

Every two years, the Alameda County Transportation Commission (Alameda CTC) performs level of service (LOS) monitoring on its Congestion Management Program (CMP) network as required by state law. This monitoring gives Alameda CTC a better understanding of how the county's key roadways perform and informs transportation decisions for the upcoming fiscal years.

The objectives of this monitoring effort are to:

- Determine the **average travel speeds** and existing LOS throughout Alameda County;
- Identify the **congested segments** (i.e. those operating at LOS F); and
- Identify the long-term **traffic congestion trends** across the CMP network.

This report is organized into eight sections and includes a number of appendices with supportive information. **Section 1**, the Introduction, provides a context for undertaking this LOS monitoring study. **Section 2** summarizes the methodology used to collect travel time data and the days of collection. **Sections 3, 4, 5** and **6** present the LOS monitoring results for the Tier 1/Tier 2 network, HOV/express lanes, bridges and OD surveys, respectively. **Section 7** presents a comparison of the results and additional insight on the trends. Lastly, **Section 8** provides conclusions, future improvements and recommendations for next steps. The **Appendices** contains maps and tables of the results, and additional details on the survey methodology.

1.1 | The CMP Network

The Alameda County CMP network is divided into two tiers. Tier 1 roadways are part of the CMP network initially adopted in 1991 and updated in 1992. As part of the LOS Monitoring Program, Tier 1 roadways are monitored for CMP conformity during the afternoon peak period and for information only during the morning peak period. Tier 2 roadways were added during an update to the CMP network in 2011. Tier 2 roadways are monitored for informational purposes only.

The entire CMP network consists of approximately 327 miles of roadways. Of this, Tier 1 roadways comprise approximately 239 miles and include all freeways, all state highways, principal and major arterials, as well as 23 ramp connections. Tier 2 roadways make up the remaining 88 miles of the network and include other major arterials and rural roadways. **Table 1-1** summarizes the distances monitored for each roadway type during the most recent CMP LOS monitoring in 2014. **Table 1-2** and **Table 1-3** provide a full list of routes for Tier 1 and Tier 2 summarized by jurisdiction. **Figure 1-1** shows a map of the CMP Network.



Table 1-1: Alameda CTC CMP Network

CMP Network Category	Distance Monitored
Freeways (Tier 1)	140 miles ⁴
Ramps and Special Segments (Tier 1)	23 connections
Arterials (Tier 1) ¹	99 miles ⁴
Arterials (Tier 2)	88 miles ⁴
HOV/Express Lanes	84 miles (each direction included separately)
Bridges ²	10 miles
OD Surveys ³	10 routes

¹ Includes 71 miles of conventional state highways.

² A section of bridges outside Alameda County are grouped under this category. The freeways category (Tier 1) contains Alameda County portions.

³ Includes nine auto, nine transit, one high occupancy vehicle (HOV), and one bike survey.

⁴ As measured in 2014 based on actual changes to the network observed in the field and the updated GIS shape file for the CMP network

Alameda CTC also separately evaluates traffic levels on 10 high occupancy vehicle (HOV)/express lane routes covering 84 miles of freeway and compares their performance to the freeway general purpose lanes. For this comparison, each direction of the HOV/express route is considered separately as the end points are often different. Further, Alameda CTC also monitors congestion levels on three bridge crossings that connect Alameda County to San Francisco and San Mateo counties. These bridges are monitored for informational purposes to understand travel from and through Alameda County to the peninsula and San Francisco.

Lastly, Alameda CTC conducts travel time surveys between selected origin and destination (OD) pairs for auto, transit, HOV, and bicycle trips. The purpose of the OD surveys is to evaluate the comparative performance of various transportation modes between major employment centers and residential areas across the county. These surveys provide insight into the journey-to-work travel times.



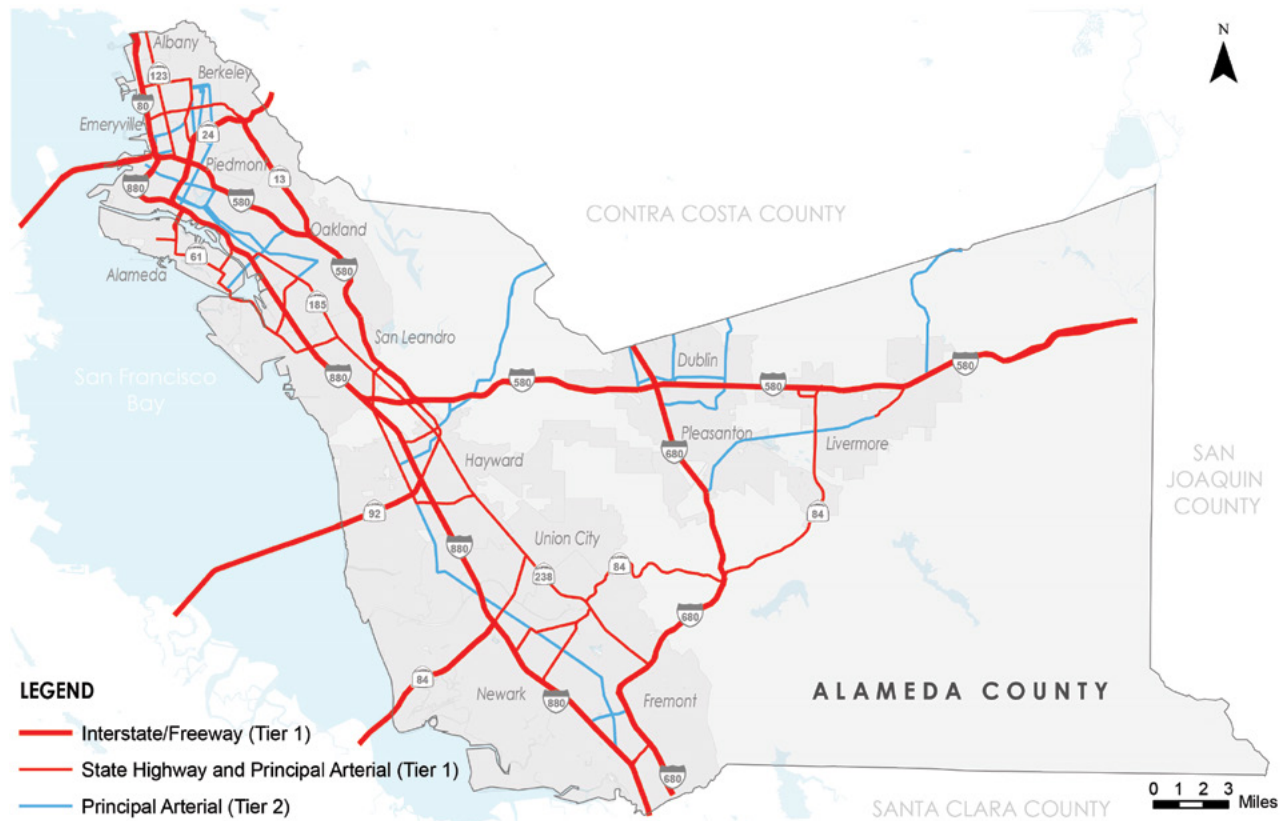


Figure 1-1: Alameda County CMP Network

1.1.1 | CMP Network Update

During each CMP update, the CMP network will be reviewed for any potential update including expansion of the network. In addition, each LOS monitoring cycle identifies any change in CMP road network, due to construction. These changes are incorporated into the CMP network and in the subsequent updates. For example, in 2014 some streets have been converted to one-way streets, causing the reverse route to either shorten or get eliminated. As a further example, the Caldecott Tunnel 4th bore completion resulted in permanent and additional lanes on SR 24 from Contra Costa County. **Appendix C** details all such road network changes and the additions to the monitoring effort this year such as the freeway HOV routes.

In addition to the physical changes to the CMP network, other minor adjustments were made in 2014 to the reported length of some CMP segments to align with updated Geographic Information System (GIS) maps to ensure consistency between the reported segment limits from historical monitoring efforts and the length reported by the GIS tool. Any segment with a notable change in reported length from 2012 is highlighted in the results tables presented in **Appendix B**.

Table 1-2: Tier 1 – Alameda County CMP Designated Roadway Network Routes by Jurisdiction

Jurisdiction	Freeway	Miles	Other State Highways	Miles	Other Arterials	Miles
Albany	I-80 I-580	1.11 0.8	Sate Rte. (SR) 123 (San Pablo Ave.)	1.2	None	-
Berkely	I-80	2.4	SR 123 (San Pablo Ave.) SR 13 (Ashby/Tunnel Rd.)	2.3 3.5	University Ave. Shattuck Ave., Adeline	2.1 1.8
Emeryville	I-80	1.2	SR 123 (San Pablo Ave.)	0.5	None	-
Oakland	I-80 I-880 I-980 I-580 SR 24 SR 13	3.3 11.3 2.5 11.7 4.6 5.9	SR 123 (San Pablo Ave.) SR 13 (Tunnel Rd.) SR 61/260 (Tubes) SR 61 (Doolittle Dr.) SR 77 (42 nd Ave.) SR 185 (E 14 th St.)	1.3 0.4 0.6 2.3 0.4 4.0	MLK Jr. Blvd. Hegenberger Rd. 29 th Ave./23 rd Ave. See Park St.- Alameda	1.4 2.5 0.5
Piedmont	None	-	None	-	None	-
Alameda	None	-	SR 61 (Doolittle Dr., Otis, Broadway, Central, Envinal Ave.) SR 260 (Tubes)	3.9 0.8	Webster St. Atlantic Ave. Park St.	0.6 0.8 0.9
San Leandro	I-80 I-880 I-980	3.3 11.3 2.5	SR 61 (Doolittle Dr.) SR 61 /112 (Davis St.) SR 185 (E. 14 th St.)	0.9 1.8 3.2	150th Ave. Hesperian Ave.	0.5 1.0
Hayward	I-180 SR 92	4.5 6.7	SR 185 (Mission Blvd.) SR 238 (Mission Blvd.) SR 238 (Foothill Blvd.) SR 92 (Jackson St.)	0.6 4.8 1.2 1.7	A St. Hesperian Blvd. Tennyson Rd.	1.5 2.7 2.4
Union City	I-880	1.9	SR 238 (Mission Blvd.)	3.1	Decoto Rd.	1.8
Fremont	I-680 I-880 SR 84	7.5 11.7 3.8	SR 238 (Mission Blvd.) SR 262 (Mission Blvd.) SR 84 (Thornton, Fremont, Peralta, Mowry Ave.)	4.8 1.6 10.7	Decoto Rd. Mowry Ave.	1.2 2.8
Newark	SR 84	2.4	None	-	None	-
Pleasanton	I-580 I-680	7.6 3.6	None	-	None	-
Livermore	I-580	5.6	SR 84	5.1	1 st St. Airway Blvd. (old SR 84)	1.7
Dublin	I-680	1.9	None	-	None	-
Unincorporated Areas	I-680 I-580 I-238 I-880	8.4 19.4 2.1 2.0	SR 84 (Vallecitos Rd.) SR 185 (Mission Blvd. & E. 14 th St.) SR 238 (Foothill Blvd.)	6.1 2.4 0.8	Hesperian Blvd.	2.0
Totals		139.7 mi		69.7 mi		28.9 mi

Table 1-3: Tier 2 – Alameda County CMP Designated Network Routes by Jurisdiction

Jurisdiction	Arterials	Miles	Arterials	Miles
Alameda County	A St.* Crow Canyon Rd. Sunol Blvd.- 1 st St.- Stanley Blvd.*	0.6 7.1 2.8	Grove Way Tassajara Rd.	0.9 0.5
Alameda	High St.	1.1	Telegraph Ave.*	1.1
Berkeley	Bancroft/Durant Ave. College Ave.*	0.7 1.2	Powell St. - Stanford Ave. Shattuck Ave.*	0.1 0.7
Dublin	Dougherty Rd. Dublin Blvd.	1.9 3.6	San Ramon Rd. Tassajara Rd.	1.6 2.2
Emeryville	40th St. - Shellmound Ave.	1.4	Powell St.. - Stanford Ave.	0.6
Fremont	Automall Pkwy. Fremont Blvd.	-	SR 61 (Doolittle Dr., Otis, Broadway, Central, Envinal Ave.)	1.2
Hayward	A St.* Hesperian Blvd.- Union City Blvd.*	1.6 8.6	Alvarado Blvd.	2.2
Livermore	E. Stanley Blvd.- Railroad Ave.- 1st St.	2.4	Vasco Rd.	6.5
Oakland	12 th St.-Lakeshore Ave. 51 st St. Broadway College Ave.* E. 15 th St. Foothill Blvd. High St.	2.4 0.8 3.7 1.0 1.0 5.4 2.4	International Blvd. Powell St. - Stanford Ave. Shattuck Ave.* Telegraph Ave.* W. Grand Ave. to Grand Ave. 73 rd Ave.	2.9 0.8 0.8 1.1 3.1 1.1
Pleasanton	Santa Rita Rd. Stoneridge Dr.	1.2 2.5	Sunol Blvd.-1st St. - Stanley Blvd.*	2.9
Union City	Alvarado Blvd.	1.0	Hesperian Blvd. - Union City Blvd.*	1.3
Totals				88.2 mi

* Denotes that roadway traverses more than one jurisdiction.

1.1.2 | Division of CMP Network

For LOS monitoring purposes, the entire CMP network is divided into shorter lengths of roads called CMP segments. The limits for the freeway segments are typically at major interchanges. Where traffic volumes entering and exiting the freeway were minor, the length between three or more sections were combined into longer segments. However, where land use changes occurred over the years impact the traffic pattern significantly, Alameda CTC reviews the segment limits and, if needed, develop appropriate shorter segments. The I-580 corridor in the east county was segmented in 2007 to develop short segments using this approach. For arterials, break points between segments generally occur at:

- Jurisdiction boundaries;
- Points where the number of travel lanes change;
- Major arterial street crossings; and
- Points where land use, speed limit, or channelization schemes change significantly.

Segment boundaries for arterial roadways are identical for both directions and the distances are generally the same or sufficiently similar so as to be considered equal. However, the distances for each direction of the same segment may differ slightly in cases of very wide intersections or when the street crossings are staggered.

Additionally, Alameda CTC classified the arterials in order to determine the LOS. For this purpose, each section between two adjacent signals was first reviewed to determine its arterial class as Class I, II, or III. Arterial class is based on access control, land use intensity, free flow speed and other factors as defined in the 1985 Highway Capacity Manual (HCM).

1.2 | LOS Standards and CMP Conformity

Alameda CTC performs LOS monitoring by measuring the average speed of traffic as vehicles travel a length of roadway on the CMP network. The average speed is then classified from LOS A (best) to LOS F (worst). LOS A represents the best travel conditions from the driver's perspective where roadways are uncongested, and LOS F represents congested conditions or deteriorated traffic flows. These standards are based on the HCM.

Tier 1 roadways that report LOS F conditions representing deteriorated traffic flows in the afternoon peak are further analyzed under special requirements (CMP conformity). Based on the analysis, if the roadway is identified to be deficient, the respective local jurisdiction will be required to prepare a deficiency plan that details the cause of the deficiency, identify measures to improve the performance of the roadway, and a funding plan for the proposed improvements. A roadway may be exempt from being identified as deficient for the following reasons:

- It operated at LOS F in the base monitoring year and is therefore "grandfathered" in at LOS F;
- It is located within an Infill Opportunity Zone (IOZ);
- It is under construction;
- It carries a certain volume of interregional trips (analysis performed using the Alameda Countywide Travel Demand Model);
- It is impacted due to freeway ramp metering or recent traffic signal coordination;
- It operated at LOS F due to traffic generated by developments such as low-income housing, a high-density development, or a mixed-use development subject to certain criteria.

As shown in **Table 1-4**, only the Tier 1 CMP network in the afternoon peak periods is subject to LOS conformance and associated deficiency planning (where applicable). Additional data monitored or collected is used for information purposes only.

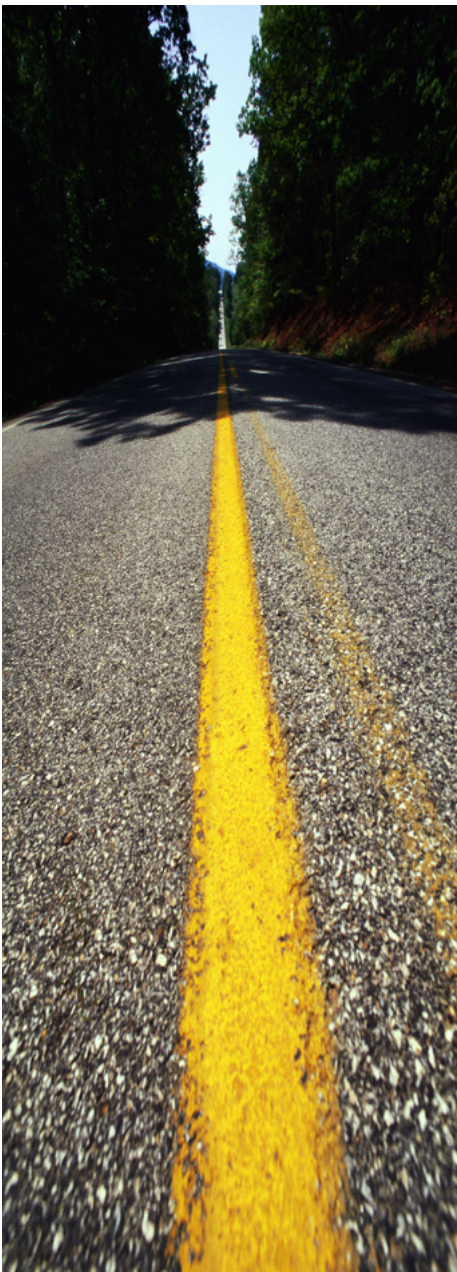
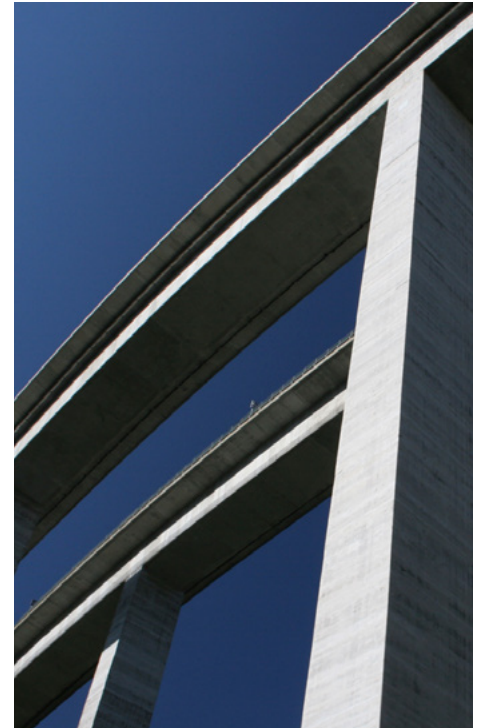


Table 1-4: CMP Network Monitoring Periods and Purpose of Monitoring

Tier	Time Period	CMP Category	Purpose
Tier 1	PM	Freeways	Conformity
		Arterials	
		Ramps & Special Segments	
	AM	Freeways	Informational
		Arterials	
		Ramps & Special Segments	
Weekends	Freeways		
Tier 2	All	Arterials	
Other	All	HOV & Express Lanes	
		Bridges	
		OD Surveys	



1.3 | What's new in this Monitoring Cycle?

Historically, Alameda CTC has adopted a floating car methodology to collect travel time information. New to this monitoring cycle is the use of commercial speed data in addition to floating car surveys. In 2013, Alameda CTC undertook an extensive validation exercise to confirm that commercial speed data was equally acceptable as floating car surveys. Based on the results of the validation, commercial data was used for monitoring two-thirds of the CMP network during the current cycle. The use of this data provides a cost effective approach and allows increased analysis opportunities at an incremental cost.

The cost savings achieved through the use of this commercial data allowed for an expansion to the monitored network through the following additions:

- Countywide HOV/express lanes (using floating car surveys as HOV specific commercial speed data was not yet available) (**Figure 1-2**); and
- LOS monitoring of three bridges between Alameda County and the Peninsula/San Francisco (using commercial speed data) (**Figure 1-2**).

Also, new to this monitoring cycle is LOS assignment to Tier 2 CMP network. In the previous 2012 monitoring cycle, Tier 2 network was monitored but LOS was not assigned as arterial class was not developed. During the 2014 monitoring cycle, a free flow speed study was conducted on Tier 2 network using a combination of floating car and commercial data and appropriate classification was assigned to each Tier 2 CMP segment. Based on this classification, LOS was calculated for 2012 and 2014. Refer to **Section 8.4** for recommendations on potential improvements in the future monitoring cycles.

