8 | Trend Analysis

Alameda CTC has been monitoring the performance of the CMP road network since 1991. In recent times, there has been a noticeable change in congestion on the network and overall performance influenced by the economic conditions in the Bay Area and the nation. This section analyzes the long term trends from 2000, the height of the dot-com boom, until today, and relates the performance of the transportation network to external factors that likely influence the traffic volume on the network such as the economy, levels of employment, demographics and transit ridership.

Overall, average speeds on the CMP network almost returned to pre-recession speeds in 2014, after peaking in 2010 during the economic recession. Figure 8-1 shows the average CMP network speeds on freeways and arterials between 2000 and 2016. Considering the large extent of the CMP network being monitored, the increase in average afternoon peak network speed, peaking in 2010 from 2006 by 0.8 mph to 51.8 mph on freeways and 0.4 mph to 26.1 mph on arterials, represents a significant improvement in network performance for both freeways and arterials. From 2010 to 2016, the speeds have been steadily declining. Freeway speeds in 2016 are now the lowest in the last 15 years, lower even than in the dot-com era.

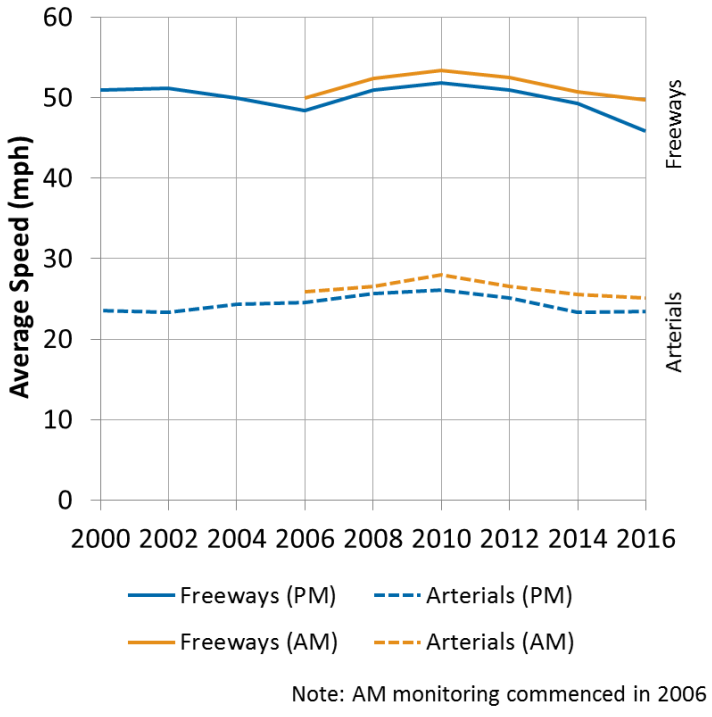

Figure 8-1: Average Speed on CMP network (mph)

8.1 | Economic and Demographic Trends

Figure 8-2 compares the economic activity and residential population in Alameda County to the traffic conditions experienced on the CMP network. While the number of residents in Alameda County continued to increase since 2006, employment has seen its ups and downs due to the recession. In 2009, employment in the county dropped significantly and was at its lowest level of the past decade in 2010. By 2011, it began to recover with more significant improvements which continues to the current year, exceeding the number of people employed in 2000, at the height of the dot-com boom (refer to Figures 8-2 and 8-3). By 2014, employment had reached and exceeded the levels of pre-recession years. The rising employment continues to add traffic to the CMP network and has resulted in the decreasing speeds and increasing number of congested (LOS F) CMP segments in the 2016 monitoring cycle.

As previously mentioned, average freeways and arterials speeds show a close correlation to employment. With the decreased employment around 2010, there were fewer workers commuting during the peak periods, resulting in improved speeds across the roadway network. As employment recovered after 2012, CMP roadway speeds declined, demonstrating that the roadway performance was more closely correlated to employment levels than the residential population.

In 2016, the Bay Area is in another economic boom on par with the dot-com era. The regional growth in jobs and population continues to add traffic to the CMP network, and residents are experiencing unprecedented lower speeds and more congestion.

Figure 8-2: Alameda County Population and Employment (Source: 2000 - 2004 Annual NAICS Employment Data: US Census; 2000 - 2004 Intercensal Population Data: US Census; 2005 - 2009 Population and Employment Data: 2010 US Census; 2010 - 2015 Population Data: DOF E-2 Report, July 1 Estimate; 2010 - 2015 Employment Data: Quarterly Census of Employment and Wages, June Estimate)

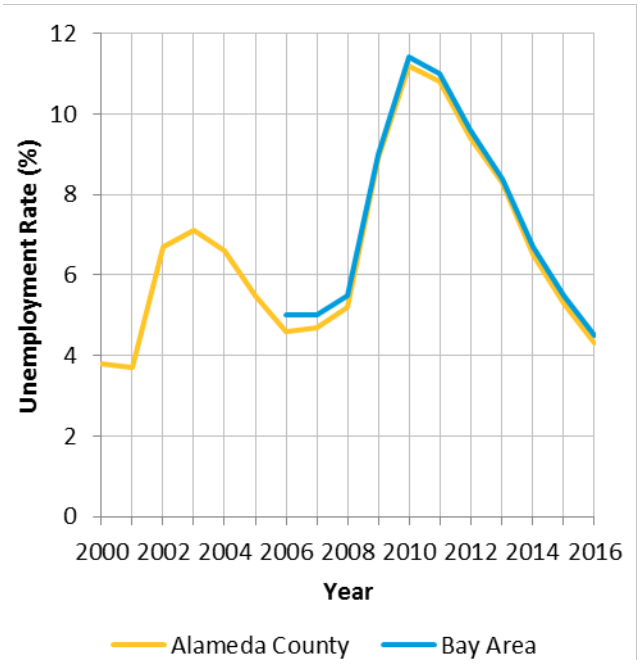

Figure 8-3: Unemployment Rate 2006-2016 (January, not seasonally adjusted) (Source: BLS / Federal Reserve)[18] [19]

Since Alameda County is the geographic center of the Bay Area, regional and inter-regional commutes impact many of the regional connectors; particularly I-80, I-880, and the three bridge crossings connecting Alameda County with the regional employment centers of Silicon Valley (Santa Clara County), San Francisco and the Peninsula (San Mateo County).

Employment data shows that Alameda and the surrounding counties all experienced increases in population and employment between 2010 and 2015 (see Figure 8-4). In half of the counties, the employment growth exceeded population growth; this disparity was particularly pronounced for San Francisco and Santa Clara Counties. The increased population in Alameda County and the suburban and exurban counties of San Joaquin and Contra Costa has resulted in a further burden on the county's transportation network from workers commuting to the employment centers. This is further evident when reviewing the vehicle volumes across the bridges and regional gateways. While stable in prior years, since 2012 there has been an increase in volumes at these points (see Figure 8-5).

[18] Local Area Unemployment Statistics. Bureau of Labor Statistics. http://data.bls.gov/cgi-bin/dsrv?la

[19] Unemployment Rate in Alameda County, CA, Percent, Monthly, Not Seasonally Adjusted. Federal Reserve Bank of St Louis. https://fred.stlouisfed.org/series/CAALAM1URN. Data prior to 2006 was not available.

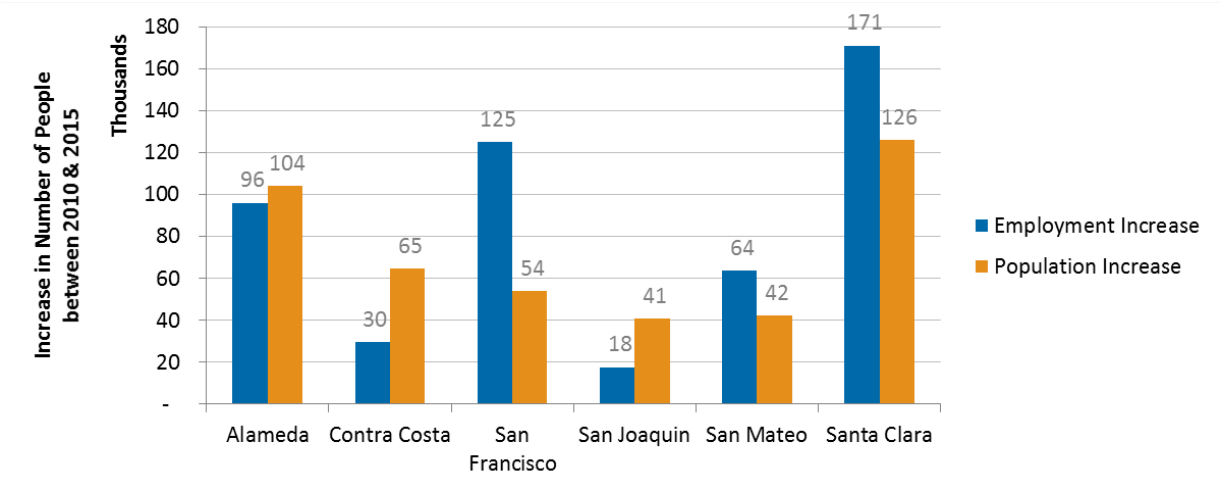

Figure 8-4: Population and Employment Growth in Alameda and Surrounding Counties (Source: DOF E-5 Report 2015-16 estimate)

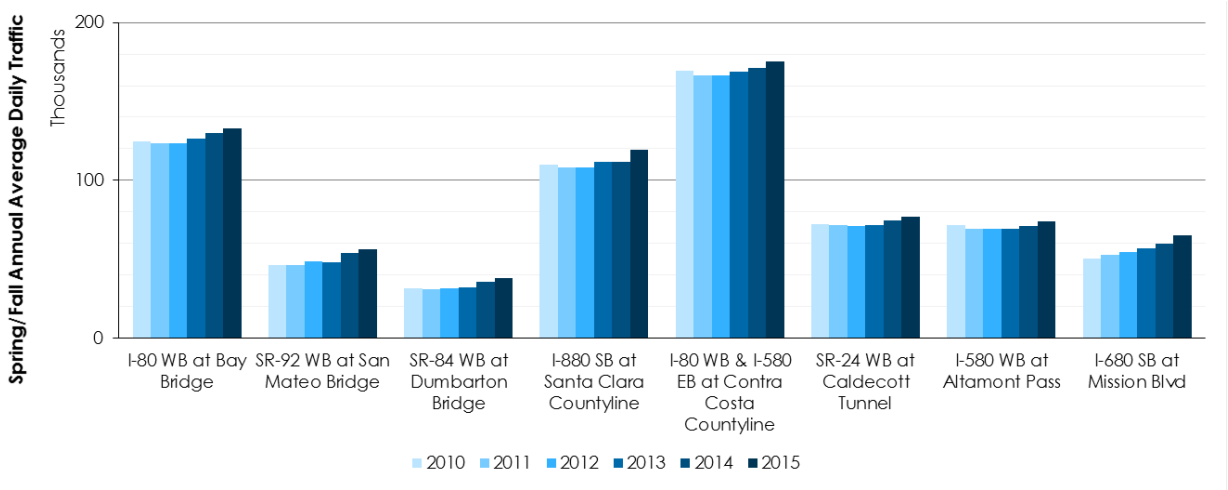

Figure 8-5: Alameda County Gateway Annual Average Daily Traffic (Source: MTC, PeMS) [20]

As a further factor for consideration, between 2014 and 2016, the retail price of gasoline for Alameda County motorists dropped precipitously and has since fluctuated. At the start of 2014, the price of gas in California was around $4 per gallon, but by the end of the year the price had dropped into the $2-$3 range.[21] In 2016, it has been slightly rising, tracking the global oil price as seen in Figure 8-6. The lower gas price has been cited in a

[20] Volumes are Tuesday-Thursday AADT from March-May and September-October. PeMS volumes extracted from MTC processing of raw PeMS Data.

[21] California All Grades All Formulations Retail Prices. U.S. Energy Information Administration. https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emm_epm0_pte_sca_dpg&f=m
Cushing, OK WTI Spot Price FOB.
https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC&f=M

nationwide study as a factor in increased automobile miles driven.[22] A study of fuel consumption in California also found that gasoline consumption was rising again since 2014 (see Figure 8-6). [23] The miles traveled on the Alameda County freeway network has risen 12.5% between the 2014 and 2016 monitoring cycles which further confirms this observation. [24]

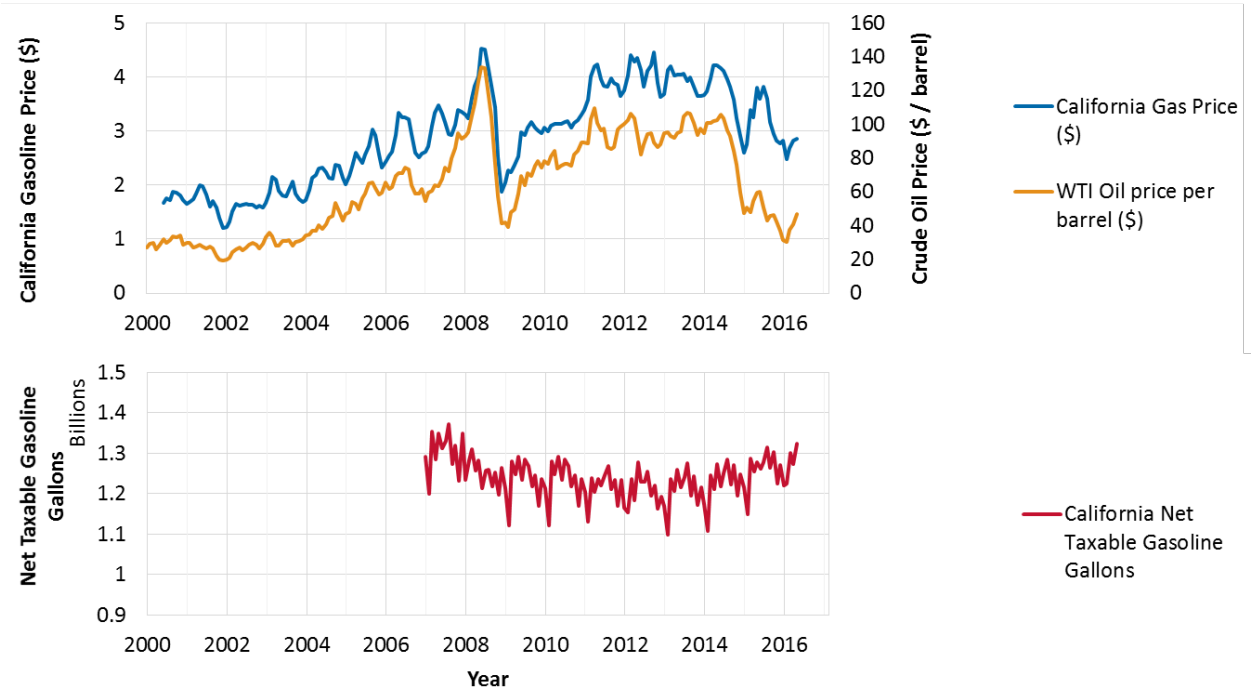

Figure 8-6: Gasoline/Crude Oil Prices (Source: EIA) and Gasoline Consumption [25] (Source: California State Board of Equalization)

In 2016, a larger reduction in speed was observed on the Tier 2 Arterial network, particularly in the afternoon peak period. This reduction may be caused by motorists that are less inclined to use freeways and major arterials that are already close to capacity, and utilizing spare capacity on the Tier 2 Arterial network.

8.2 | Transit Trends

The CMP network roadway speeds were also compared to public transit ridership, specifically on BART, a major regional transit system. Figure 8-7

[22] U.S. Driving Tops 3.1 Trillion Miles in 2015, New Federal Data Show. Federal Highway Administration. News Release Feb 22, 2016.
http://www.fhwa.dot.gov/pressroom/fhwa1607.cfm
[23] Net Taxable Gasoline Gallons. California State Board of Equalization.
http://www.boe.ca.gov/sptaxprog/spftrpts.htm
[24] Alameda County Vehicle Miles Travelled Report. Caltrans Performance Measurement System (PeMS).
http://pems.dot.ca.gov/
[25] Data not available prior to 2007

shows the relationship between average afternoon peak freeway speeds and BART ridership. In 2010, at the peak of recent recession, BART ridership was low and the demand on freeways had lessened as evident from higher afternoon peak freeway speeds. During the economic recovery in 2012 through 2016, the demand on these two transportation services has increased, showing increasing BART ridership and declining average afternoon peak freeway speeds.

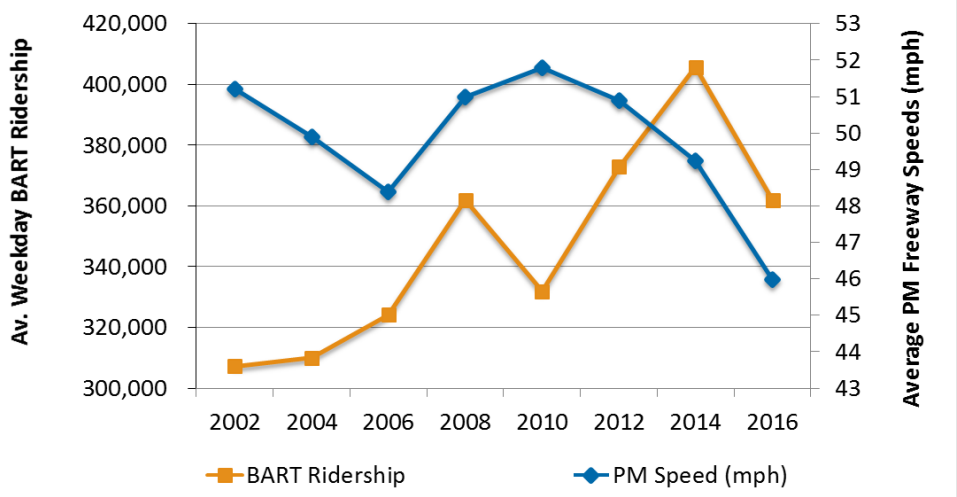

Figure 8-7: PM Peak Average Freeway Speed and BART Ridership (Source: BART)

In addition to economic growth, other recent policy changes and trends may have influenced the greater usage of BART. Since October 2013, BART has allowed passengers to bring their bikes on non-crowded cars except for the lead car.[26] This can make BART trips more attractive to users who would otherwise drive, by providing convenient first and last mile connections at the BART trip ends.

[26] BART Board votes to permanently lift bike ban. BART Website. http://www.bart.gov/news/articles/2013/news20131024

8.3 | Technology Trends

Mobile technology advances are also leading to changes in how people get around. In 2015, 64% of Americans were found to own a smartphone, up from 58% in early 2014.[27] Smartphone applications make it easier to drive and use public transit with routing and scheduling suggestions including real time arrival information. Driving navigation applications such as Waze have allowed drivers to make better pre-trip and en-route choices of route and departure time using historic and real time traffic information, and provide alternate route guidance around congestion and incidents.

Bike sharing could also potentially change travel behaviors in Alameda County. Bay Area Bike Share was introduced in some San Francisco neighborhoods in 2013, and a wider rollout of 7,000 bicycles is planned for San Francisco, Oakland and Berkeley in 2017.[28] This expansion into Alameda County offers residents another transportation option in getting to and from various activities and transit services, and have the potential to significantly change transportation patterns.[29]

There continues to be new technologies and services emerging for ridesharing. Lyft, in partnership with MTC, launched Scoop, a carpool option in its ride-hailing application in spring of 2016. It allows commuters to arrange carpools on Bay Area commuter routes. Passengers will pay $4 to $10 per ride, of which the driver will receive a portion to offset his/her travel costs.[30] Google began a pilot program in May that enables several thousand workers at specific South Bay firms to use the Waze app to connect with fellow commuters. This service, like Scoop, charges riders a per-mile rate, which is directed to the driver to offset his/her costs. The service may be considered for expansion to the general public.[31]

Figure 8-8. Bay Area Bike Share

...to name a few

Overall, traveler behavior as a whole may be changing. These ride sharing services may help to provide the first and last mile connections to a fixed route transit service (i.e. BART) that would otherwise have been a door-to-door or door-to-transit automobile trip. Delivery services such as Amazon and instacart may eliminate the need for some shopping trips altogether, but also add more delivery vehicles to the traffic stream. If these services begin to use automated driving, the reduced cost may make them even more appealing and widespread, although it could result in increased traffic.

[27] US Smartphone Use in 2015. By Aaron Smith. Chapter 1: A Portrait of Smartphone Ownership. Pew Research Center. 2015. http://www.pewinternet.org/2015/04/01/chapter-one-a-portrait-of-smartphone-ownership/

[28] Bike-share system expanding in Bay Area, starting in SF. SFGATE. March 23, 2016. http://www.sfgate.com/bayarea/article/Bike-share-system-expanding-in-Bay-Area-starting-6974166.php

[29] Special Report 319: Between Public and Private Mobility. Examining the rise of technology-enabled transportation services. Transportation Research Board. 2016. http://onlinepubs.trb.org/onlinepubs/sr/sr319.pdf

[30] Lyft adding S.F. to South Bay carpooling service to app. SFGATE. March 30, 2016. http://www.sfgate.com/business/article/Lyft-to-leverage-app-for-commute-carpools-7215297.php

[31] Google Takes on Uber With New Ride-Share Service. Alphabet's carpooling program in San Francisco offers rides at cheaper rates. Wall Street Journal. August 31, 2016. http://www.wsj.com/articles/google-takes-on-uber-with-new-ride-share-service-1472584235