent of arterial miles with 1,000 or more trucks.
    - Excluding three through routes with few connections – SR-126 (Henry Mayo Drive), Pearblossom Highway and La Cienega Boulevard between I-405 and I-10) – 80 percent of the arterials with more than 1,000 trucks per day are located adjacent to an industrial land use or directly connect an industrial land use to a freeway ramp.
- 65 percent of truck-related collisions on arterial roadways occurred adjacent to industrial land uses.
- Arterials are primarily used by trucks as access to industrial land uses from freeway facilities.
    - With some rare exceptions, trucks do not use arterials for long distances. These exceptions are arterials where parallel freeway options are not available or perhaps the freeway segment is highly congested and the arterial presents a more desirable route:
        - La Cienega Boulevard from I-405 to I-10
        - Henry Mayo Drive (SR-126) from I-5 to Ventura County Line
        - Pearblossom Highway from SR-14 to San Bernardino County Line
    - The only linear arterial routes of significant length with more than 750 trucks per day serve major industrial areas:
        - Sepulveda Boulevard from Crenshaw Boulevard to I-710 (serving City of Carson industrial area)
        - Harry Bridges Boulevard/Alameda Street from San Pedro to I-105 (serving the ports)
        - Wilmington Boulevard from Lomita Boulevard to SR-91(serving City of Carson industrial area)
        - Telegraph Boulevard from Fidelia Avenue to Santa Fe Springs Road in Santa Fe Springs (serving the City of Santa Fe Springs industrial area)

        - Slauson Avenue from Eastern Avenue in Bell to Dice Road in Santa Fe Springs (serving industrial areas in the Cities of Commerce, Pico Rivera and Santa Fe Springs
- Truck volumes are overly dispersed in the SCAG model projections. The travel demand model disperses trucks in large volumes across more roadways than was found in actual truck counts or discussed in truck industry stakeholder interviews. For example, the SCAG model had large volumes of trucks on low-volume mountain pass roadways—presumably diverted from parallel freeways due to congestion. However the truck industry stakeholder interviews recorded that truck trips have high levels of routine and are rarely diverted due to congestion except in some specific routes. The model is not always as accurate at predicting the reasons truck drivers choose their routes as it is primarily designed as a model for forecasting person trips on a regional level rather than truck trips along specific routes.
- Different industrial land uses produce a wide range of truck trip generation rates as revealed in truck counts.
    - Truck Trip generation appears to be concentrated in several major industrial areas:
        - In and around the Ports of Los Angeles and Long Beach, including parts of Carson, Compton, and Rancho Dominguez
        - The areas southeast of downtown Los Angeles including Vernon, and Commerce
        - The industrial areas of Norwalk, Santa Fe Springs, and Pico Rivera
        - Industry and Irwindale
        - The industrial area in the northwestern part of Santa Clarita
    - Other industrial zoned areas appear to have lower rates of truck trip generation (although zoned industrial these areas do not generate as many truck moves per unit as the areas noted above):
        - Refineries (Torrance, Carson, El Segundo)
        - Airports (Long Beach, LAX)
        - Light industrial (Paramount, Long Beach, along Workman Mill, South El Monte, Pomona, Glendale, parts of the San Fernando Valley, Palmdale, and Lancaster)
        - Quarries (Irwindale)
- 309 miles of Los Angeles County arterial roads carried more than 1,000 trucks per day, 555 miles of arterial roads carried more than 750 trucks per day, and 1,039 miles of arterials carried more than 500 trucks per day.
    - 750 trucks per day appears to be a reasonable indicator of a relatively significant number of trucks per day on an arterial, with 500 trucks per day being an appropriate measure for moderate significance of truck usage on an arterial.

Average daily total traffic volume of more than 20,000 vehicles per day was the threshold for CSTAN screening criterion #6 (Traffic Volume), and average daily truck volume of 750 trucks per day was the threshold of CSTAN screening criterion #7 (Truck Traffic Volume). Those thresholds represented average countywide daily traffic volumes and include the top 7.5 percent segments of truck volume in the County. Detailed truck count data can be found in Appendix A and truck volume maps can be found in Appendix C.

Truck-Related Collisions

Truck-related collision data is of particular value to the development of CSTAN in terms of helping to identify where truck travel occurs. The two most important factors contributing to truck-related collisions are the volume of trucks and the physical conditions of the facilities. Both patterns and outliers of the data informed the CSTAN process. The most significant pattern is the concentration of truck-related crashes near truck-generating industrial areas such as Carson, Industry and Commerce. However, several truck-related collision locations outside of industrial areas also indicate arterial corridors important to goods movement. This information was also useful in identifying truck count data gaps.

Truck-related collisions in Los Angeles County were compiled from the California Highway Patrol Statewide Integrated Traffic Records System (SWITRS) with data from 2008 to 2011. The SWITRS database of truck-related collision data does not specify the exact location of a collision. Instead, it identifies the approximate locations of truck-related collisions by listing the nearest intersection to the actual accident location. For the purposes of the CSTAN data compilation and geocoding, the total number of records at the closest intersection to the collision was summed. By this methodology, the intersections with the greatest number of total incidents in its proximity could be compiled. It should be noted that this study did not analyze the type (e.g, truck-truck, truck-vehicle, truck-bike/pedestrian) or cause of the accidents and only reports data directly obtained from SWITRS.

For the time period analyzed there were 354,225 total collisions in Los Angeles County, 18,595 (5 percent) of which involved a truck, and 7,574 of which involved a truck on an arterial roadway. Thus, 40 percent of truck collisions occurred on arterial roads and 60 percent occurred on freeway facilities. Truck-related collisions occurring at freeway-ramp locations were classified as arterial locations if the collision occurred on the arterial roadway portion of the intersection.

Those 7,574 arterial truck-related collisions occurred at 5,723 locations. Locations with three or more truck-related collisions (418 locations) met the truck collision criterion threshold for CSTAN screening criterion #8(Truck-related collisions). Three truck related accidents over a three year period was selected as the CSTAN threshold because it represents an average collision rate of one per year per location and there was a natural break in the data between two and three collisions. Maps showing approximate locations of truck accidents can be found in Appendix C.

Table 3 Arterial Truck-Related Collisions by Number of Locations (Closest Intersection) 2008-2011

Truck-Related Collisions	Number of Closest Intersection Locations
24	1
21	2
15	1
14	3
11	5
10	4
9	5
8	9
7	13
6	23
5	30
4	86
3	236
2	795
1	4510

Zoning/Land Use

Land use data from the County and its component cities' General Plans are collected and standardized by SCAG for its regional planning activities. Industrial and utility categories including wholesaling and warehousing, those land uses most likely to generate large numbers of trucks, were consolidated by the project team into a GIS file. Those land uses were broadly referred to as "industrial land uses" in the project and arterial corridors adjacent to those areas meet CSTAN screening criterion #9.

This GIS shapefile was cross referenced with various other sources of truck-generating land use data. A database of warehouse and distribution center locations was collected and used to confirm the location of those key truck generators. California Highway Patrol (CHP) truck domicile data by zip code and SCAG traffic analysis zone truck production and attraction data derived from American Transportation Research Institute (ATRI) data were used to confirm the proportional contribution of industrially-zoned areas to truck trip generation.

As part of its 2012 RTP/SCS development process, SCAG contracted with ATRI to provide zonal origin and destination date for trucks in the SCAG region and point-specific truck location data. ATRI collects GPS data from truck cabs from selected trucking companies. ATRI uses the data to produce reports on freight performance measures at highway locations, where detailed truck location and speed can be shown on the freeway system, arterial system, and at origin and destination points. However, due to privacy concerns of showing levels of truck intensity at private businesses, the data were aggregated to the TAZ level for SCAG's purposes. The SCAG ATRI data were collected between October 1 and October 30 of 2009. It is not known if data were collected for all days or all hours during this time period. Given the low number of productions and attractions in the San Pedro ports area, either the data was for a subset time period or a subset of trucks—those with GPS units with data collected by ATRI.

The SCAG ATRI data provided for this effort include truck trip productions and attractions for each TAZ in the SCAG region. The highest cumulative producing and attracting TAZ is in Mira Loma with 33,300 productions and attractions measured for the month of October 2009. The highest producing and attracting TAZ in Los Angeles County was in the City of Commerce with 27,400 monthly productions and attractions. Since TAZs are not consistent in their size or area covered, the productions and attractions were normalized by area for the beta mapping. Below is an example of the ATRI data for the City of Commerce area which shows relative concentrations of truck trip origins and destinations with the darker zones experiencing a greater number of truck trip generated. This data is compiled for the entire county, and is helpful for comparing the relative truck generation of areas; however we are unable to directly correlate it to truck volumes.

An additional layer of land uses sensitive to truck activity such as educational uses and parks, was also created to assist in the refinement of CSTAN routes to acknowledge the potential for incompatibility of the truck network with certain land uses. Maps of industrial and commercial land uses can be found in Appendix C.

Bicycle/Pedestrian Coordination

As described earlier, the increasing implementation of Complete Street elements, combined with the need for goods movement have resulted in growing conflicts that local jurisdictions are now beginning to recognize and address. Because one of the goals of the CSTAN is to help minimize bicycle/pedestrian conflicts, the CSTAN was overlaid onto the existing bike lane/path network to identify where potential conflicts with trucks might be located. These maps can be found in Appendix C. Though potential conflicts between bicycle/pedestrian uses and trucks was not used as a screening criteria, it was applied as a refinement criteria as identified in Table 2.

Concurrent with the development of the CSTAN, Metro developed a Complete Streets policy that was adopted by the Metro Board in October 2014 and is intended to “ensure that streets form a comprehensive and integrated transportation network promoting safe and convenient travel for all users while preserving flexibility, recognizing community context, and using design guidelines and standards that support best practices.” At the same time, the policy acknowledges the need to provide access for goods movement and encourages local jurisdictions to “consider truck access when implementing complete streets projects and balancing user needs, as appropriate.”

The application of the CSTAN in coordination with the Metro Complete Streets policy will assist local jurisdictions with planning for potential complete streets improvements, while at the same time providing access needed for goods movement. Cities can use the CSTAN to identify high truck volume corridors to coordinate bicycle and pedestrian improvements. Where bicycle facilities are planned and overlap with the CSTAN, cities may want to consider placement of the bicycle facilities on a nearby parallel street that would still facilitate an integrated bicycle network. Or if bicycle facilities are planned on the same arterial as those traversed by high truck

volumes identified in the CSTAN, cities could consider effective design treatments that improve safety for bicyclists and truck traffic. The CSTAN could also help identify areas of high freight activity and/or industrial land uses would warrant additional enhancements to reduce conflicts between pedestrians and trucks, such as crosswalk enhancements that improve safety.

Network Refinement – Draft Working Network

At the July 9, 2014 CSTAN TAC meeting, potential draft working networks for the CSTAN were presented and there was discussion about the screening criteria, how they were applied, and the ultimate purpose of the CSTAN and the level of coverage of the seven presented alternatives. The potential CSTAN working network alternatives were developed based on varying levels of applying the CSTAN screening criteria.

The TAC was provided seven options for the application of the criteria to review various potential levels of extensiveness of the truck arterial network (Group A to Group G). Table 1 provides a listing of the ten categories used to identify the CSTAN. Since a network of too few or too many arterial corridors would make it difficult to meet the goals of CSTAN, the seven various network groupings allowed the TAC to select a network size that best meets the goals of the project. The seven proposed groupings can be found in Table 4.

The draft network groupings used a progressively more lenient threshold application of the criteria starting with arterial segments meeting at least seven of the ten CSTAN screening criteria down to those meeting four or more of the CSTAN screening criteria. In addition, STAA truck routes (criterion #5) were included in all scenarios and two of the other screening criteria, criterion #4, municipal truck routes and criterion #7, daily truck volumes, were used as critical factors to help define the potential CSTAN scenario groupings by including all arterial segments meeting those thresholds in some of the scenarios.

Table 4: CSTAN groupings

Total Arterial Miles Considered for CSTAN	**6,973 miles**
Group A – Seven or More Criteria Met, or Truck ADT >750, or on STAA Truck Route	746 miles
Group B – Six or More Criteria Met, or Truck ADT >750, or on STAA Truck Route	910 miles
Group C – Six or More Criteria Met, or Truck ADT >500, or on STAA Truck Route	1,275 miles
Group D – Five or More Criteria Met, or Truck ADT >750, or on STAA Truck Route	1,447 miles

Group E – Five or More Criteria Met, or Truck ADT >500, or on STAA Truck Route	1,695 miles
Group F – Five or More Criteria Met, or Truck ADT >500, or on STAA or City Truck Route	2,085 miles
Group G – Four or More Criteria Met, or Truck ADT >500, or on STAA or City Truck Route	2,566 miles
Existing Metro CSAN Roadways	2,847 miles

The groupings ranged from a low of 746 miles of coverage (Group A) up to a high of 2,566 miles of coverage (Group G). By comparison, the Countywide Significant Arterial Network is 2,847 miles of arterial roadway; thus the largest potential CSTAN (as presented at the TAC) would have been 90 percent as large as the entire CSAN network, which did not seem appropriate given that the CSTAN is a focused network just for trucks and the CSAN is for all travel modes and primarily for person throughput.

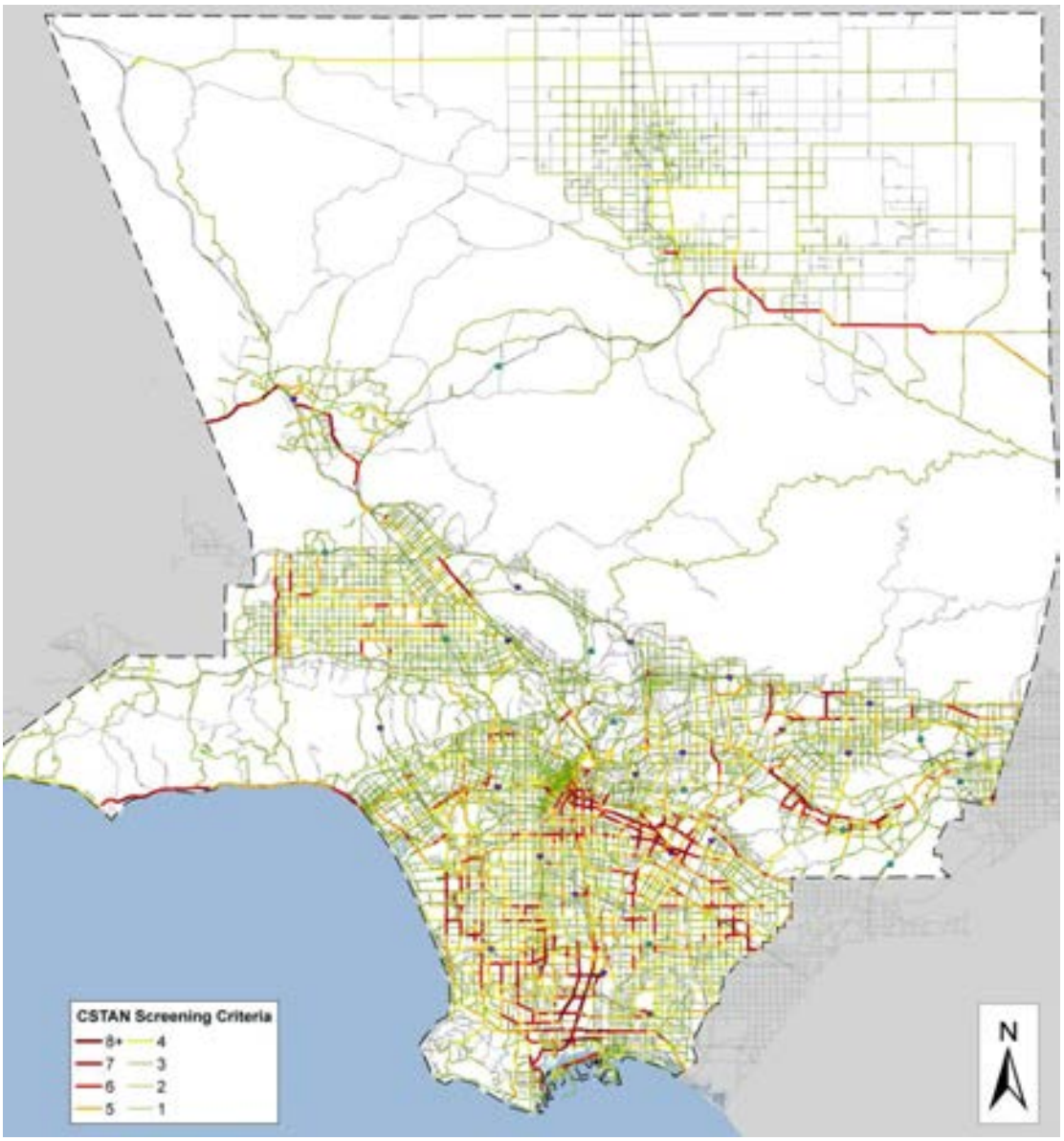


Figure 4 Number of CSTAN Screening Criteria Met by Arterial Roadway Segment

After discussion with the TAC, it was determined that roadways identified for the draft working network would either: 1) meet six or more of the CSTAN screening criteria, 2) carry more than 750 trucks per day, or 3) be a STAA truck route (Group B). The TAC felt that Group B was a reasonable starting point that had a high enough threshold for inclusion in the draft CSTAN. Group B was then used as the starting point and underwent further review and refinement by the TAC, and project team using previously developed refinement criteria intended to assist in the rational closing of gaps in the network left out of the data-only screening process. For this review effort, the TAC asked for maps showing the adopted municipal truck routes and truck restrictions overlaid onto Group B so that each jurisdiction at a glance can see the relationship between the CSTAN alternative "Group B" coverage and its own truck network. National

Highway System Intermodal Connectors, STAA routes and STAA Terminal Access routes were also presented on the maps.

TAC members were asked to 1) review the possible Group B CSTAN coverage and comment for their jurisdiction—specifically any routes they would NOT want to be part of CSTAN as well as any other routes that should be part of CSTAN, 2) comment on network continuity and any "gap closures" that may be evident in their jurisdiction, and 3) comment in general on the appropriateness of Group B in their area. They were also asked for other general or specific comments that should be considered such as key industrial areas, key sensitive areas or land uses and other issues in their jurisdiction.

The following agencies returned comments:

- City of Alhambra
- City of Diamond Bar
- City of Duarte
- City of El Monte
- City of Los Angeles
- City of Montebello
- City of Palmdale
- City of Pomona
- City of South Pasadena
- City of Walnut
- City of West Hollywood
- County of Los Angeles
- Metrolink
- Port of Long Beach
- Port of Los Angeles
- Gateway Cities COG
- San Gabriel Valley COG

During the review period, comments from local jurisdictions were integrated into the draft CSTAN network. In addition, the consultant team updated the screening criteria data and applied other refinement criteria to reconfigure the draft network into a logical, continuous set of arterials that serve industrial and truck intensive land uses and connect those areas to the freeway system. Since the screening criteria were applied on a segment by segment basis, minor fluctuations in the level of criteria met resulted in gaps and discontinuity in the network. As shown in the draft working network, these resulted in gaps (segments dropping below the criteria threshold) and created unconnected sections of roadway (segments meeting the criteria threshold without any nearby segments doing the same). The refinement criteria were used to close the gaps and eliminate the disconnected segments of arterials to create a connected and logical network.

Since the refinement decisions were based on professional judgment, each addition or reduction of a segment was recorded with a note of which refinement criterion was used to make the determination. The same notations were made where those additions and reductions were made due to stakeholder and agency comments. Stakeholder and agency comments resulting in changes to the network were prioritized above refinement criteria decisions.

The primary reason for adding or removing segments of roadway was connectivity/discontinuity with the remainder of the system. Beyond the simple connectivity of the system, other segments

recommended for inclusion in the network included connections to freeway access, routes identified in stakeholder outreach, ITS priority corridors, arterials used as freeway alternatives, and service to industrial areas. Reasons to recommend removal of candidate segments from the draft working CSTAN included discontinuity or isolation from the rest of the system and segments through sensitive land uses such as adjacent to residential areas and schools.

A second set of maps were generated for the review of the Draft Final CSTAN by the TAC and agencies across the County to finalize the CSTAN. The maps show the refinement process by displaying the draft working CSTAN and the links that were added and removed to produce the draft final CSTAN. Additional comments were received and addressed from the Cities of Los Angeles and Palmdale and the Port of Long Beach. The final CSTAN is the product of arterials identified through the screening criteria and subsequent refinement by both the project team and local jurisdictions throughout the County.

The combined refinement activities based on City review and comment and the consultant team technical refinement analysis resulted in the addition of 345 miles and the removal of 106 miles of arterials from the circulated draft network. Below are tables detailing the reasons for adding or removing segments of roadway from the draft working CSTAN.

Table 5: Added Segment Mileage

Reason to Add	Mileage
Enhance Connectivity	241.4
Freeway Access	23.4
Stakeholder Outreach	19.2
GCCOG Smart Corridors (ITS)	5.7
City Comment	13.8
Freeway Alternate	14.4
Serves Appropriate Land Use	26.3
Total	344.1

Table 6: Removed Segment Mileage

Reason to Remove	Mileage
City Comment	25.6
Discontinuity	66.2
Land Use not appropriate	14.3
Bicycle/Pedestrian	0.1
Total	106.1

As shown in **Table 7**, the draft final CSTAN consists of 1,660 miles of arterials out of the total 6,973 miles of arterials in Los Angeles County (approximately 24 percent of the arterial system).

Table 7: Draft Final CSTAN

	Mileage
CSTAN Network	1,657
Total Mileage Considered	6,973

Table 8 is a comparison of CSTAN with the Countywide Significant Arterial Network (CSAN). As shown, 1,660 miles of CSTAN are also on the CSAN network (58 percent of CSAN), while 192 miles are outside of the CSAN system (12 percent of CSTAN).

Table 8: Draft Final CSTAN Compared to CSAN

	Mileage
CSTAN Total	1,657
CSAN	2,847
CSTAN overlaps with CSAN	1,465
CSTAN does not overlap with CSAN	192

CSTAN arterial corridors represent a subset of Los Angeles County arterials that are most important to the trucking of goods. The following characteristics of CSTAN arterial segments as they compared to other County arterial segments:

- Average number of lanes: CSTAN: 4.4 lanes, other County arterials: 2.8 lanes
- Average Daily Truck Volume: CSTAN: 660 trucks per day, other County arterials: 90 trucks per day average
- Segments with truck-related collisions: CSTAN: 14 percent, other County arterials: three percent.
- Segments located in industrial areas: CSTAN: 47 percent, other County arterials: 12 percent
- Segments located on defined truck routes: CSTAN: 71 percent, other County arterials: seven percent

A chart of CSTAN arterials and the jurisdiction they are located in can be found in Appendix B. Maps of the CSTAN can be found in Appendix C.

Environmental justice is the fair treatment of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of policies, laws, and regulations. In the context of CSTAN as an indicator of the broader transportation infrastructure serving trucks in Los Angeles County, environmental justice would mean that CSTAN-classified arterials would be located in equal proportion inside and outside communities with low median household incomes and large percentages of minority residents. To perform this assessment, the SCAG guidelines for determining environmental justice communities were followed using data collected by United States decennial by census tract.

For median household income, the first and second quintile of median household income by census tract was used to define low income communities. Those census tracts' households would have an average income that is approximately $43,000 in 2010 dollars. For minority communities, majority minority communities were defined by census tract. These sets of census

tracts were overlaid on the Los Angeles roadway network in GIS to determine the amount of CSTAN arterials and non-CSTAN arterials.

Overall CSTAN comprises of 23.8 percent of arterials in Los Angeles County. The results of the environmental justice analysis show that 28.8 percent of roadways in low median household income areas are part of CSTAN and 30.1 percent of roadways in majority minority areas are part of CSTAN. This compares to 21.5 percent of roadways in non-low income areas and 12.0 percent of roadways in non-minority areas being part of CSTAN. Therefore low income and minority areas of Los Angeles County do have a higher concentration of CSTAN arterials located in their communities. While these patterns of significant truck arterials are the result of a multitude of factors ranging from zoning, population patterns, housing costs, and the historical relationship between industrial areas and neighborhoods in southern California, it does demonstrate the continuing need to balance the operation of freight and broader community values and goals.

CSTAN Application and Updates

The CSTAN represents Metro's first countywide analysis of arterial truck travel and designation of a strategic truck arterial network. Important lessons were learned including data collection and definition issues, the sensitivity of trucks traveling on local arterials and the inconsistent consideration of goods movement in transportation planning at the local level. While there are many good examples across the country of arterial truck plans and projects, there appears to be a greater need to coordinate and recognize potential conflicts between goods movement and local transportation plans and projects. The CSTAN will help to bring attention to both the cities and Metro of these potential planning and programming conflicts, and the decision makers can then take proactive measures to reduce and/or mitigate them.

The primary objective of the CSTAN is to assist Metro and cities in identifying truck arterial system needs and connectivity gaps and direct funding to projects providing the greatest expected benefit to goods movement, while still supporting person throughput and development of Compete Streets programs. In the future, Metro hopes that the CSTAN will be used as a planning tool for identifying goods movement-related arterial improvements and guiding future transportation plans and projects for the benefit of all users of the roadway network.

As described earlier, the CSTAN in coordination with the Complete Streets policy can assist local jurisdictions planning for complete streets improvements identify and address potential conflicts between goods movement and other users of the roadway. In fact, the Complete Streets policy recognizes the need for goods movement and recommends "Working with local jurisdictions to identify a network of strategic arterial truck routes. These routes may be less desirable for full Complete Streets treatment; however, accommodations for other users of the roadways or provision for parallel bicycle and/or pedestrian facilities should be considered, where feasible. Local jurisdictions are encouraged to refer to this plan to help coordinate planning to minimize potential operational conflicts between different users of the roadway." To help accomplish this goal, Metro staff intends to develop Complete Streets best practices and

guidelines that will more specifically define how to address and mitigate conflicts between bicycle/pedestrian uses and goods movement.

Finally, Metro may consider developing a web-based database of arterial truck data collected and developed for this project. This centralized data resource may be used for future planning studies and research reports and by users of the transportation system.

Updates of CSTAN

Understanding that roadway conditions change including roadway characteristics (traffic volume, truck volume), designated functional classifications (as part of local plans) and relationship to land use (due to growth and development), the consultant team recommends that Metro consider adopting a process to modify and update the CSTAN.

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