3. TRAVEL-TIME STUDIES OF ORIGIN-DESTINATION PAIRS

This section describes travel-time surveys between selected origin and destination (O-D) points for auto, transit, bicycle and HOV lane trips. Also included is travel-time data for the three Bay Bridge Crossings that connect Alameda County to San Francisco and San Mateo Counties.

The purpose of the O-D surveys is to evaluate the comparative performance of various transportation modes between major employment centers and residential areas in Alameda County to provide insight into journey-to-work travel times. Similarly, since the Bay Bridge Crossings are important county-to-county regional links, travel-time data on these bridges show how these connections are performing over time.

For the O-D surveys, ten origin-destination pairs (see Appendix F) have been generally studied to simulate typical commute trips on the County's major travel corridors. These paired surveys were run simultaneously in the same corridor. Out of the total ten O-D pairs, all were surveyed for auto, and nine for transit. Eight pairs were surveyed during the p.m. peak period, and two during the a.m. peak period. In addition, bicycle travel times were recorded for one O-D pair between Emeryville and Berkeley, while one pair included HOV lane travel between Fremont and San Jose.

Out of the total ten pairs, the first five pairs were surveyed from 1996 until 2002. Four additional O-D pairs were surveyed for the first time in 1998. An additional survey of HOV lane travel times was added for one of the O-D pairs (Fremont to San Jose) in 2000. These ten trip combinations, and the specific routes that were followed, are listed in Appendix F. Over the years, for few cases, changes were made to the origin or destination locations to accommodate transit service changes. The new destinations were selected to be as close to the previous destination as possible, in a residential area, and approximately the same distance from the previous transit station or bus stop.

Travel-time data for the three Bay Bridge Crossings were previously reported in the LOS Monitoring Reports in 2002, 2004 and 2010 (reported 2009 data). The data represents travel time on all the bridges for the a.m. and p.m. commute periods between origin and destination in the segments between I-880 or I-80 in Alameda County across the bridges to SR 101 in San Francisco and San Mateo Counties. Data for 2002 and 2004 were based on the auto travel-time data collected by Caltrans. Data for 2009 and 2012 are based on MTC's 511.org Toll Tags data.

In the 2012 monitoring cycle, data collected for four O-D pairs were found to not meet the data collection standards; therefore, the data were declared as unqualified as reported in Table 15 and described in Appendix F. Data for the remaining six O-D pairs were analyzed and reported.

SURVEY METHODOLOGY

Except for the O-D surveys on the bridges where toll tags data were used instead, two surveyors, one driving an auto and one taking transit (or a bicycle in one case), traversed between the designated origin and destination points, documenting their travel times and identifying any anomalies that they encountered during the course of their trip (e.g., a traffic accident). Transit trips were taken either on buses (AC Transit, UC Transit, VTA, Wheels), rail (BART or ACE), or a combination of these modes. The bicycle trip was taken on local streets in Emeryville and Berkeley. Whenever possible, the auto and transit trip started on the same day at the same time.

Surveys were conducted on mid-week days (Tuesday through Thursday) during the period between the second weeks of March 2012 and June 2012 on two different days. The data for all O-D pairs were collected during the p.m. peak period (4:00 to 6:00 p.m.) with the exception of two pairs between Fremont and San Jose, which were surveyed during the a.m. peak period (7:00 to 9:00 a.m.). Travel-time data were recorded for each trip. Table 14 lists the time components that were noted for each type of trip.

Table 14: Time Components of Origin-Destination Surveys

Auto Trip	Transit Trip
Start time at origin door (walk)	Start time at origin door (walk)
Auto departs parking	Arrive at first transit stop
Merge onto 1st freeway	Board 1st bus/rail
	Exit 1st bus/rail
Merge onto 2nd freeway	Board 2nd bus/rail
	Exit 2nd bus/rail
Exit from freeway	Board 3rd bus/rail
Arrive at parking	Exit 3rd bus/rail
Arrive at destination door (walk)	Arrive at destination door (walk)

For the analysis of transit trip data, no more than half of a route's scheduled headway was used for the initial waiting time. The actual waiting time was used for all other transit transfers. The Emeryville-Berkeley O-D Pair is generally surveyed by bicycle in addition to the transit and auto travel. No data for this O-D pair have been reported for 2012 as the collected data did not meet the data collection standards.

2012 SURVEY RESULTS

O-D Pairs

For the six O-D pairs for which new data were reported in 2012, travel times by both auto and transit either increased or stayed the same for travel between Fremont and San Jose using both HOV and general purpose lanes. All other pairs showed slight decreases in auto travel time and increases in transit travel time. The worst transit commute was between Hayward and Livermore (112 minutes) although data for the O-D pair, Fremont-Pleasanton, that experiences the usual longer transit travel time was not reported this time. For the O-D pairs studied, transit travel times range between 2-5 times longer than auto travel, which is similar to conditions prior to 2010, but slightly worsened from the 2010 results where transit travel times ranged between 2-4 times longer than travel by auto.

Auto Times

Table 15 lists the results of the 2012 O-D surveys and also includes a comparison with the previous surveys. Of the six O-D pairs reported, auto travel time either increased or remained the same for travel between Fremont and San Jose while auto travel time between remaining four O-D pairs improved. The largest comparable decrease was between Fremont and Alameda where the auto travel time decreased by 17 percent or 8 minutes. This improvement for travel between Fremont and Alameda is consistent with the improvement in average corridor speed reported on the northbound I-880 in the afternoon between Fremont and Alameda in the Tier 1 LOS Monitoring element although this corridor experienced few congested locations. Improvement in travel time for travel between Hayward and Livermore by 13% or 13 minutes could be attributed to the change in travel route taken by using the previous exit on I-580 to Livermore compared to what was done until 2010.

Table 15: Origin-Destination Pair Travel Times

					1998	2000	2002	2004	2006	2008	2010	2012			
O-D Pair	Origin	Destination	Mode	Driving Distance	Avg. (min)	Avg. (min)	Avg. (min)	Avg. (min)	Avg. (min)	Avg. (min)	Avg. (min)	2012 Avg. (min)	No. of Runs	Range of Times	Percent Variation from '10
1* p.m.	Hayward	Newark	Auto	11.2 mi	24	22	22	16	19	14	15	14	4	13-16	-7
			Transit		88	92	79	90	86	74	57	76	2	65-88	33
2 p.m.	Emeryville	Berkeley	Auto	4.8 mi	25	26	25	28	22	22	24	N/A	N/A	N/A	Unqualified data
			Transit		61	n/a	56	53	45	70	59	N/A	N/A	N/A	
			Bike		33	30	30	33	30	32	47	N/A	N/A	N/A	
3* p.m.	Hayward	Livermore	Auto	34.5 mi	53	45	49	61	61	54	51	38	4	34-45	-25
			Transit		144	152	141	120	113	143	N/A	112	2	101-124	22**
4 p.m.	Oakland	San Leandro	Auto	10.8 mi	35	29	32	41	34	27	27	24	4	22-28	-11
			Transit		74	64	56	70	66	78	67	76	2	69-84	13
5* p.m.	Fremont	Pleasanton	Auto	18.0 mi	31	34	33	27	39	26	37	N/A	N/A	N/A	Unqualified data
			Transit		130	122	125	146	181	145	154	N/A	N/A	N/A	
6 a.m.	Fremont	San Jose	Auto	14.8 mi	39	55	49	30	33	27	28	28	4	22-37	0
			Transit		129	104	118	94	111	82	73	93	2	89-98	27
7 a.m.	Fremont	San Jose	Auto	14.8 mi	---	35	34	27	25	23	23	25	4	21-30	9
8* p.m.	Oakland	Pleasanton	Auto	26.6 mi	58	60	62	45	57	41	52	N/A	N/A	N/A	Unqualified data
			Transit		81	96	91	77	75	107	74	N/A	N/A	N/A	
9 p.m.	Fremont	Alameda	Auto	25.2 mi	50	57	53	64	52	43	48	40	4	34-46	-17
			Transit		86	74	70	123	102	94	91	88	2	84-92	-3
10 p.m.	Alameda	Oakland	Auto	6.8 mi	21	17	21	22	21	22	24	N/A	N/A	N/A	Unqualified data
			Transit		51	47	45	45	43	51	52	N/A	N/A	N/A	

* Destination for these four O-D pairs changed since 2004.
** Comparison made with 2008 data as 2010 data was not available.
Note: For details on unqualified data, please refer to Appendix F.

Transit Times

Of the five O-D pairs for which data were reported for transit, transit travel times degraded on three pairs with one pair, Fremont-Alameda showing improvement with a 3% decreased travel time (three minutes) compared to the travel time in 2010. One pair (Hayward-Livermore) did not have data from 2010 for comparison. The largest transit travel time increase was between Hayward and Newark, where the travel time increased by 33% (57 minutes to 76 minutes). The degradation in transit travel time is likely due to the service cuts implemented by AC Transit in 2011.

Travel Times on Bay Bridge Crossings

Data for 2002 and 2004 data for the Bay Bridge Crossings were based on the auto travel-time data collected annually by Caltrans on all the bridges for the a.m. and p.m. commute periods. However, similar and comparable data was not available after 2004 because Caltrans stopped collecting travel-time data on Bay Area freeways and MTC took over the monitoring responsibility. Even though MTC's annual Freeway Congestion Monitoring program focused only on congested freeway segments, and therefore only data for the Bay Bridge was collected, MTC has suspended the Monitoring program since 2008. Since this data is not used in the annual CMP Conformity process, Toll Tags data from MTC's 511.org has been reported since the 2010 LOS Monitoring Study. Table 16 presents the data for all the three bridges for 2002, 2004, 2010 (reported 2009 data), and 2012 monitoring cycles. The data presented are for the weekday peak periods, consistent with the data from prior years.

Comparison between the 2009 and 2012 travel-time data across the three bridges show that travel time across the bridges in general has increased in both directions and during both peak periods with the exception of San Mateo Bridge. The San Mateo Bridge shows improvement in both directions during the p.m. peak period with eastbound trips showing highest travel-time reduction of 19% (16.5 minutes in 2009 to 13.4 minutes in 2012), likely due to completion of the I-880/SR 92 interchange improvements. Bay Bridge travel time increased more in the p.m. peak period for both directions (an increase of 28% and 15% for westbound and eastbound p.m. peak period compared to 6% and 4%, respectively, for the a.m. peak period). Regarding Dumbarton Bridge, travel time in the commute directions, westbound travel in the a.m. and eastbound travel in the p.m., show a greater increase (26% and 25% compared to 10% and 14%) in travel time compared to the opposite directions for both peak periods.

The Bay Bridge Crossings travel-time data presented for 2009 and 2012 in Table 16 shows significantly shorter travel time across the bridges compared to the previous two years. In this regard, the following points are to be kept in mind when using the toll tags data reported, as these make the data not directly comparable with the previous years:

- *Shorter travel time*: Since autos with toll tags do not slow down at the toll plazas they will tend to show shorter travel time than the ones that go through cash-only lanes.
- *Different Segment Termini:* Origin and Destination points for many of the bridges are different because of the different sources of data.
- *Different Economy*: The economy in 2009 and 2012 are down or recovering economies compared to the booming or stable economies in 2001 and 2003, which will reflect in the commute travel time.

Table 16: Travel Times on Bay Bridge Crossings

Bridge	Time Period	From-To	2001		2003		2009	2012	Percent Difference between 2009-2012
			Segment Travel Time	Total Travel Time	Segment Travel Time	Total Travel Time	Total Travel Time	Total Travel Time	
Dumbarton Bridge (SR 84)	**Westbound (toward San Mateo County)**								
	a.m.	2001-03: I-880 - US 101	25	32	7	14	9.7	12.2	26%
	a.m.	2009-12: I-880 - SR 84 @	7		7				
	p.m.	University Ave	6	12	6	11	8.8	9.7	10%
	p.m.		6		5				
	Eastbound (toward Alameda County)								
	a.m.	2001-03: US 101 - I-880	6	12	5	11	10.8	12.3	14%
	a.m.	2009-12: SR 84 @ University	6		6				
	p.m.	Ave - I-880	17	26	14	23.5	11.1	13.9	25%
	p.m.		9		9.5				
San Mateo Bridge (SR 92)	**Westbound**								
	a.m.	2001-03: I-880 - US 101	20	27	8	15.5	12.3	15.3	24%
	a.m.	2009-12: I-880 - SR 92 @	7		7				
	p.m.	Foster City Blvd	8	15	7	14.5	10.9	10.8	-1%
	p.m.		7		7.5				
	Eastbound								
	a.m.	2001-03: US 101 - I-880	7	13	7	14	10.5	10.9	4%
		2009-12: SR 92 @ Foster City	6		7				
	p.m.	Blvd - I-880	20	39	7	24	16.5*	13.4	-19%
			19		17				
Bay Bridge (I-80)	**Westbound**								
	a.m.	2001-09: I-580 merge - 5th	—	31	—	26	12.8*	13.6	6%
		St Off-ramp	—		—				
	p.m.	2009-12: I-880@ 7th St to	—	17	—	23.5	12.6*	16.1	28%
		I-80 @ Fremont St	—		—				
	Eastbound								
	a.m.	2001-03: Sterling St On-	—	8	—	8	7.9*	8.2	4%
		ramp - I-580 Off-ramp	—						
	p.m.	2009-12: I-80 @ 4th St to	—	14	—	17.5	12.2*	14	15%
		I-880 @ Grand Ave							

* Reflects computation error correction to previously reported data

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