Level of Service and Transit Performance Standards

3

State law requires that level of service (LOS) standards be established to monitor the CMP roadway network's LOS as part of the CMP process[9]. The legislation leaves the choice of LOS measurement methodology to the CMAs, but mandates that the LOS be measured by the most recent version of the Transportation Research Board's Highway Capacity Manual (HCM) or a uniform methodology adopted by the CMA, Alameda CTC for Alameda County, that is consistent with the HCM (see Appendix B for Alameda CTC's assessment of HCM2010).

LOS definitions generally describe traffic conditions in terms of speed and travel time, volume and capacity, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. LOS is represented by letter designations, ranging from A to F, with LOS A representing the best operating conditions and LOS F representing the worst (see Appendix E for graphic representation of LOS).

The purpose of setting LOS standards for the CMP network is to provide a quantitative tool to analyze the effects of land use changes on the transportation network's performance (i.e., congestion) or to identify hot spots. If the actual network performance of a roadway segment falls below the standard (i.e., congestion worsens below LOS E), actions must be taken to improve the LOS.

Alameda CTC contracts with a consultant to perform the necessary LOS monitoring for the CMP network. Initially, the CMP network was monitored annually, but in 1998 a policy was adopted to perform the LOS monitoring every two years, which has proven to be the most cost-effective approach. The next monitoring study will be performed in spring 2018.

In addition to monitoring auto LOS on the CMP roadways, Alameda CTC has expanded its biennial performance monitoring to include multimodal performance standards. This is an outcome of the agency's development of comprehensive countywide modal plans, including a Countywide Goods Movement Plan, a Countywide Multimodal Arterial Corridor Plan, and a Countywide Transit Plan to identify and address the multimodal transportation needs of the county as a whole. The first step in this effort is monitoring transit performance standards on the transit monitoring network described in Chapter 2, beginning with the next monitoring cycle in 2018.

[9] California Government Code Section 65089(b)(1)(A).

Standards and Approach for LOS Monitoring

LOS is an indication of traffic growth trends using vehicular volumes, capacity, and measurement of average speed and delay. The goal is to develop a consistent approach for monitoring LOS that is easy to use, non-duplicative, and compatible with local government data and travel-demand models. Table 3.1 describes the approach for monitoring LOS in Alameda County and defines the facility classifications.

Table 3.1—Approach to LOS Monitoring

Element	Approach
Level of Service	As defined in the California Government Code Section 65089.3, the LOS standard is E, except where F was the LOS when originally measured, in which case the standard is F. The methods employed by Alameda CTC constitute a uniform methodology adopted by the Commission that is consistent with the HCM1985 that includes speed-based LOS methodology for roadway segments. Methods described in HCM Chapter 8, "Two-Lane Highways" and Chapter 11, "Urban and Suburban Arterials" were the basis for establishing the LOS on the CMP network. LOS is assessed based on the average speed observed along a roadway segment (link speeds) or total volumes approaching an intersection (link volumes). These methods are not designed to replace the more detailed procedures that local agencies are likely to use for non-CMP purposes (such as local impact studies). Such procedures typically focus on an intersection's ability to handle individual turning movements rather than average speed on a roadway segment. Pending the final rulemaking of the Office of Planning and Research's CEQA Guidelines on Evaluating Transportation Impacts in CEQA to implement SB 743, local impact studies would shift from measuring intersection or segment-level LOS impacts to vehicle miles traveled impacts.
Facility Classifications	The HCM provides methods for determining LOS on several types of facilities. These facilities are grouped into "interrupted-flow" and "uninterrupted-flow" facilities. Interrupted-flow facilities include city streets and surface highways (for example, State Route 123/San Pablo Avenue) that are part of the state highway system. Freeways are uninterrupted-flow facilities. For the purposes of LOS monitoring, the CMP network can be classified into three functional types of facilities: 1) freeways; 2) two-lane roadways; and 3) urban/suburban arterials. In Alameda County, HCM1985 classification is used for the Tier 1 roadways for consistency in methodology and for the ability to track performance trends over time. HCM2000 is followed for Tier 2 roads added since 2011.

Element	Approach
1) Freeways	Freeways are uninterrupted-flow facilities, since traffic never stops (except during the most congested periods or when incidents occur). The 1991 Alameda County CMP, in coordination with local jurisdictions, defined appropriate segments and performed the necessary "floating car" runs on the freeways to obtain travel speed data (refer to "Data Collection and Requirements" in this chapter for information on this data collection method). This allowed the establishment of a baseline LOS for the roadway network, including identification of segments operating at LOS F.
2) Two-Lane Roadways	Two-lane roadways are uninterrupted-flow facilities, also referred to as principal arterials. The criteria adopted by Alameda CTC for including principal arterials in the CMP network specify a minimum of four lanes; therefore, two-lane roadways are not included as principal arterials. However, since all state highways must be in the system, two-lane state highways located in the county are also included in the CMP network. These two-lane roads constitute a fairly small portion of the CMP network mileage. For two-lane roads without interruptions (signals or stop signs), the methodology in HCM Chapter 8 is used, based on average travel speed.
3) Urban and Suburban Arterials	Urban and suburban arterials are multilane streets that have traffic signals spaced no more than two miles apart on average. Urban and suburban arterials are characterized by platoon flows. Operational quality is controlled primarily by the efficiency of signal coordination and is affected by how individual signalized intersections operate along the arterial. LOS is primarily a function of travel speed along segments and is calculated from field data. Because the CMP legislation emphasizes systems-level planning, HCM Chapter 11 is used to estimate arterial LOS. Advantages include the need for relatively little input data, simple applied calculations, and the results of explicitly determined LOS (A, B, C, etc.).
Monitoring	Alameda CTC conducts LOS monitoring. The state statute requires Caltrans to monitor LOS on the freeway network, unless Alameda CTC designates that responsibility to another entity. Monitoring is conducted biennially, recognizing that other surveys could be done for development impact studies or other local analyses (e.g., intersection turning movement counts). Alameda CTC uses two data collection methods for LOS monitoring: 1) commercial speed data based on aggregated traffic data from GPS-enabled vehicles and mobile devices, traditional road sensors, and other sources; and 2) the floating car technique of recording travel times between checkpoints based on actual travel time during the peak period. Refer to "Data Collection and Requirements" in this chapter for details on the two data collection methods.
Interregional Trips	As defined by the statute, "interregional travel means any trip that originates from outside" Alameda County. A trip means a one-direction vehicle movement. The origin of any trip is the starting point of that trip. In accordance with the Metropolitan Transportation Commission (MTC) guidelines, trips with no trip end in Alameda County (through trips) are not subtracted for monitoring reports.

Highway Capacity Manual (HCM) and LOS Standards

The Congestion Management Program legislation requires that the LOS monitoring on CMP roadways be measured by the most recent version of the HCM or by a uniform methodology adopted by the CMA, consistent with the HCM. For LOS Monitoring and Deficiency Plan purposes, Alameda CTC uses speed-based LOS methods included in the HCM1985 to

determine LOS for the CMP roadways, as shown in Table 3.2 (adopted in 1991 and updated in 2004).

To transition to using the most recent HCM for the purposes of LOS monitoring and Land Use Analysis Programs of the CMP, efforts were made in 2005 to use HCM2000 and in 2013 to use HCM2000 or HCM2010. Based on comparative analyses of the various HCMs, the following observations were made:

- **Different methodologies would hinder conformity.** For freeways, the differences between the HCM1985 and the HCM2000 and HCM2010 methodologies were significant. Specifically, the basis for determining LOS has changed from speed-based LOS in HCM1985 to density-based LOS in HCM2000 and HCM2010. This eliminates the ability to track previous LOS trends, monitoring of existing deficiency plans, and consistency in determining deficiency; hence, this affects conformity.
- **Classification changes would affect conformity.** For arterials, the roadway classifications changed after the HCM1985. Classifications were added in the HCM2000, and later classifications were eliminated in the HCM2010. Further, in the HCM2010, free-flow speed, which is the basis for estimating LOS in all HCM versions, requires additional facility-specific data that is excessive for large-scale use such as LOS monitoring on the countywide CMP network.

Using the later HCM2000 and HCM2010 versions would result in applying density-based LOS methodology for freeways and changed classifications for arterials. This would not provide substantially improved performance data and would hinder conformity and the ability to compare past performance trends. Based on this analysis for the Tier 1 network, which is subject to conformity, Alameda CTC will continue to use speed-based LOS methodology and arterial classifications in the HCM1985 to monitor freeways and arterials. For the Tier 2 network, which has been only monitored for informational purposes since 2012 and has no previous performance data available to compare, LOS was reported using both HCM1985 and HCM2000 methodologies starting in 2014. Accordingly, the 2014 LOS Monitoring Report developed different classifications for Tier 2 based on HCM1985 and HCM2000 and the reported LOS. Since the classification has already been established, the 2018 LOS monitoring cycle will continue to use the same approach.

As part of the 2013 CMP update, Alameda CTC identified LOS standards to monitor alternative modes in a comparable way to auto performance. Since HCM2010 also included LOS standards for monitoring alternative modes, such as multimodal level of service (MMLOS), Alameda CTC evaluated MMLOS for monitoring performance of transit and bicycle and pedestrian modes. It was found that using the HCM2010-based MMLOS is data and resource intensive and costly for large-scale applications such as monitoring countywide performance of the alternative modes; therefore, it is not suitable for LOS monitoring purposes. In-lieu of MMLOS, Alameda CTC will measure multimodal performance beginning with transit performance in the 2018 LOS monitoring cycle. The 2017 CMP Update, as described in Chapter 2, has identified major transit corridors across the county for monitoring transit performance using transit speed as the metric. Alameda CTC will continue to review the methodology during each CMP update to identify any improvements to the overall approach.

Table 3.2—Relationship Between Average Travel Speed and LOS

Freeways (Source: HCM1985)			
Level of Service	**Average Travel Speed (mph)**	**Volume-To-Capacity Ratio**	**Maximum Traffic Volume (vehicles/hour/lane)**
A	≥ 60	0.35	700
B	≥ 55	0.58	1000
C	≥ 49	0.75	1500
D	≥ 41	0.90	1800
E	≥ 30	1.00	2000
F	≤ 30	Variable	–

Arterials LOS (Source: HCM1985) (used for monitoring freeways and arterials)			
Arterial Class	**I**	**II**	**III**
Range of Free Flow Speed (mph)	35 to 45	30 to 35	25 to 35
Typical Free Flow Speed (mph)	40	33	27
Level of Service	**Average Travel Speed (mph)**		
A	≥ 35	≥ 30	≥ 25
B	≥ 28	≥ 24	≥ 19
C	≥ 22	≥ 18	≥ 13
D	≥ 17	≥ 14	≥ 9
E	≥ 13	≥ 10	≥ 7
F	≤ 13	≤ 10	≤ 7

Arterials LOS (Source: HCM1985 and HCM2000) (used for monitoring Tier 2 arterials)				
Urban Street Class	**I**	**II**	**III**	**IV**
Range of Free Flow Speed (mph)	55 to 45	45 to 35	35 to 30	35 to 25
Typical Free Flow Speed (mph)	50	40	35	30
Level of Service	**Average Travel Speed (mph)**			
A	> 42	> 35	> 30	> 25
B	> 34-42	> 28-35	> 24-30	> 19-25
C	> 27-34	> 22-28	> 18-24	> 13-19
D	> 21-27	> 17-22	> 14-18	> 9-13
E	> 16-21	> 13-17	> 10-14	> 7-9
F	≤ 16	≤ 13	≤ 10	≤ 7

Sources: Table 12-1, Special Report 209, HCM 1985; Exhibit 15-2, HCM 2000 (U.S. Customary Units). Information in [brackets] added for clarification.

Traffic Monitoring Program

Alameda CTC conducts LOS monitoring on the Alameda County CMP network. For this purpose, the CMP route segments were determined for travel-time analysis with input from the Alameda County Technical Advisory Committee (ACTAC) and appropriate local jurisdiction departments (traffic engineering, planning department, etc.). Data collection time periods were determined based on the general congested peak periods on most of the CMP roadway network.

Definition of Roadway Segments

Alameda CTC used the following guidelines to determine the segments:

- Segments should be at least one mile and not more than five miles in length; and
- Logical segment break-points include jurisdictional boundaries, points where the basic number of travel lanes change, locations where land use changes occur (e.g., commercial areas versus residential), and points where the posted speed limit changes or where the number of adjacent driveways is significantly different.

Since the adoption of the CMP roadway segments in 1991, the intensity and location of congestion throughout the county has changed. In 2007, the CMP roadway segment lengths and criteria for designating the CMP roadway segments to develop new segments were updated to better reflect existing land use and travel patterns.

Many long segments were found to be operating at better levels of service because speeds were averaged over the length of longer segments. Splitting these segments using the approved criteria revealed congestion hot spots and more accurately identified congested segments. Because the original checkpoints were retained, all new segments nest within the pre-2007 roadway segments. This approach allows trends to be evaluated over time. During the 2009 CMP Update, SR 84 in East County was segmented into shorter segments based on the same criteria. Similarly, as part of the 2017 CMP update, two segments on A Street and Mission Boulevard in Hayward were segmented into shorter segments, to reflect the one-way traffic pattern that resulted from opening the Hayward Loop. From a field and operating perspective, the current CMP roadway segmentation criteria are still appropriate; therefore, no changes are recommended for this update.

Data Collection and Requirements

The traffic monitoring program requires information about average travel speed, which is the basis for measuring level of service on all facility types (i.e., freeways, two-lane highways, and urban/suburban arterials). For a given roadway segment, speed data must be collected and reported separately for each travel direction. Travel speed studies for this purpose are conducted using two methods for autos—commercial speed data and floating car survey:

- Commercial speed data aggregates traffic data from GPS-enabled vehicles and mobile devices, traditional road sensors, and other sources. These data are reported using discrete roadway links known as Traffic Message Channels (TMCs). For the 2016 LOS monitoring, data at one-minute intervals was accessed for the selected monitoring times across all the identified TMCs in Alameda County. Use of commercial speed data was approved by the Commission in 2013 based on a validation exercise carried out by Alameda CTC. As a part of that exercise, it was determined that commercial speed data could be used for freeways (Tier 1), ramps (Tier 1), and part of the arterials (Tier 2), where commercial speed data is available, which was 71 miles out of 89 miles of Tier 2 arterials at that time.
- Floating car surveys are used where the coverage of commercial speed data is not adequate or results are not expected to be reliable. Floating car surveys use GPS technology to determine the travel time between the start and end of each CMP

segment. A test car is driven six times in each direction on each CMP segment. If congested segments (LOS F) are experienced in the afternoon, and the route is subject to conformity, then two additional runs are generally completed on the entire route. Floating car surveys are conducted for Tier 1 arterials and for 18 miles out of 89 miles of Tier 2 arterials. In the 2016 LOS Monitoring Report, two new metrics were added—reliability and duration of delay, both of which were calculated for informational purposes.

The data collection process also identifies the days and time periods to perform CMP network monitoring. For the 2016 LOS monitoring, monitoring days were reviewed and identified separately for commercial speed data and floating car surveys:

- Commercial speed data collection and floating car surveys are generally conducted in the months of March, April, and May when schools are in session. When additional floating car surveys are required, some data collection efforts can be extended into the first week of June, but need to be complete before the schools close for the summer.
- Data are collected on a Tuesday, Wednesday, and/or Thursday, because these days are most indicative of average weekday conditions. Additional weekend monitoring of freeways (Tier 1) was done for informational purposes, between 1:00 p.m. and 3:00 p.m.
- Monitoring time periods are 4:00 p.m. to 6:00 p.m. during the p.m. peak hours and 7:00 a.m. to 9:00 a.m. during the a.m. peak hours. Generally, p.m. peak-period monitoring is used for conformity purposes, with the exception of the Tier 2 network, where both morning and afternoon peak periods are monitored for informational purposes only. Monitoring during the a.m. peak period for all CMP roadways is for informational purposes only.
- Test car runs on a particular segment must span a range of days and time of day. This means that test car runs should not be bunched on the same day of the week or taken on separate days at the same time.
- Data collection during holidays, special events, when school is not in session, or when roadway construction is under way must be avoided.
- Consistent monitoring periods must be observed for each roadway segment. For example, a comparison between April 2010 and April 2011 is likely to be more valid than a comparison between January 2010 and August 2011.
- If special generators are located within a few miles of the monitoring location, it must be determined whether unusual or unwanted activity levels are occurring at the special generators.
- Incidents are generally expected to impact traffic conditions, and therefore data associated with incidents is excluded. For floating car surveys, where the driver observes an incident, the floating car survey run is repeated. For commercial speed data, freeway incident data sets from PeMS are reviewed, and the speed data records for the corresponding time period are removed across all the relevant CMP segments.

The traffic monitoring methodology for autos for the 2018 LOS Monitoring Report will follow the same approach as the 2016 LOS Monitoring Report. Data will be collected in spring of 2018. The methodology for data collection and analysis for the transit performance assessment will be determined as part of the 2018 monitoring effort.

Grandfathered LOS F Roadway Segments

CMP legislation exempts congested CMP roadway segments that did not meet the minimum LOS standards (LOS E) when the CMP network was formed (in 1991 and 1992) from deficiency identification and preparing a deficiency plan. These grandfathered segments were identified based on the LOS monitoring performed in 1991 for the CMP roadway segments and in 1992 for the CMP freeway-to-freeway connectors during the p.m. peak period, which is used for conformity. According to

the study results, a total of 15 freeway segments (excluding freeway-to-freeway connectors) and 15 arterial segments were operating at LOS F in 1991 and five freeway-to-freeway connectors were operating at LOS F in 1992. Tables 3.3, 3.4, 3.5, and Figure 3.1 show the grandfathered CMP segments including the freeway-to-freeway connectors.

Although these segments are grandfathered by statute, they are not exempt from analysis and mitigation for the purpose of satisfying the Land Use Analysis Program (Chapter 6), the California Environmental Quality Act (CEQA), and the federal National Environmental Protection Act. The CMP focuses on existing congestion; therefore, Alameda CTC will consider strategies and/or improvements to address grandfathered segments in corridor studies as well as investments in the Countywide Transportation Plan and in the CMP Capital Improvement Program.

Table 3.3—LOS F Freeways for Alameda County CMP-Designated Roadway Network

	Roadway		Limits	Jurisdiction	Average Speed (mph)
1	I-80	WB	From University to I-80/I-580 Split	Berkeley/Emeryville	16.6
2	I-80	WB	From I-80/I-580 Split to Bay Bridge Toll Plaza	Oakland	29.7
3	I-80	EB	From I-580/I-80 Split to University	Emeryville/Berkeley	25.8
4	I-80	EB	From University to Central	Berkeley/Albany	25.8
5	SR-24	EB	From I-580 to Fish Ranch Road	Oakland	28.5
6	I-580	SB	From I-80/I-580 to I-980/Hwy 24	Oakland	25.6
7	I-980	EB	From I-880 to SR-24/I-580	Oakland	28.5
8	I-238	EB	From I-880 to I-580	County/San Leandro	29.8
9	I-880	SB	From Hegenberger to Washington	San Leandro/Oakland	29.2
10	I-880	SB	From Washington to A Street	County/Hayward	24.3
11	I-880	NB	From Tennyson to SR-92 (Jackson)	Hayward	18.2
12	I-880	NB	From SR-92 to Lewelling	Hayward	23.2
13	I-880	NB	From Dixon Landing to SR-262/Mission	Fremont	29.3
14	SR-92	WB	From Clawiter to Toll Gate	Hayward/County	27.1
15	SR-92	EB	From Toll Gate to I-880	Hayward/County	27.5

Source: Data is based on surveys taken during the afternoon peak period in September/October 1992.

Table 3.4—LOS F Freeway-to-Freeway Connectors, Alameda County CMP-Designated Roadway Network

	Roadway	Jurisdiction	Length (miles)	Average Speed (mph)	Free Flow Speed
1	I-80 SB to I-580 EB*	Oakland	0.30	18.7	45.0
2	I-580 WB to I-80 NB*	Oakland	0.21	16.0	45.0
3	I-680 SB to I-580 EB	Pleasanton	0.67	16.3	35.0
4	SR-13 NB to SR-24 EB	Oakland	0.35	14.4	45.0
5	I-580 WB; SR-24 WB to I-80 NB	Oakland	0.69	22.1	45.0

Source: Data is based on surveys taken during the afternoon peak period in September/October 1992.
* LOS condition was first reported during the 1991 surveys.

Table 3.5—LOS F Arterial Segments, Alameda County CMP-Designated Roadway Network

	Roadway		Limits	Jurisdiction	Arterial Class	Average Speed (mph)
1	SR-13 (Ashby Avenue)	WB	From Telegraph Avenue to Shattuck Avenue	Berkeley	III	8.7
2	SR-13 (Ashby Avenue)	WB	From Shattuck Avenue to MLK Jr. Way	Berkeley	III	9.3
3	SR-13 (Ashby Avenue)	EB	From College Avenue to Domingo Avenue	Berkeley	III	6.8
4	SR-123 (San Pablo Avenue)	SB	From Park Avenue to 35th Street	Emeryville/Oakland	II	9.4
4	SR-260	SB	From 7th/Webster Street to Atlantic Street	Oakland/alameda	I	12.3
6	SR-238 (Mission Boulevard)	NB	From Sycamore Street to Jackson Street	Hayward	II	8.8
7	SR-92 (Jackson Street)	EB	From I-880 to Winton Avenue	Hayward	II	8.6
8	SR-92 (Jackson Street)	EB	From Winton Avenue to Mission Boulevard	Hayward	II	4.5
9	Hesperian Boulevard	NB	From La Playa to Winton Avenue	Hayward	I	11.1
10	Hesperian Boulevard	SB	From 14th Street to Fairmont Drive	San Leandro	II	9.9
11	Hesperian Boulevard	SB	From Spring Lake to Lewelling Boulevard	Unincorporated	II	9.6
12	SR-112 (Davis Street)	WB	From I-880 to San Leandro Boulevard	San Leandro	II	5.2
13	Decoto Road	WB	From Union Square to Alvarado-Niles Road	Union City	II	8.6
14	SR-84 (Fremont Boulevard)	WB	From Peralta Boulevard to Thornton Avenue	Fremont	II	7.2
15	Mowry Avenue	EB	From I-880 to Farwell Drive	Fremont	II	9.6

Source: Based on surveys during the afternoon peak period (4 p.m. to 6 p.m.) in July-August and October 1991.

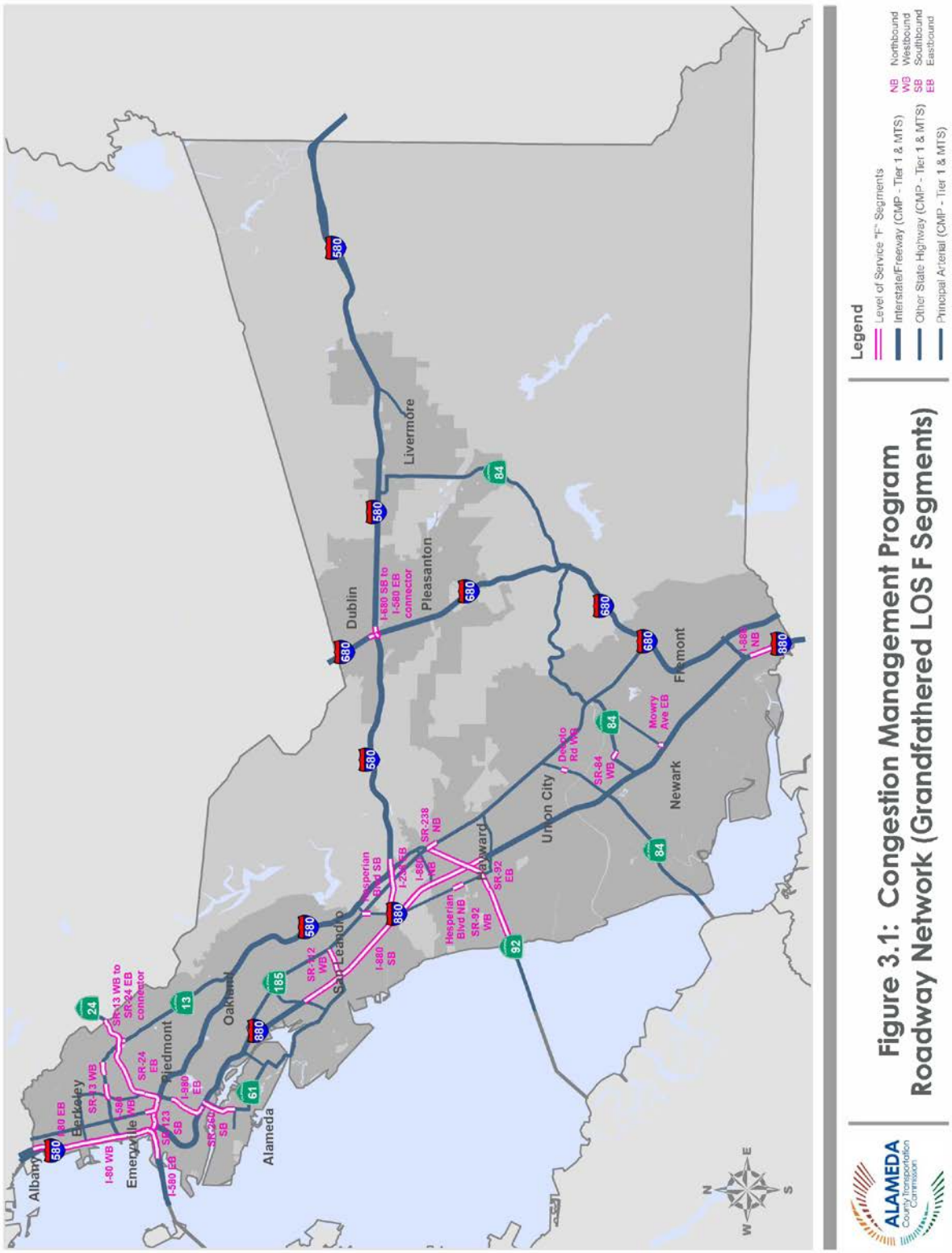

Figure 3.1: Congestion Management Program Roadway Network (Grandfathered LOS F Segments)

Comparison with Previous LOS Results

The results of LOS monitoring over the last two decades for the key commute corridors in Alameda County appear in Table 9, which shows overall traffic conditions and compares trends for long-distance trips on the CMP freeway network. The 2016 LOS Monitoring Report stated that congestion on the CMP network increased in 2016 as compared to 2014, as shown in the increased number of LOS F segments from 2014 and decreased average speed on freeways and arterials. In 2016, the number of congested segments operating at LOS F increased from 45 to 64. Some areas that showed improvements appear to be related to the improvement projects completed since 2014, after the LOS monitoring was complete. In the 2016 LOS Monitoring Report, Alameda CTC concluded that the congestion increase could be likely due to the improving economy, combined with many construction activities occurring across the county.

Analysis of performance trends since 1991 shows that congestion on the Alameda County CMP network and the number of vehicle miles traveled have both increased. Further, as employment increases, freeway speed decreases, resulting in a corresponding increase in congestion. Yet on a few freeways, as shown in Table 3.6, speed increased, likely due to improvements such as express lanes, adding lanes, and operational improvements such as signal timing. More details are available in the 2016 LOS Monitoring Report on the Alameda CTC website.

Table 3.6—LOS Trends on the CMP-Designated Network (afternoon peak period)

				Year/Miles per Hour													
Road		**Limits**	**Mi.**	**91**	**92**	**94**	**96**	**98**	**00**	**02**	**04**	**06**	**08**	**10**	**12**	**14**	**16**
I-80	EB	Bay Bridge Toll Plaza to Contra Costa line	6	24	20	22	21	20	27	19	32	23	21	29	22	23	19
I-80	WB	Contra Costa line to Bay Bridge Toll Plaza	6	25	24	23	25	28	18	22	28	28	36	27	26	26	27
I-580	EB	I-238 to I-205	30	56	55	55	55	NA	41	31	34	37	35	31	40	41	NA
I-580	WB	I-205 to I-238	30	57	56	55	55	NA	55	55	60	59	61	66	65	63	NA
I-580	EB	I-80 to I-238	16	53	52	44	53	60	63	55	43	39	47	42	41	40	34
I-580	WB	I-238 to I-80	15	58	56	51	52	61	63	60	57	55	63	60	54	60	57
I-680	NB	Scott Creek Road to Alcosta Boulevard	21	58	57	57	52	51	58	51	42	53	43	40	42	30	23
I-680	SB	Alcosta Boulevard to Scott Creek Road	21	59	58	55	61	67	63	62	66	59	63	66	66	67	66
I-880	NB	Dixon Landing Road to I-980	31	45	44	43	46	39	48	38	49	45	43	42	42	40	29
I-880	SB	I-980 to Dixon Landing Road	31	43	40	38	46	50	49	41	39	37	48	46	48	46	41
SR-13	NB	Mountain Boulevard to Hiller Drive	5	54	50	49	48	53	51	50	35	39	51	41	35	30	32
SR-13	SB	Hiller Drive to Mountain Boulevard	5	56	59	53	47	59	60	55	54	49	49	39	43	42	32
SR-24	EB	I-580 to Fish Ranch Road	5	30	29	30	24	39	33	21	40	26	24	18	18	15	14
SR-24	WB	Fish Ranch Road to I-580	4	54	58	54	50	60	57	61	59	59	58	67	60	56	62

Note: NA means data was not available due to the express lane ramp up period.

Infill Opportunity Zones

Senate Bill 1636 (Figueroa), signed by the governor in 2002, established "infill opportunity zones" (IOZs) to encourage transit-supportive and infill developments. The statute exempted infill opportunity zones from the requirements to maintain the LOS E. None of the local jurisdictions within Alameda County established or adopted infill opportunity zones by the statute's sunset period of December 2009. However, Senate Bill 743 (Steinberg), passed in September 2013, instituted key changes to the CMP statute that will support infill development, including lifting the sunset date on designating IOZs and directing the governor's Office of Planning and Research to develop new metrics for assessment of transportation impacts to replace the LOS measure. Alameda CTC will continue to closely follow implementation of this law as its rulemaking is finalized. The 2019 CMP update will incorporate revisions based on final rule-making for implementation of SB 743. Chapter 6, "Land Use Analysis Program" provides more information on Alameda CTC's efforts in supporting infill development.

Transit Performance Monitoring

Alameda CTC plans to begin monitoring transit performance on the Transit Monitoring Network (described in Chapter 2), beginning with the next monitoring cycle in 2018. For the transit performance monitoring to be effective and to limit additional data collection required from the transit operators, Alameda CTC plans to use a travel time measure that is consistent with data submitted by transit operators as part of the existing direct local distribution Master Program Funding Agreement (MPFA) with the operators. According to the agreement, the travel time metric is required to be reported biennially through the LOS Monitoring Report. Data for this metric will be collected from the transit operators starting with the 2018 LOS monitoring cycle.

This travel time performance measure evaluates speeds of peak and non-peak bus services on the Transit Monitoring Network's roadway segments. With the same data, Alameda CTC will explore possible reliability metrics. The performance standard for the travel time measure, as defined in the MPFA, is that average bus speeds should be at least 50 percent of prevailing auto speed or maintain or increase speed annually.

Note that similar to the auto LOS metric, the transit metric measures the operations of the roadway from a bus vehicle perspective. It does not measure outcomes of operational performance, such as ridership and on-time performance. These types of metrics, as well as outcome metrics for autos like VMT and mode share, are monitored in Alameda CTC's annual Performance Report at the system or county level. The metrics in the Performance Report meet the requirements of the MPFA.

Local Government Responsibilities and Conformance

Alameda CTC is responsible for monitoring conformance of local jurisdictions with the adopted CMP. [15] Among the requirements, Alameda CTC must monitor compliance with the LOS standards. If a roadway segment does not conform to the LOS standards based on the biennial monitoring, Alameda CTC will notify the affected local jurisdiction that may elect to remedy the LOS problem or prepare a deficiency plan (see Chapter 10). If after 90 days the local jurisdiction is still in non-conformance, Alameda CTC is required to follow the conformance process as identified in Chapter 9, "Program Conformance and Monitoring." When a deficiency plan is adopted, status reports on the implementation of the deficiency plan showing progress must be submitted to Alameda CTC annually as part of the annual conformity

[15] California Government Code Section 65089.3.

process. The detailed process for finding of non-conformance and the resulting withholding of Proposition 111 funds is described in Chapter 9.

Next Steps

- Continue to use speed-based HCM1985 for auto LOS monitoring for the Tier 1 network. Apply both HCM2000 and HCM1985 to the Tier 2 network as appropriate.
- Explore expanding the use of commercial speed or big data to survey all arterial and HOV/express lanes. Conduct a validation study for using commercial speed data on arterial roads prior to the 2018 monitoring cycle. For HOV and express lanes, explore commercial speed data providers that capture lane-based speeds and use speed data collected from Alameda CTC's express lane operations.
- Also evaluate the 10 origin-destination pair (O-D) informational monitoring in terms of the methodology and data used and overall usefulness of the O-D monitoring results.
- Collaborate with transit partner agencies to monitor the transit monitoring network for the 2018 LOS monitoring efforts. Explore potential future monitoring of bicycle and pedestrian activities.
- Explore opportunities for additional visualizations and summary snapshots in the 2018 LOS monitoring efforts and for developing an online portal for storing monitoring data and sharing information.
- Closely follow and participate in the implementation of SB 743 including development of the replacement measure to assess the impact on the transportation system within and outside the infill development areas; identify impact to the CMP LOS monitoring element; and update the 2019 CMP to incorporate appropriate changes.

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