

Route 262 Improvements Traffic Forecast Report

Prepared for

Alameda County Congestion Management
Agency
and
HQE Incorporated

Draft Report

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1. INTRODUCTION

The Alameda County Congestion Management Agency (ACCMA), in partnership with the City of Fremont and Caltrans, has contracted with HQE, Inc. and DKS Associates to prepare a Project Study Report (PSR) for potential improvements to State Route (SR) 262 (Mission Boulevard) between I-880 and I-680 in the City of Fremont. The Route 262 Improvements PSR will address the need and purpose of the proposed project, the potential environmental impacts, and the estimated costs and timeline for delivery. The PSR will consist of evaluating the following project components:

- Widening of Route 262 (Mission Boulevard) from four to six lanes between Warm Springs Boulevard and I-680;
- Widening and realigning the I-680 southbound to westbound exit ramp to a tee intersection with Route 262 and signalizing the new intersection;
- Eliminating the I-680 southbound to eastbound loop exit ramp;
- Realigning the I-680 northbound to eastbound exit ramp to a tee intersection with Route 262 and signalizing the new intersection;
- Eliminating the I-680 northbound to westbound loop exit ramp; and
- Tight Diamond Interchange and/or intersection improvements at Route 262/Warm Springs Boulevard.

The purpose of this report is to present the projected 2035 AM and PM peak traffic demands that will be used to analyze the freeway mainline segments, ramps and intersections within the study area. While the Project may add capacity to portions of SR 262, it is primarily an operational improvement and does not significantly increase corridor capacity. Furthermore, capacity constraints on the study area freeways (I-880 and I-680) effectively constrain traffic demand in the study area. Therefore, the No Project forecasts will also be used for the build project alternatives.

Section 2 summarizes the methodology used to develop the forecasted travel demands. The forecasted peak hour demands for the freeway mainline segments, ramps and intersections are presented in Section 3.

2. FORECAST METHODOLOGY

The future year traffic operations analysis conducted as part of the PSR should evaluate conditions 20 years after the expected completion of the proposed improvements. Assuming that it will take a minimum of seven years to fund, complete the environmental review, design and construct any potential improvements, the first year of operation is expected to be 2015 and the horizon year for the traffic analysis has been defined to be 2035.

The process for developing the constrained 2035 traffic demands for use in the operational analysis involved three steps. In the first step, the ACCMA countywide model was used to generate 2005 and 2035 travel model forecasts (TMF) for the freeway entry, ramp and arterial entry links within the study area. Because the current ACCMA countywide travel demand model only includes a 2005 base year and a 2030 forecast year, the 2035 model forecasts were developed based on linear extrapolation using a five-year growth rate derived from the growth between 2005 and 2030 as illustrated in the following equation:

$$2035 \text{ TMF} = 2030 \text{ TMF} + \left[\frac{(2030 \text{ TMF}) - (2005 \text{ TMF})}{25 \text{ years}} \right] * (5 \text{ years})$$

This approach for developing the 2035 travel demand model forecasts was discussed with ACCMA staff. It was noted that this same approach had been applied for other studies and was considered appropriate for this effort.

For existing roadway facilities, results from the travel demand model are not used directly in the operational analysis. Instead, in the second step of the process, changes in the forecasted demand between 2005 and 2035 as produced by the travel demand model were added to existing traffic demands. In general this approach is illustrated by the following equation:

$$2035 \text{ demand} = \text{Existing demand} + (2035 \text{ model forecast} - 2005 \text{ model forecast})$$

Consistent with the analysis methodology, results from ACCMA's AM and PM peak hour models were used for the forecasting process.

In the third step, a "reasonableness check" of the results was conducted after application of the formulas presented above. This reasonableness check included the implementation of manual adjustments to the forecasts to address any unusual or unreasonable changes that did not match practiced constraints. Adjustments made as part of this effort included:

- Limiting growth on the freeway entering the study area where physical capacity constraints would prevent the forecasted demand from reaching the study area (in turn, downstream demands were also adjusted).
- Modifying travel model forecasts to account for unusual assignment behavior.
- Eliminating projected decreases in demand ("negative growth"), unless such a decrease was relatively small or justifiable.
- Modifying forecasts for intersections that include a freeway ramp to conform to the adjusted ramp demands, in order to maintain consistency in the forecast estimates.

- Modifying forecasts to provide reasonable consistency in the traffic demand flows between adjacent roadway segments (i.e. balancing the departing demands at one intersection and approach demands at a downstream intersection which acknowledging some sources and sinks such as driveways).

3. NETWORK ASSUMPTIONS

As noted in the previous section, the forecasts presented in this report were developed using outputs from the ACCMA countywide travel demand model. The 2030 ACCMA model network (assumed for 2035) included a number of roadway improvements that directly impact the study area. These improvements included:

- Extension of the southbound HOV on I-880 through the I-880/SR 262 interchange to connect to the existing HOV lanes on either side of this interchange.
- Extension of the northbound HOV on I-880 from south of Dixon Landing to the existing lane north of the I-880/SR 262 interchange, plus the addition of one mixed-flow lane before the off-ramp to Mission Blvd.
- The widening of northbound I-680 to add an HOV lane and an auxiliary lane between the Scott Creek Road on-ramp and SR 262 off-ramp.
- Widening of SR 262 (Mission Boulevard) from four to six lanes between I-880 and Warm Springs Boulevard.

However, the original 2030 model network did not include the reconfiguration of the I-880/SR 262 interchange that is currently under construction. Therefore, modifications to the model network to reflect this improvement were made prior to the application of the model for this analysis. Specific elements of the interchange reconfiguration that were added to the model network included:

- Modification of the southbound I-880 connector to SR 262 eastbound to include two lanes and split to Warren Avenue.
- Modification of the northbound I-880 connector to eastbound SR 262 to include two lanes.
- Construction of a new Warren Avenue overcrossing and interchange with separate northbound off-ramp, northbound on-ramp and southbound on-ramp (as noted above, southbound off would be via the connector to eastbound SR 262).
- Replacement of the railroad overcrossing to allow for the widening of SR 262 between I-880 and Warm Springs Blvd as noted above, and the construction of new connections from westbound SR 262 to Kato Road and from Kato Road to eastbound SR 262.
- Closure of existing or pre-construction connections between westbound SR 262 and Kato Road, westbound SR 262 and Gateway Blvd, and the I-880 to eastbound SR 262 ramp and Warren Avenue.

4. FUTURE YEAR (2035) DEMAND FORECASTS

Figure 1 presents the constrained 2035 AM and PM peak hour traffic demands for the freeway mainline segments, ramps and intersections within the study area. The term “constrained” is used because the demands presented in this figure have been adjusted to take into account capacity constraints on the freeways entering the study area (“gateway” locations). In the peak direction of each peak period (southbound in the AM and northbound in the PM), the unconstrained 2035 demands on both I-880 and I-680, derived by applying the formulas presented in Section 2 of this report, greatly exceed the mainline capacity at the gateway locations. The projected demands at these locations have been “constrained” to match the estimated capacity. In turn, demands downstream of mainline capacity constraint were also adjusted accordingly. The assumed capacity and demand adjustment for each gateway location is summarized Table 1. The forecast calculations and manual adjustments are presented in more detail in Appendix A.

As shown in Figure 1, the projected growth within the study area varies by peak period and direction. During the AM peak hour, demands on SR 262 are forecasted to grow by approximately 50% in the westbound (peak) direction, and 100 % in the eastbound direction. The higher off-peak direction (eastbound) growth rate is due in part of the upstream capacity constraint on I-680 southbound. In the PM peak hour, the growth rates are near 60% westbound and 70% eastbound.

On I-680, even with the mainline capacity constraints, demands are projected 30% to 40% in the AM peak, and over 40% in the PM peak. Meanwhile, on I-880 the constrained demands represent about a 40% increase over existing demands for all cases except northbound in the PM peak where the projected growth rate is almost 60%.

Table 1- Freeway Mainline Capacity Constraint Adjustments

Location	Peak	Lane Configuration			Auxiliary Lane Demands		Estimate Capacity	Unconstrained Demand	Constrained Demand
		General Purpose ¹	HOV ²	Auxiliary ³	Upstream On	Downstream Off			
I-880 Southbound	AM	3	1	1	668	2127	8650	14296	8650
I-880 Northbound ⁴	PM	3	1	2	-	-	10280 ⁴	13232	10280
I-680 Southbound	AM	3	1	1	1570	1815	9500	14401	9500
I-680 Northbound	PM	3	1	1	1871	2732	9800	15876	9800

Notes:

1. Capacity of general purpose lane assumed to be 2100vph.
2. Capacity of HOV lane assumed to be 1650vph. Because unconstrained demands significantly exceed capacity it was assumed that HOV demand would also reach or exceed capacity.
3. Auxiliary lane capacity set as lesser of upstream on and downstream off demands.
4. For Northbound I-880, gateway constraint was derived by working backwards expected bottleneck in segment after off-ramp to SR 262. This segment would have 3 GP lanes plus 1 HOV lane (capacity = 6300 & 1650 = 7950) but an unconstrained demand of 10229. This ratio of capacity to demand was applied to the upstream demand to determine the maximum potential flow at the gateway.

Source: DKS Associates (2008)

APPENDIX A – 2035 TRAFFIC FORECAST CALCULATIONS

Table 1 : 2035 Forecast AM Link Demand

LOCATION	Existing AM Peak	Model Demand		Growth 2005 ->2030 AM Peak		2035 Unconstrained			2035 Constrained			Comments
	Peak Hour	2005 1Hr	2030NP 1Hr	1 Hr Diff	1-Hr % Diff	1 Hr Diff	1-Hr % Diff	Peak Hour Demand	1 Hr Diff	1-Hr % Diff	Peak Hour Demand	
	I-680											
Northbound Entry Links Total	5953	4038	5315	1276	21%	1532	26%	7485	1532	26%	7485	
(1) NB Off to Mission/262- ALA	886	312	419	107	12%	129	15%	1015	129	15%	1015	
(3) SEG NB OFF TO NB MISSION/RTE 262	140	297	371	74	53%	89	63%	229	89	63%	229	
(4) SEG NB OFF TO SB MISSION/262	746	15	48	33	4%	40	5%	786	40	5%	786	
(7) SEG NB ON FR SB MISSION/262	42	45	110	65	156%	79	187%	121	79	187%	121	
(8) SEG NB ON FR NB MISSION/262	682	254	575	320	47%	384	56%	1066	384	56%	1066	
(11) NB ON FR MISSION/262	724	299	685	386	53%	463	64%	1187	463	64%	1187	
NB OFF to Durham Rd	650	528	977	449	69%	539	83%	1189	539	83%	1189	
Southbound Entry Links Total	6935	7056	13278	6221	90%	7466	108%	14401	2565	37%	9500	SB 680 mainline capacity constraint
(12) SB OFF TO MISSION /262	1356	1289	3770	2482	183%	2978	220%	4334	1503	111%	2859	Adjust demand based on upstream mainline constraint
(9) SEG SB OFF TO SB MISSION/RTE 262	1328	1267	3311	2044	154%	2452	185%	3780	1166	88%	2494	Adjust demand based on upstream mainline constraint
(10) SEG SBOFF TO NB MISSION BL/262	28	22	460	438	1564%	525	1877%	553	337	1204%	365	Adjust demand based on upstream mainline constraint
(5) SEG SB ON FR SB MISSION BL/262	526	832	1746	914	174%	1097	209%	1623	1097	209%	1623	
(6) SEG SB ON FR NB MISSION BL/262	313	406	1422	1016	324%	1219	389%	1532	1112	355%	1425	Adjust demand based on upstream mainline constraint
(2) SB ON FR MISSION BL/262	839	1238	3168	1930	230%	2316	276%	3155	2209	263%	3048	
I-880												
Northbound Entry Links Total	4279	5634	7057	1422	33%	1707	40%	5986	1707	40%	5986	
(1) NB I-880 off to EB Mission	1201	636	751	115	10%	138	11%	1339	138	11%	1339	
NB I-880 off to Warren			710	710		852		852		n/a	852	
Warren on ramp to NB 880			49	49		59		59		n/a	59	
(4) WB Mission to NB I-880	1080	258	174	-84	-8%	0	0%	1080	0	0%	1080	Eliminate negative growth
SB I-880 off to Fremont	454	241	1397	1156	255%	1387	306%	1841	1387	306%	1841	
Cushing on-ramp to SB I-880	693	1178	1157	-21	-3%	-25	-4%	668	-25	-4%	668	
Southbound Entry Links Total	6214	7082	13817	6735	108%	8082	130%	14296	2436	39%	8650	SB 880 mainline capacity constraint
(3) SB I-880 to West Warren Ave	103	650	1681	1031	1001%	1237	1201%	1340	708	687%	811	Adjust demand based on upstream mainline constraint
W.Warrent to W. Mission	23	21	0	-21	-93%	-26	-111%	-3	-26	-111%	0	
(2) SB I-880 overpass to Mission	336	167	626	459	137%	551	164%	887	200	60%	536	Adjust demand based on upstream mainline constraint
Total overpass to Mission	359	189	626	437	122%	525	146%	884	525	146%	884	Adjust demand based on mainline constrained flow
Warren on ramp to SB 880			569	569		683		683			683	
(5) WB Mission to SB I-880	2073	1516	3225	1709	82%	2050	99%	4123	1154	56%	3227	Adjust demand based on upstream mainline constraint
SR 262												
EB SR 262 Entry	1560	825	1377	552	35%	663	42%	2223	315	20%	1875	Adjust demand based on upstream mainline constraint
Kato to EB Mission			1216	1216		1459		1459			1459	
EB Arrival at Warm Spring	1560	825	2593	1768	113%	2122	136%	3682	1774	114%	3334	Adjust demand based on upstream mainline constraint
EB Departure at Warm Spring	1250	740	1985	1244	100%	1493	119%	2743	1262	101%	2512	Adjust demand based on upstream mainline constraint
EB Arrival at Mohave	1250	740	1985	1244	100%	1493	119%	2743	1222	98%	2472	Adjust demand based on upstream mainline constraint
EB Departure at Mohave	1393	799	1996	1198	86%	1437	103%	2830	1245	89%	2638	Adjust demand based on upstream mainline constraint
EB SR 262 End	566	457	830	373	66%	448	79%	1014	68	12%	634	Adjust demand based on upstream mainline constraint
WB SR 262 Entry	810	1741	2602	861	106%	1033	128%	1843	1033	128%	1843	
WB Arrival at Mohave	2361	2146	4105	1959	83%	2350	100%	4711	1064	45%	3425	Adjust demand based on upstream mainline constraint
WB Departure at Mohave	2316	2099	4066	1967	85%	2360	102%	4676	1173	51%	3489	Adjust demand based on upstream mainline constraint
WB Arrival at Warm Spring	2316	2099	4066	1967	85%	2360	102%	4676	1189	51%	3505	Adjust demand based on upstream mainline constraint
WB Departure at Warm Spring	3356	1856	4197	2341	70%	2810	84%	6166	1746	52%	5102	Adjust demand based on upstream mainline constraint
WB Mission to Kato Road			798	798		958		958			795	
WB SR 262 End	3356	1856	3399	1543	46%	1852	55%	5208	951	28%	4307	Adjust demand based on upstream mainline constraint
NB Arrival at Warm Spring	1401	932	1101	168	12%	202	14%	1603	202	14%	1603	
NB Departure at Warm Spring	923	898	1188	290	31%	348	38%	1271	206	22%	1129	Adjust demand based on upstream mainline constraint
SB Arrival at Warm Spring	1179	1509	2570	1062	90%	1274	108%	2453	1274	108%	2453	
SB Departure at Warm Spring	972	1870	2959	1089	112%	1307	134%	2279	1138	117%	2110	Adjust demand based on upstream mainline constraint
NB Arrival at Mohave	337	66	51	-15	-5%	0	0%	337	0	0%	337	
NB Departure at Mohave	87	#N/A	#N/A	#N/A	#N/A	0	0%	87	0	0%	80	Adjust demand based on upstream mainline constraint
SB Arrival at Mohave	131	#N/A	#N/A	#N/A	#N/A	0	0%	131	0	0%	131	Apply the same growth with SB Departure
SB Departure at Mohave	193	55	78	23	12%	28	0%	221	28	14%	158	Adjust demand based on upstream mainline constraint

Note: Capacity assumptions: Mainline: 2100 vphph, HOV lane: 1650 vphpl

Table 2 : 2035 Forecast PM Link Demand

LOCATION	Existing PM Peak	Model Demand		Growth 2005 - PM Peak		2035 Unconstrained			2035 Constrained			Comments
	Peak Hour	2005 1Hr	2030 NP	1 Hr Diff	1-Hr % Diff	1 Hr Diff	1-Hr % Diff	Peak Hour Demand	1 Hr Diff	1-Hr % Diff	Peak Hour Demand	
I-680												
Northbound Entry Links Total	6648	6662	14352	7690	116%	9228	139%	15876	3152	47%	9800	NB 680 mainline capacity constraint
(1) NB Off to Mission/262- ALA	1232	1431	3282	1851	150%	2221	180%	3453	899	73%	2131	Adjust demand based on upstream mainline constraint
(3) SEG NB OFF TO NB MISSION/RTE 262	642	1163	2111	948	148%	1137	177%	1779	456	71%	1098	Adjust demand based on upstream mainline constraint
(4) SEG NB OFF TO SB MISSION/262	590	268	1171	903	153%	1084	184%	1674	443	75%	1033	Adjust demand based on upstream mainline constraint
(7) SEG NB ON FR SB MISSION/262	15	21	182	161	1073%	193	1288%	208	193	1288%	208	Adjust demand based on upstream mainline constraint
(8) SEG NB ON FR NB MISSION/262	962	718	2362	1644	171%	1973	205%	2935	1650	172%	2612	Adjust demand based on upstream mainline constraint
(11) NB ON FR MISSION/262	977	739	2544	1805	185%	2166	222%	3143	1843	189%	2820	Adjust demand based on upstream mainline constraint
Southbound Entry Links Total	4599	4210	5818	1608	35%	1929	42%	6528	1929	42%	6528	
(12) SB OFF TO MISSION /262	1030	593	1100	508	49%	609	59%	1639	609	59%	1639	
(9) SEG SB OFF TO SB MISSION/RTE 262	989	577	1079	502	51%	603	61%	1592	603	61%	1592	
(10) SEGSOFF TO NB MISSION BL/262	41	16	21	5	13%	6	15%	47	6	15%	47	
(5) SEGSB ON FR SB MISSION BL/262	197	80	301	221	112%	265	135%	462	265	135%	462	
(6) SEGSB ON FR NB MISSION BL/262	966	217	482	265	27%	318	33%	1284	318	33%	1284	
(2) SB ON FR MISSION BL/262	1163	297	783	486	42%	583	50%	1746	583	50%	1746	
I-880												
Northbound Entry Links Total	6481	9024	14650	5626	87%	6751	104%	13232	3799	59%	10280	Capacity constraint at mainline
(1) NB I-880 off to EB Mission	1328	1576	2972	1364	105%	1675	126%	3003	1005	76%	2333	Adjust demand based on upstream mainline constraint
NB I-880 off to Warren			1064	1064		1277		992	992		992	Adjust demand based on upstream mainline constraint
Warren on ramp to NB 880			1509	1509		1811		1811	1811		1811	
(4) WB Mission to NB I-880	966	596	1044	448	46%	538	56%	1504	538	56%	1502	Adjust demand based on upstream mainline constraint
SB I-880 off to Fremont	414	89	110	21	5%	26	6%	440	26	6%	440	
Cushing on-ramp to SB I-880	757	755	1399	644	85%	772	102%	1529	772	102%	1529	
Southbound Entry Links Total	5352	4341	5960	1620	30%	1944	36%	7296	1944	36%	7296	
(3) SB I-880 to West Warren Ave	113	41	204	163	144%	195	173%	308	195	173%	308	
W Warren to Mission	154	131	0	-131	-85%	-157	-102%	-3	-157	-102%	-3	
(2) SB I-880 overpass to Mission	401	124	606	482	120%	578	144%	979	578	144%	979	
Total overpass to Mission	555	255	606	351	63%	421	76%	976	421	76%	976	
Warren on ramp to SB 880			1035	1035		1241		1241	1241		1241	
(5) WB Mission to SB I-880	1015	823	1463	640	63%	768	76%	1783	768	76%	1783	
SR 262												
EB SR 262 Entry	1883	1831	3578	1747	93%	2097	111%	3980	1426	76%	3309	Adjust demand based on upstream mainline constraint
Kato to EB Mission			462			555		555	555		555	
EB Arrival at Warm Spring	1883	1831	4040	2210	117%	2652	141%	4535	1981	105%	3864	Adjust demand based on upstream mainline constraint
EB Departure at Warm Spring	2203	1870	3493	1623	74%	1948	88%	4151	1545	70%	3748	Adjust demand based on upstream mainline constraint
EB Arrival at Mohave	2203	1870	3493	1623	74%	1948	88%	4151	1407	64%	3610	Adjust demand based on upstream mainline constraint
EB Departure at Mohave	2420	1942	3531	1589	66%	1907	79%	4327	1444	60%	3864	Adjust demand based on upstream mainline constraint
EB SR 262 End	1175	2187	2819	632	54%	758	65%	1933	79	7%	1254	Adjust demand based on upstream mainline constraint
WB SR 262 Entry	490	343	674	331	68%	397	81%	887	397	81%	887	
WB Arrival at Mohave	1857	1086	2441	1355	73%	1626	88%	3483	1011	54%	2868	Adjust demand based on upstream mainline constraint
WB Departure at Mohave	1807	1044	2403	1359	75%	1630	90%	3437	1042	58%	2849	Adjust demand based on upstream mainline constraint
WB Arrival at Warm Spring	1807	1044	2403	1359	75%	1630	90%	3437	1033	57%	2840	Adjust demand based on upstream mainline constraint
WB Departure at Warm Spring	1981	1105	2962	1857	94%	2228	112%	4209	1735	88%	3716	Adjust demand based on upstream mainline constraint
WB Mission to Kato Road			455			546		546	480		480	Adjust demand based on upstream mainline constraint
WB SR 262 End	1981	1105	2507	1402	71%	1682	85%	3663	1255	63%	3236	Adjust demand based on upstream mainline constraint
NB Arrival at Warm Spring	1451	2018	3086	1068	74%	1282	88%	2733	1282	88%	2733	
NB Departure at Warm Spring	927	1809	2757	948	102%	1137	123%	2064	1033	111%	1960	Adjust demand based on upstream mainline constraint
SB Arrival at Warm Spring	1026	1047	1355	308	30%	370	36%	1396	370	36%	1396	
SB Departure at Warm Spring	919	1155	1672	517	56%	621	68%	1540	490	53%	1409	Adjust demand based on upstream mainline constraint
NB Arrival at Mohave	465	136	124	-13	-3%	0	0%	465	0	0%	465	
NB Departure at Mohave	129	#N/A	#N/A	#N/A	#N/A	0	0%	129	-11	-9%	118	Adjust demand based on upstream mainline constraint
SB Arrival at Mohave	265	#N/A	#N/A	#N/A	#N/A	14	5%	279	14	5%	279	
SB Departure at Mohave	434	106	124	18	4%	21	5%	455	-45	-10%	389	Adjust demand based on upstream mainline constraint

Note: Capacity assumptions: Mainline: 2100 vphph, HOV lane: 1650 vphpl