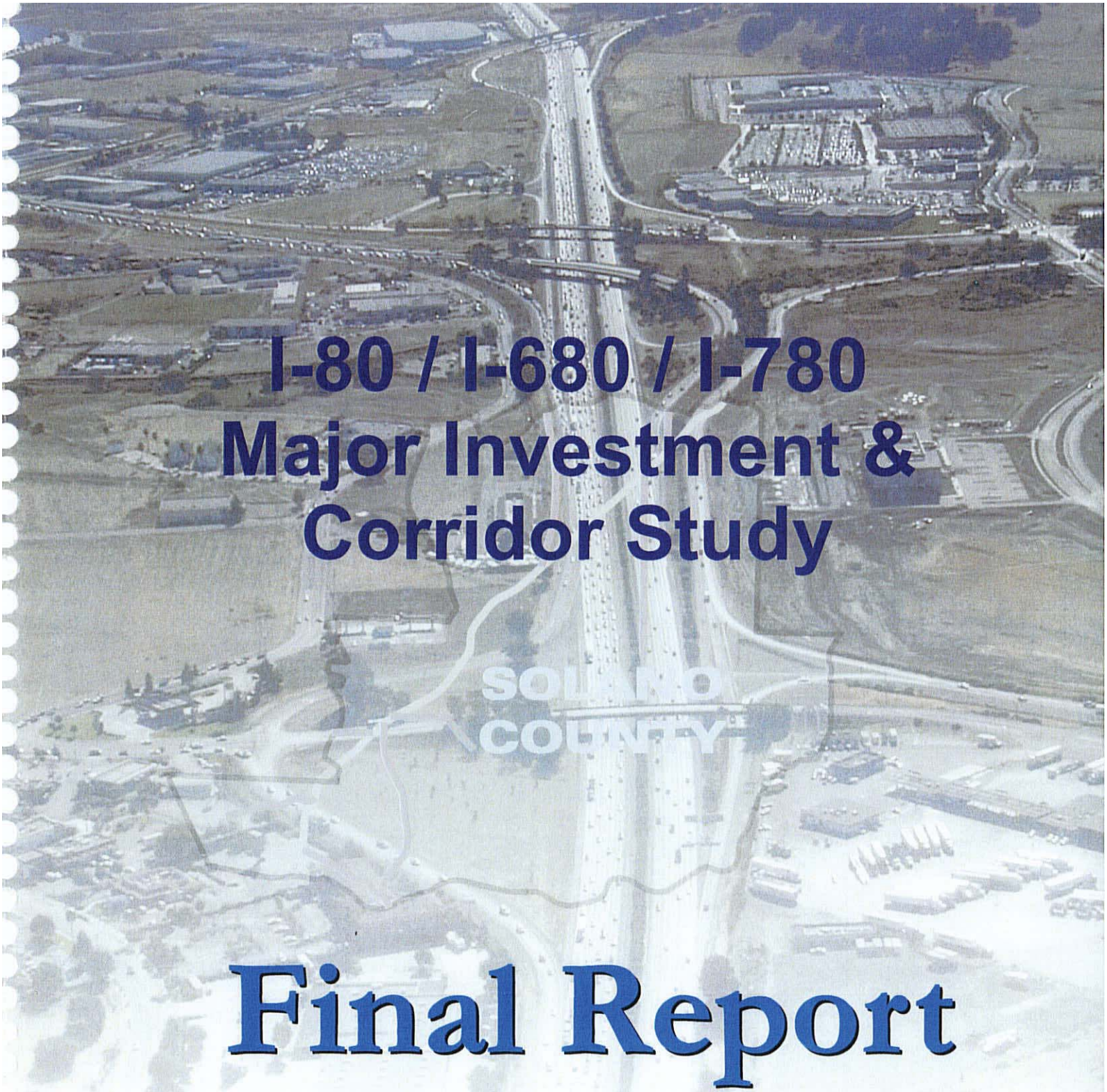

I-80 / I-680 / I-780 Major Investment & Corridor Study

Final Report

July 14, 2004

Solano Transportation Authority

Korve Engineering

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0 EXECUTIVE SUMMARY

0.1 Introduction

The goal of the I-80/I-680/I-780 Major Investment and Corridor Study is to develop a long range, multi-modal transportation plan for the I-80, I-680 and I-780 corridors in Solano County. Interstates 80, 680 and 780 form the backbone of Solano County's roadway network. According to projections by the Association of Bay Area Governments (ABAG), the population of Solano County will grow by 45 percent between 2000 and 2025, and transportation demands on the County's freeway network are expected to increase accordingly. If transportation improvements are not pursued within the study corridors in this timeframe, forecasts predict dramatic increases in vehicular congestion and delay. These increases in vehicular congestion are projected to be the worst on the segments of I-80 through Fairfield and Vacaville, with peak hour delays of greater than one-half hour in some sections.

As identified in Intercity Transit Element Section of the *Solano Comprehensive Transportation Plan* (CTP), Solano County also has a need to develop a short and long range multi-modal transit plan to accommodate projected growth. Without investing in intercity transit services to accommodate transit usage, regional roadways will become increasingly congested, thereby adversely impacting the quality of life in Solano County and its economic strength.

The I-80/I-680/I-780 study corridor is divided into seven discrete segments, as listed below. The study corridor was separated into these seven geographic segments because they display distinct travel patterns and serve different travel markets. Segment boundaries are typically comprised of major freeway to freeway interchanges.

- Segment 1: I-80 from Red Top Road to SR-12 East;
- Segment 2: I-80 from the Carquinez Bridge to SR-37;
- Segment 3: I-780 from I-680 to I-80;
- Segment 4: I-680 from the Benicia Bridge to I-80;
- Segment 5: I-80 from SR-37 to Red Top Road;
- Segment 6: I-80 from SR-12 East to I-505; and
- Segment 7: I-80 from I-505 to SR-113 North.

0.2 Existing Conditions

The heaviest traveled segments of I-80 are those which pass through Fairfield. These segments carry approximately 70 percent more traffic than those segments which are the least traveled. The lighter traveled areas of I-80 are those segments located between the I-680 and SR 37 interchanges and those located east of Vacaville, through Dixon. Figure 0-1 illustrates peak-hour traffic volumes and corresponding service levels at critical locations, on I-80, I-680 and I-780.

Intercity bus services within Solano County are operated by Benicia Transit, Fairfield-Suisun Transit, Vallejo Transit, Vine Transit and Yolobus. Amtrak also serves the

County with its Capitol Corridor Intercity Rail Service. Baylink Ferry provides ferry services connecting Vallejo and San Francisco.

0.3 Future Conditions

Future travel demands in the study corridors were forecasted using the Napa/Solano County travel demand model, modified with a future set of baseline transportation improvements. Significant increases in traffic volumes are anticipated throughout the study corridors. Table 0-1 illustrates the magnitude of increase in unconstrained travel demand at a number of key locations.

Table 0-1 Increase in Traffic Volumes at Critical Locations

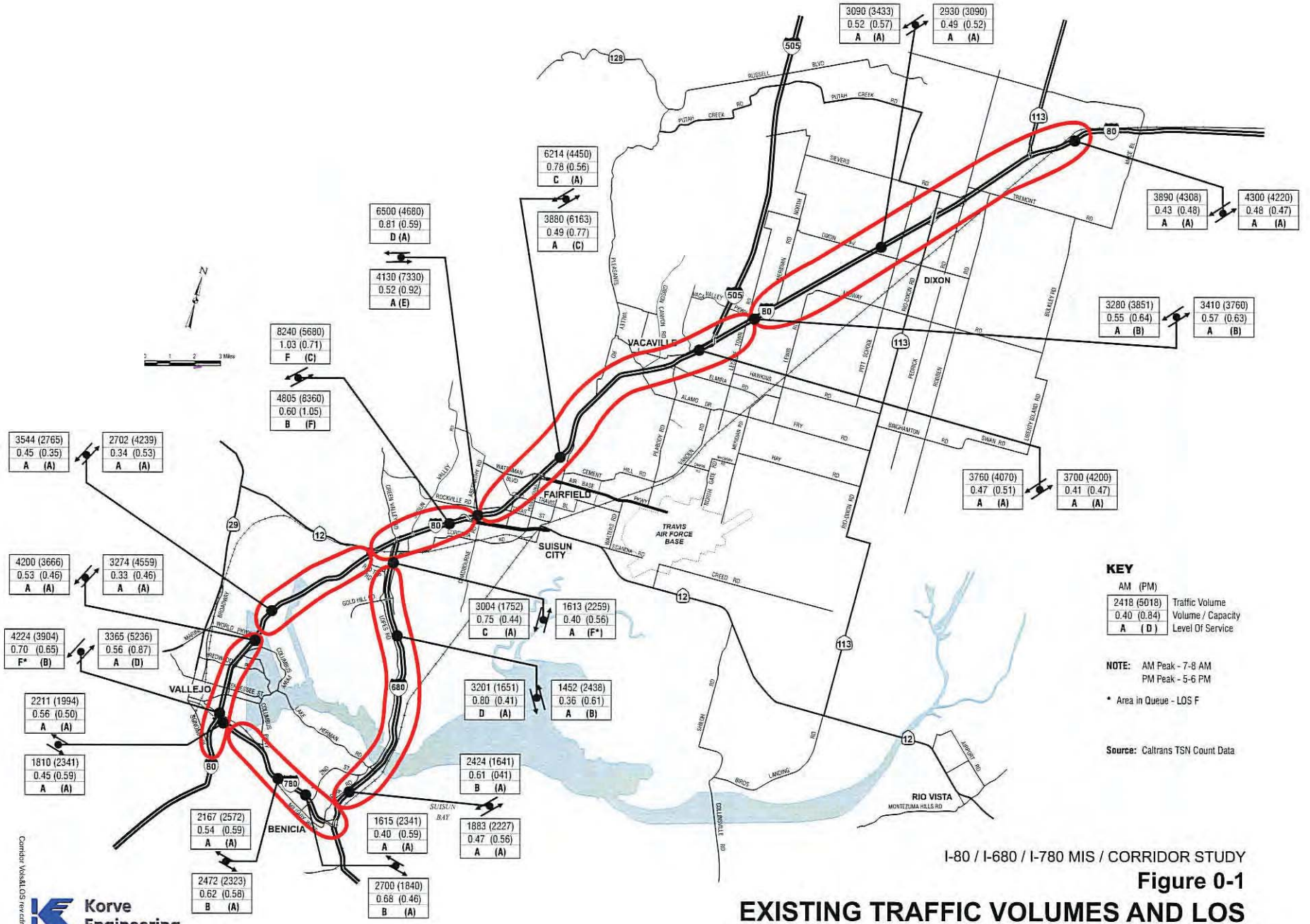
Location	Seg-ment	Peak Hour *	Traffic Volume in Peak-Direction		Increase
			Existing	2030	
WB I-80, West of SR-12 (East)	1	AM	8,240	14,023	**70%**
EB I-80, East of SR-37	2	PM	4,239	7,436	**75%**
EB I-780, Laurel St	3	PM	2,341	2,895	**24%**
NB I-680, Cordelia Rd	4	PM	1,944	3,025	**56%**
WB I-80, West of American Canyon Rd	5	AM	3,582	7,383	**106%**
WB I-80, West of North Texas St	6	AM	6,310	8,475	**34%**
EB I-80, East of Leisure Town Rd	6	AM	3,410	5,585	**64%**
WB I-80, East of Dixon Ave/West A St	7	PM	3,380	5,244	**55%**

* AM peak hour = 7-8 am and PM peak hour = 5-6 pm.

Due to a 54 percent increase in resident workers and 64 percent increase in jobs in Solano County, forecasted by Metropolitan Transportation Commission (MTC), the County is expected to experience a substantial increase in transit demand. The future implementation of incentive policies such as higher parking fees and bridge tolls, will likely result in an increase in transit market share for some critical corridors. As an example, the transit share for San Francisco-bound trips is expected to increase from 23 to 33 percent in the next 20 years. The demand for park-and-ride facilities is expected to double according to projections based on the MTC model, with Fairfield experiencing the greatest increase in the demand for spaces. Finally, it should be noted that truck traffic is anticipated to grow by more than 100 percent by the year 2040 on the study sections of I-80.

0.4 Alternatives Development

Based on the existing and future unconstrained travel demand forecasts, along with a constrained analysis of corridor bottlenecks and queues, highway, transit and park and ride improvement alternatives were developed. These alternatives were supplemented by input from public scoping meetings, and input provided by Caltrans and local agency staff.



0-3

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Corridor Vols&LOS rev.cdr

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 0-1

EXISTING TRAFFIC VOLUMES AND LOS AT CRITICAL LOCATIONS

0.5 Evaluation Criteria and Methodology

Those improvements which have been funded, and are currently underway in one form or another are categorized as "near term" improvements. These are listed in Table 0-2. Mid-term improvement projects were prioritized through a detailed corridor constrained traffic operations analysis taking into account bottlenecks, queues and delays during different time horizons. Those improvements which work to solve existing bottlenecks and congestion through the study corridors were prioritized first. Mid-term projects are generally intended to serve traffic demand until approximately the horizon year 2020.

Table 0-2 Near-term Projects

Project Number	Segment	Project Name
1A	7	Leisure Town Road Park and Ride
1B	6	Bella Vista Road Park and Ride
1C	6	Fairfield Transportation Center – Phase 2
1D	1	Red Top Road Park and Ride
1E	7	Leisure Town Road Interchange Improvement
1F	1	Widening EB/WB I-80 "Aux Lane" – I-680 to SR 12 (E)

Projects to be implemented in the period after 2020, and after implementation of the mid-term improvements, have been categorized as long-term improvement projects. Long-term projects were evaluated with nine criteria and were prioritized based on their aggregate performances. These nine criteria are listed below:

1. Traffic Operations including Link Volume/Capacity Ratio, Levels of Service, Bottlenecks, Queuing and Vehicle Delay;
2. Safety;
3. High Occupancy Vehicles (HOV) Lane Performance;
4. Preliminary Right-of-Way (ROW) Requirements;
5. Preliminary Environmental Constraints;
6. Order of Magnitude Costs;
7. Complement Transit Plan;
8. Compliance with Engineering Standards; and
9. User Benefits.

Local interchange improvements were developed in concert with local City staffs, because improvements to local interchanges are largely driven by local land use decisions and changes in local travel patterns.

Public outreach meetings were held at project initiation in selected cities to allow the public to provide input to the study scope and process. A study Working Group and Project Development Team were formed, and met monthly throughout the study process, to review project work products and guide the direction of the study.

0.6 Recommendations

Based on the evaluation described above, twenty-four mid-term and twenty-six long term projects were recommended and their priorities and costs are shown in Table 0-3 and

Table 0-4, respectively. The locations of mid-term and long-term projects are illustrated in Figures 0-2 and 0-3, respectively. Local Interchange improvements within each local jurisdiction were prioritized separately and Table 0-5 presents the results.

Table 0-3 Recommended Mid-Term Projects

Priority	Project	Seg-ment	Cost in million $ (2003)
1	(Near Term Projects stated in Table 0-2)		
2	Extension of WB I-80 HOV Lane - East of Carquinez Bridge to East of SR-29	2	$1.5 - 5.7 ****
3	EB I-80 Signage for SR-29 - West of Toll Plaza	2	$0.16
4	Expand Lemon St & Curtola Pkwy Park & Ride	2	$30.0 * ****
5	North Connector	1	$68.0 ****
6A	EB I-80 Aux Lane - Suisun Valley Rd to Existing Truck Scales	1	$2.4 **
6B	WB I-80 Aux Lane – Existing Truck Scales to Suisun Valley Rd	1	$1.7 **
7	I-80 EB & WB HOV Lane – SR 12 West to Air Base Pkwy (Requires design exception)	1,6	$78.0 ** ****
8	Braiding EB I-80 Ramps - I-680 to Suisun Valley Rd with improvements along I-680 including Red Top Road	1	$131.0 - 186.0 **
9	EB I-80 Aux Lane - Travis Blvd to Air Base Pkwy	6	$3.7
10A	Relocate/Reconstruct Truck Scales	1	$226.0 **
10B	Upgrade Project 7 to Full Caltrans Standards	1,6	$4.0
11A	WB/EB I-80 Aux Lane - SR-12(E) to Suisun Valley Rd	1	$10.9 **
11B	Improvement/Expansion of Fairfield Transportation Center – Phase 3	6	$6.0 *
12	EB I-80 Mixed Flow Lane – SR-12 (E) to Beck Av Merge	6	$16.6
13A	WB I-80 Aux Lane – West Texas St to Abernathy Rd	6	$4.4
13B	WB I-80 Aux Lane – Waterman Blvd to Travis Blvd	6	$5.0
14A	Red Top Rd Park & Ride - Phase 2	1	$4.0 *
14B	Gold Hill Road Park & Ride	4	$3.0 *
15A	Lake Herman Rd / Vista Point Park & Ride	4	$0.2 *
15B	Benicia Intermodal Terminal	4	$30.0 *
16	Braid EB I-80 Ramps – SR-12(W) to Green Valley Rd	1	$44.0 **
17	WB I-80 Aux Lane - Green Valley Rd to SR-12 (W)	1	$2.2 **
18	I-80/I-505 Weave Correction Project	6	$8.4 ***
19A	Benicia – Downtown Area Park & Ride	3	$2.5 *
19B	Hiddenbrooke Pkwy Park & Ride	5	$0.25 *
19C	North Texas St Park & Ride	6	$1.0 *
19D	Columbus Pkwy/Rose Rd Park & Ride	3	$1.5 *
20	EB/WB I-780 Stripe Aux Lane – 2nd St to 5th St	3	$0.2
21	I-80 / Pitt School Rd Interchange Improvement	7	$4.1
22	North First St Park & Ride	7	$0.25
23	WB I-80 HOV Lane - Carquinez Bridge to SR-37	2	$15.7
24	EB I-80 HOV Lane - Carquinez Bridge to SR-37 with improvement to Redwood Pkwy EB off-ramp	2	$32.3
		Total	**$739-$798**

* P&R estimate from Wilbur Smith and Associates.
** Estimates from Mark Thomas Company, Inc.
*** Info from Caltrans PSR.
**** Projects which are currently partially funded.

Table 0-4 Recommended Long-Term Projects

Priority	Description	Segment	Cost in Million $ (2003)	
25	EB/WB I-80 HOV Lane - Air Base Pkwy to I-505	6	$111.2	
26	EB I-80 Mixed Flow Lane - SR-12 (E) to Air Base Pkwy	6	$64.4	
27	WB I-80 Mixed Flow Lane SR-29 to Cummings Skwy	2	$11.4	
28	I-780/I-80 Interchange Improvement	2	$48	
29	EB/WB I-780 Aux Lane - Military West to Columbus Pkwy	3	$4.3	
30	Turner Parkway Extension over I-80 to Fairgrounds Dr with Park & Ride and HOV Connectors	2	$38.0	
31	Vacaville Intermodal Transportation Center	6	$12.0	**
32A	EB I-80 Aux Lane – Redwood Pkwy to SR-37 with 2-lane off-ramp	2	$18.1	
32B	EB I-80 Aux Lane – Tennessee St to Redwood Pkwy	2	$18.8	
33	EB/WB I-80 Mixed Flow Lane - SR-12 (E) to I-680	1	$38.0	*
34	WB I-80 Mixed Flow Lane - Air Base Pkwy to SR-12 (E)	6	$48.2	
35	I-80 Widening - Meridian Rd to Kidwell Rd	7	$60.0	
36A	WB I-80 Aux Lane – North Texas St to Waterman Rd	6	$28.4	
36B	EB I-80 Aux Lane – Air Base Pkwy to North Texas St	6	$24.5	
37A	EB I-80 Aux Lane – Cherry Glen Rd to Alamo Dr	6	$7.9	
37B	WB I-80 Aux Lane – Merchant St to Cherry Glen Rd	6	$16.5	
38	Braid WB I-80 Ramps - Suisun Valley Rd to SR-12 (W)	1	$78.0	*
39A	I-80/I-780/Curtola Pkwy HOV Connector	2	$45.0	
39B	EB I-80 Aux Lane – I-780 to Georgia St	2	$13.2	
39C	WB I-80 Aux Lane – Georgia St to I-780	2	$14.0	
39D	WB I-80 Aux Lane – Redwood Pkwy to Tennessee St	2	$10.8	
39E	EB I-80 Aux Lane - North Texas St to Lagoon Valley Rd	6	$7.5	
40	SR-113/I-80 Interchange Improvement	7	$22.7	
41	EB I-80 Aux Lane - Alamo Dr to Davis St	6	$6.2	
42	EB I-80 Aux Lane - Davis St to Peabody Rd	6	$3.5	
43	EB I-80 Aux Lane - Peabody Rd to Allison Dr	6	$5.0	
44	WB I-80 Aux Lane - Monte Vista Av to Mason St	6	$6.2	
45	WB I-80 Aux Lane - Mason St to Alamo Dr	6	$5.0	
46	I-80 Ramp Improvements Through Vallejo (SR-29 to Redwood)	2	$42.0	
47	West A Street Park & Ride	7	$0.25	**
48	NB/SB I-680 HOV Lane - Benicia Bridge to I-80	4	$160.0	
49	Walters Road Park & Ride	6	$2.0	**
50	I-80/SR-37/Columbus Parkway Interchange Improvements	5	$7.0	
		Total	**$978**	

* Estimates from Mark Thomas and Company, Inc.
** Estimates from Wilbur Smith and Associates

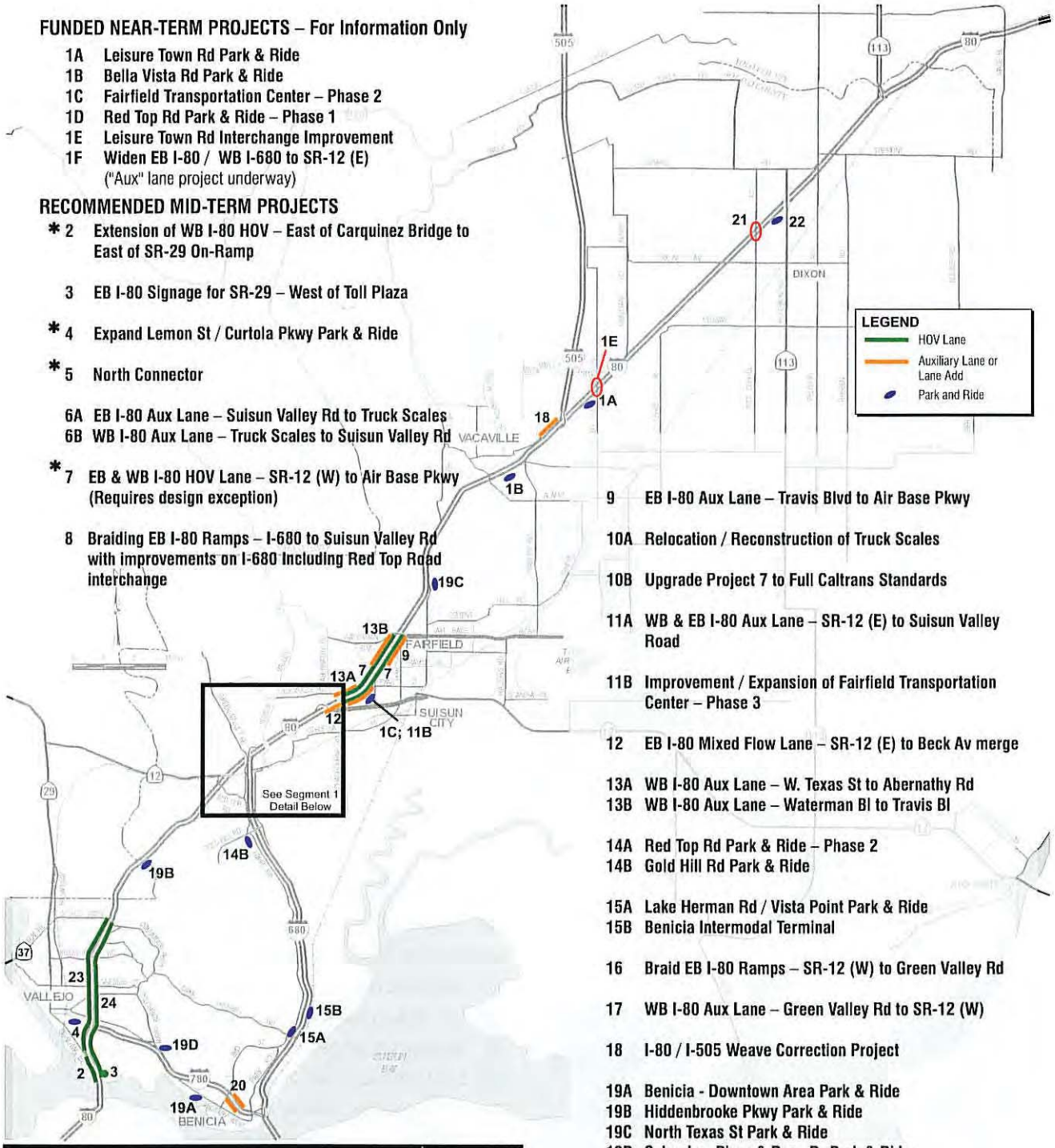
FUNDED NEAR-TERM PROJECTS – For Information Only

- 1A Leisure Town Rd Park & Ride
- 1B Bella Vista Rd Park & Ride
- 1C Fairfield Transportation Center – Phase 2
- 1D Red Top Rd Park & Ride – Phase 1
- 1E Leisure Town Rd Interchange Improvement
- 1F Widen EB I-80 / WB I-680 to SR-12 (E) ("Aux" lane project underway)

RECOMMENDED MID-TERM PROJECTS

- * 2 Extension of WB I-80 HOV – East of Carquinez Bridge to East of SR-29 On-Ramp
- 3 EB I-80 Signage for SR-29 – West of Toll Plaza
- * 4 Expand Lemon St / Curtola Pkwy Park & Ride
- * 5 North Connector
- 6A EB I-80 Aux Lane – Suisun Valley Rd to Truck Scales
- 6B WB I-80 Aux Lane – Truck Scales to Suisun Valley Rd
- * 7 EB & WB I-80 HOV Lane – SR-12 (W) to Air Base Pkwy (Requires design exception)
- 8 Braiding EB I-80 Ramps – I-680 to Suisun Valley Rd with improvements on I-680 Including Red Top Road interchange
- 9 EB I-80 Aux Lane – Travis Blvd to Air Base Pkwy
- 10A Relocation / Reconstruction of Truck Scales
- 10B Upgrade Project 7 to Full Caltrans Standards
- 11A WB & EB I-80 Aux Lane – SR-12 (E) to Suisun Valley Road
- 11B Improvement / Expansion of Fairfield Transportation Center – Phase 3
- 12 EB I-80 Mixed Flow Lane – SR-12 (E) to Beck Av merge
- 13A WB I-80 Aux Lane – W. Texas St to Abernathy Rd
- 13B WB I-80 Aux Lane – Waterman Bl to Travis Bl
- 14A Red Top Rd Park & Ride – Phase 2
- 14B Gold Hill Rd Park & Ride
- 15A Lake Herman Rd / Vista Point Park & Ride
- 15B Benicia Intermodal Terminal
- 16 Braid EB I-80 Ramps – SR-12 (W) to Green Valley Rd
- 17 WB I-80 Aux Lane – Green Valley Rd to SR-12 (W)
- 18 I-80 / I-505 Weave Correction Project
- 19A Benicia - Downtown Area Park & Ride
- 19B Hiddenbrooke Pkwy Park & Ride
- 19C North Texas St Park & Ride
- 19D Columbus Pkwy & Rose Dr Park & Ride
- 20 EB / WB I-780 Stripe Aux Lane – 2nd St to 5th St
- 21 I-80 / Pitt School Rd Interchange Improvement
- 22 North First St Park & Ride
- 23 WB I-80 HOV Lane – Carquinez Bridge to SR-37
- 24 EB I-80 HOV Lane – Carquinez Bridge to SR-37 with Ramp Improvements at Redwood Parkway

* Projects which are currently partially funded.



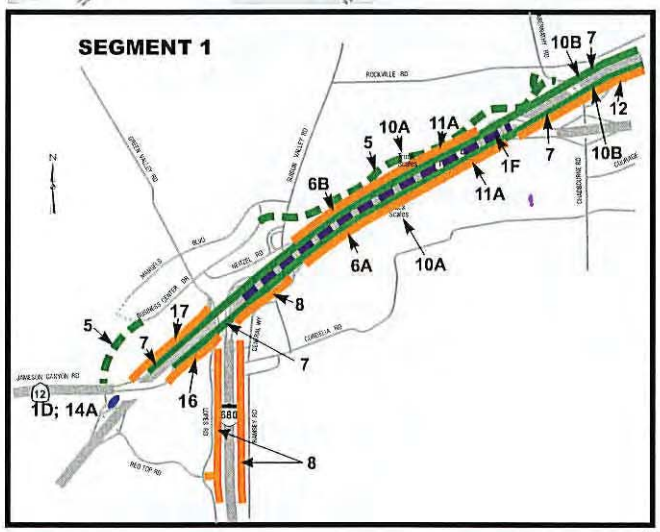


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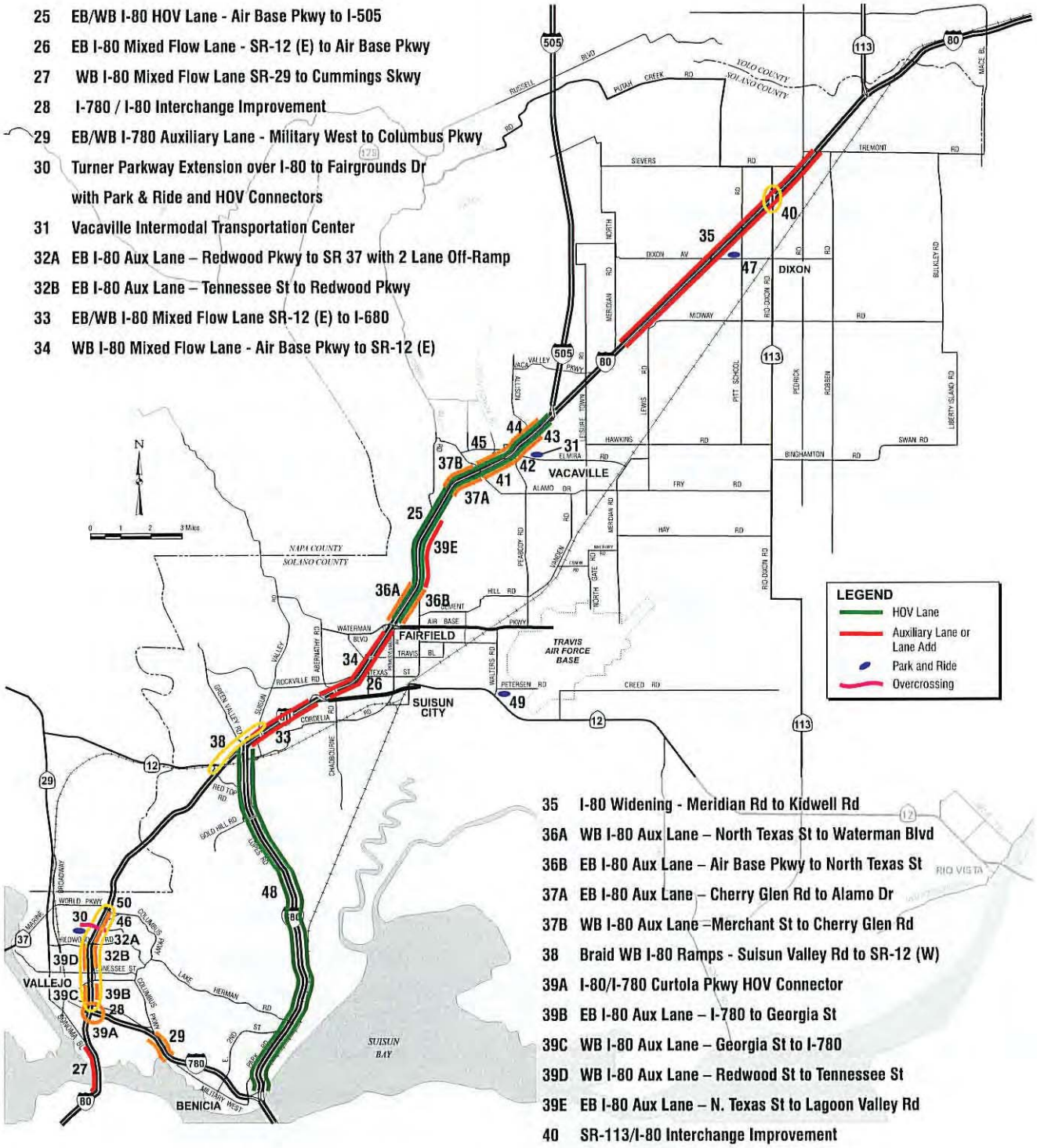
Figure 0-2

MID-TERM PROJECTS IN ORDER OF PRIORITY

June 5, 2003
Rev 7-1-03
Rev 7-7-03
Rev 8-7-03
Rev 8-11-03
Rev 8-28-03
Rev 9-3-03
Rev 11-25-03
Rev 2-24-04
Rev 3-04-04
Rev 5-05-04
Rev 5-07-04
Rev 5-18-04
Rev 6-1-04
Rev 6-17-04
Rev 8-4-04



25 EB/WB I-80 HOV Lane - Air Base Pkwy to I-505

26 EB I-80 Mixed Flow Lane - SR-12 (E) to Air Base Pkwy

27 WB I-80 Mixed Flow Lane SR-29 to Cummings Skwy

28 I-780 / I-80 Interchange Improvement

29 EB/WB I-780 Auxiliary Lane - Military West to Columbus Pkwy

30 Turner Parkway Extension over I-80 to Fairgrounds Dr with Park & Ride and HOV Connectors

31 Vacaville Intermodal Transportation Center

32A EB I-80 Aux Lane – Redwood Pkwy to SR 37 with 2 Lane Off-Ramp

32B EB I-80 Aux Lane – Tennessee St to Redwood Pkwy

33 EB/WB I-80 Mixed Flow Lane SR-12 (E) to I-680

34 WB I-80 Mixed Flow Lane - Air Base Pkwy to SR-12 (E)

35 I-80 Widening - Meridian Rd to Kidwell Rd

36A WB I-80 Aux Lane – North Texas St to Waterman Blvd

36B EB I-80 Aux Lane – Air Base Pkwy to North Texas St

37A EB I-80 Aux Lane – Cherry Glen Rd to Alamo Dr

37B WB I-80 Aux Lane –Merchant St to Cherry Glen Rd

38 Braid WB I-80 Ramps - Suisun Valley Rd to SR-12 (W)

39A I-80/I-780 Curtola Pkwy HOV Connector

39B EB I-80 Aux Lane – I-780 to Georgia St

39C WB I-80 Aux Lane – Georgia St to I-780

39D WB I-80 Aux Lane – Redwood St to Tennessee St

39E EB I-80 Aux Lane – N. Texas St to Lagoon Valley Rd

40 SR-113/I-80 Interchange Improvement

41 EB I-80 Aux Lane – Alamo Dr to Davis St

42 EB I-80 Aux Lane – Davis St to Peabody Rd

43 EB I-80 Aux Lane – Peabody Rd to Allison Dr

44 WB I-80 Aux Lane – Monte Vista Av to Mason St

45 WB I-80 Aux Lane – Mason St to Alamo Dr

46 I-80 Ramp Improvements Through Vallejo (SR-29 to Redwood)

47 West A Street Park & Ride

48 NB/SB I-680 HOV Lane - Benicia Bridge to I-80

49 Walters Road Park & Ride

50 I-80/SR-37/Columbus Parkway Interchange Improvements

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Figure 0-3

LONG TERM PROJECTS IN ORDER OF PRIORITY

June 5, 2003
Rev 7-1-03
Rev 7-7-03
Rev 8-7-03
Rev 8-11-03
Rev 10-1-03
Rev 11-25-03
Rev 12-15-03
Rev 1-15-04
Rev 1-26-04
Rev 1-28-04
Rev 1-29-04
Rev 2-23-04
Rev 3-04-04
Rev 5-05-04
Rev 5-07-04
Rev 5-18-04
Rev 5-25-04
Rev 6-17-04
Rev 8-4-04

Table 0-5 Recommended Local Interchange Improvements Prioritized by Local Jurisdiction

Jurisdiction		Description of Interchanges	Segment	Cost in Million $ (2003)	Note
Benicia	1	I-780/Rose Dr/Columbus Pkwy	3	$4.3	
	2	I-780/E 2nd St/E 5th St	3	$3.0	
	3	I-780/Southampton Rd/E 7th St	3	$3.2	
	4	I-680/Industrial Way/Bayshore Rd	4	$6.9	
	5	I-680/Lake Herman Rd	4	$14.8	
	6	I-780/Military West	3	$1.5	
Dixon	1	I-80/Pedrick Rd	7	$18.8	
	2	I-80/West A St/Dixon Ave	7	$22.8	
	3	I-80/Pitt School Rd	7	$13.2	
Fairfield	1	I-80/Green Valley Rd	1	--	Included as part of Mid Term Project 8 and Long Term Project 37
	2	I-80/N Texas St/Lyon Rd	6	$25.3	
	3	I-80/Abernathy Rd	1	--	Included as part of Mid Term Project 5
	4	I-80/Magellan Rd/Auto Mall Pkwy	6	$7.8	
	5	I-80/Suisun Valley Rd	1	--	Included as part of Mid Term Project 8 and Long Term Project 37
	6	I-80/W Texas St/Beck Ave/Oliver Rd	6	$34.3	
	7	I-80/Red Top Rd	1	--	Included as part of Mid Term Project 8 and Long Term Project 37
	8	I-680/Red Top Rd	1	--	Included as part of Mid Term Project 8 and Long Term Project 37
	9	I-80/Central Way	1	--	Included as part of Mid Term Project 8 and Long Term Project 37
	10	I-80/Travis Blvd	6	--	No Proposed Improvement
	11	I-80/Airbase Pkwy/Waterman Blvd	6	--	No Proposed Improvement
	12	I-80/Gold Hill Rd	1	--	No Proposed Improvement

Jurisdiction		Description of Interchanges	Segment	Cost in Million $ (2003)	Note
Solano County	1	I-680/Marshview Rd	4	$7.8	
	2	I-680/Parish Rd	4	$5.8	
	3	I-80/Kidwell Rd	7	--	No Proposed Improvement
	4	I-80/SR-113 (North)	7	--	No Proposed Improvement
Vacaville	1	I-80/Alamo Dr/Merchant St	6	$10.5	
	2	I-80/California Dr Over-crossing and Cherry Glen Rd off-ramp	6	$20.2	
	3	I-80/Lagoon Valley Rd/Cherry Glen Rd	6	$14.4	
	4	I-80/Pena Adobe Road/Cherry Glen Rd	6	$30.6	
	5	I-80/Davis St	6	--	Included as Long Term Project 41
	6	I-80/Midway Rd	7	$24.0	
	7	I-80/Weber Rd/Meridian Rd	7	$24.5	
	8	I-80/Peabody Rd/Mason St/Elmira Rd	6	--	No Proposed Improvement
Vallejo	1	I-80/Tennessee St	2	$66.4	
	2	I-80/Redwood St	2	Alt 1: $12.8 Alt 2: $52.1	
	3	I-80/Georgia St	2	$1.5	
	4	I-80/Springs Rd/Solano Ave/Magazine St/Sequoia Ave/Maritime Academy Dr	2	--	Included as part of Long Term Project 45
	5	American Canyon Rd	2	Alt 1: $2.2 Alt 2: $8.4	
	6	I-780/Glen Cove Pkwy	3	$1.3	
	7	I-780/Cedar St	3	--	Included as part of Long Term Project 28

1 INTRODUCTION

1.1 Background

The goal of the I-80/I-680/I-780 Major Investment and Corridor Study is to develop a long range, multi-modal corridor transportation plan for the I-80, I-680 and I-780 corridors in Solano County. Interstates 80, 680 and 780 form the backbone of Solano County's roadway network. These facilities serve a number of users, including, but not limited to: goods movement, commute traffic, regional through trips, intercity travel and recreational traffic, both regional and local in nature. Solano County also has an extremely high rate of carpooling and vanpooling when compared to other areas of the State, without the provision of carpool lanes. While traffic flows are substantial on these roadways throughout the day, distinctly recognizable peaks occur in the morning and evening peak commute hours.

In the morning peak hour, the predominant commute directions are south and west while in the evening peak hour the predominant commute directions are north and east. These flows occur because of the large number of commuters traveling from residences in Solano County to employment centers in the inner Bay Area. These patterns are reversed on the east end of the corridor through Dixon because this section also serves a large number of commuters to and from Davis, Sacramento and communities east. Congestion levels that prevail on a typical weekday are exacerbated by recreational travel, particularly on Friday and Sunday nights and "get-away" weekends. Daily traffic increases on Fridays can range from 15 to 30 percent depending upon the affected segment of freeway.

The intercity express bus services that cater to the I-80, I-680 and I-780 transportation corridors in Solano County comprise a critical element of the County's multimodal transportation services. The recently completed Intercity Bus Element of the Solano County Comprehensive Transportation Plan outlines a multimodal vision of intercity express bus services, passenger rail service and facilities improvements, paratransit improvements, ferry improvements and support infrastructure improvements over the next 20 year period. Implementation of the Intercity Bus Element is the key focus of this current planning effort.

1.2 Goals and Objectives

Consistent with the goals and objectives of the Arterials, Highways and Freeways Element of the May 2002 Comprehensive Transportation Plan, the goals and objectives of the I-80/I-680/I-780 Major Investment and Corridor Study are as follows:

- Develop a plan and implementation program for the County's freeway system that serves future needs;
- Develop a plan and implementation program for a High Occupancy Vehicle (HOV) system which complements planned transit improvements and serves future transit, carpool and vanpool users;

- Develop a plan and implementation program for local and regional freeway interchanges that serve future needs;
- Identify the right-of-way which should be preserved to meet long term travel demands;
- Develop a plan and implementation program which is consistent with the implementation of a future traffic management system;
- Develop a plan and implementation program which preserves corridor safety; and
- Develop a plan and implementation program that is sensitive to areas of environmental concern.

1.3 Purpose and Need

The purpose of the I-80/I-680/I-780 Major Investment and Corridor Study is to evaluate the existing and future transportation networks within the study corridors, and to develop a long range prioritization list of multi-modal improvements necessary to serve existing and future transportation needs.

Typically a six to eight lane facility in the study area, Interstate 80 extends well beyond Solano County, connecting the metropolitan areas of San Francisco and Sacramento. Through Fairfield, I-80 serves roughly 190,000 daily vehicles with approximately 12,000 of these trips occurring in the peak hour. The Napa/Solano County model forecasts that in the next twenty years, more than 300,000 daily vehicles will use this section of freeway. At the Carquinez Bridge, I-80 serves approximately 120,000 daily trips with about 8,000 occurring in the peak hour. Truck traffic on I-80 normally comprises six to eight percent of total daily travel; however, truck traffic on I-80 can be as low as five percent and as high as 13.5 percent, depending on the location. Truck traffic is expected to grow by 70 percent over the next 20 years, primarily due to significant expansion of container facilities at the Port of Oakland.

I-680 is a north/south facility in the study area, connecting I-80 with the Benicia Bridge and points south to San Jose. This four-lane freeway serves approximately 60,000 daily vehicles through Solano County, with trucks comprising roughly six percent of traffic. At the Benicia Bridge, I-680 serves approximately 100,000 daily vehicles. I-780 is an east/west facility connecting I-80 near the Carquinez Bridge with I-680 at the Benicia Bridge. I-780 serves roughly 60,000 daily vehicles, with trucks comprising approximately four percent of total traffic.

Figure 1-1 illustrates the locations and magnitude of existing congestion levels and peak hour vehicular delays throughout the study area. In the morning peak hour, westbound vehicles on I-80 experience roughly 6 minutes of delay between West Texas Street and I-680 in Fairfield and approximately 6.5 minutes of delay approaching the southbound State Route 29 merge in Vallejo. In the evening peak hour, eastbound vehicles on I-80 are delayed approximately four minutes at the I-680 eastbound merge and approximately two minutes in the section between Travis Boulevard and Air Base

Parkway. Northbound vehicles on I-680 are delayed approximately 10 minutes approaching the I-80 on-ramp.

Figures 1-2, 1-3 and 1-4 illustrate forecast conditions in the study corridors if no further improvements, over and above those which are currently funded, were pursued, for the horizon years 2010, 2020 and 2030 respectively. With no additional improvements, westbound delays on I-80 in the morning peak hour will reach approximately 30 minutes through Vacaville and Fairfield, and approximately 12 minutes through Vallejo, by the year 2030. Similarly, with no improvements, eastbound delays during the evening peak hour will grow to approximately 20 minutes for vehicles on I-80 and I-680, by the year 2030. The primary funded improvement which affects the delays and queues shown on Figures 1-2, 1-3 and 1-4 (but not Figure 1-1) is the installation of an auxiliary lane on I-80 from I-680 to SR 12 East, which is currently under construction.

As identified in the Solano Comprehensive Transportation Plan (CTP) Intercity Transit Element, Solano County has a need to develop a short and long range multi-modal transportation plan for the I-80/I-680/I-780 Transit Corridor to accommodate projected growth. According to 2002 ABAG projections, the population in Solano County will grow 45% between 2000 and 2025. This suggests a corresponding increase in the number of intercity commuters and other travelers. Table 1-1 summarizes projected growth in the County.

Table 1-1 Projected Growth in Solano County, 2000-2025

Solano County	2000	2025	Percent Change
Population	394,500	571,300	45%
Employed Residents	179,500	302,200	68%
Single-Family Units	99,600	148,100	49%
Multi-Family Units	30,800	43,300	41%
Population over 62	45,300	120,700	166%

Source: Association of Bay Area Governments (ABAG)

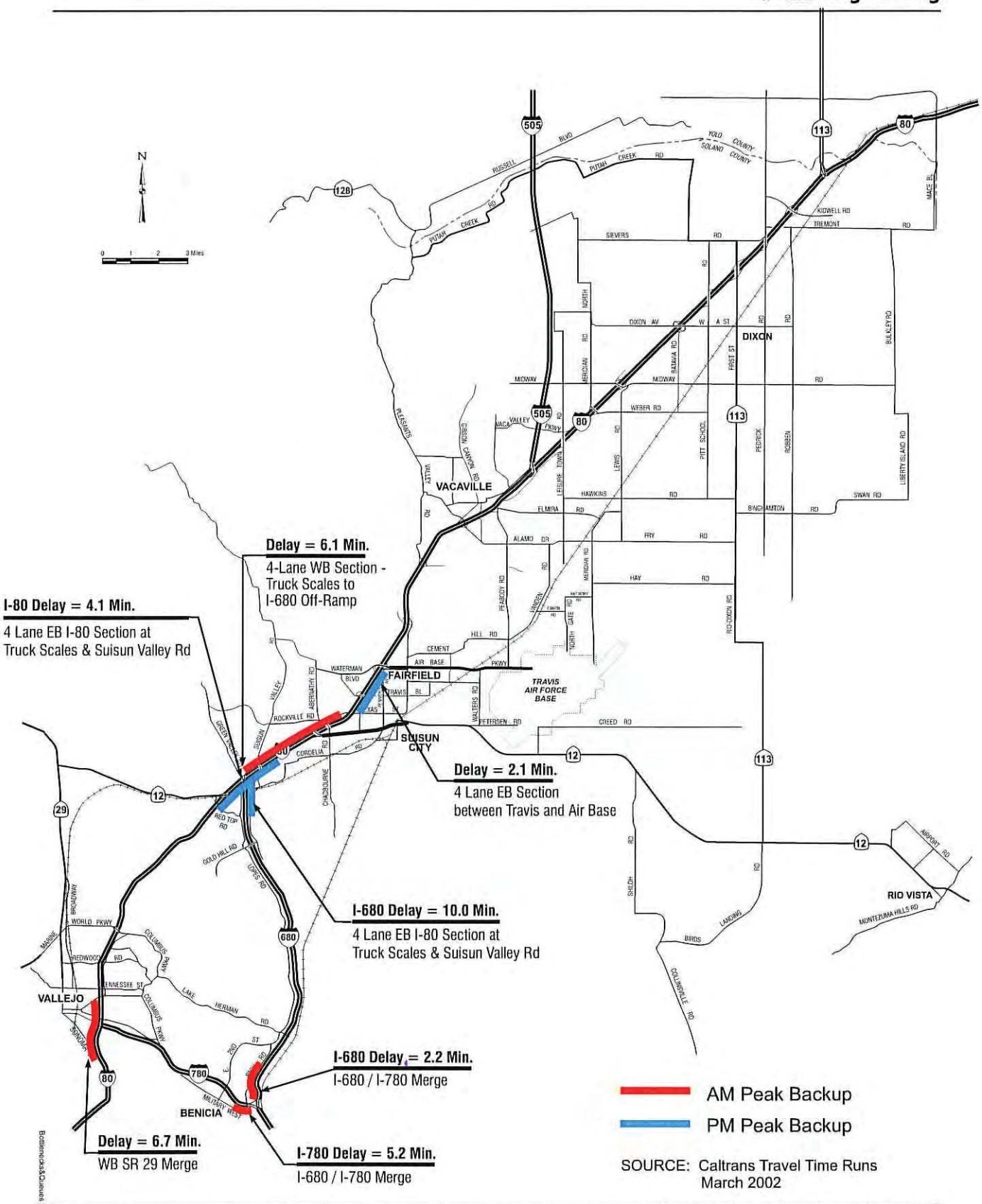
Intercity transit services enhance travel mobility to and from, and within Solano County, as well as providing increased transportation capacity. Without added investment in intercity transit services, regional roadways will become congested more quickly than forecast, thereby adversely impacting the quality of life in Solano County and also its economic strength.

Thus, the purpose of the transit analysis in the Corridor Study is to assist the decision makers of Solano County jurisdictions in the development of the transportation system, including the following components:

- Intercity bus services and vehicles;
- Support Systems (including intermodal centers and park-and-ride facilities); and
- Rail and ferry services.

1.4 Segments Description

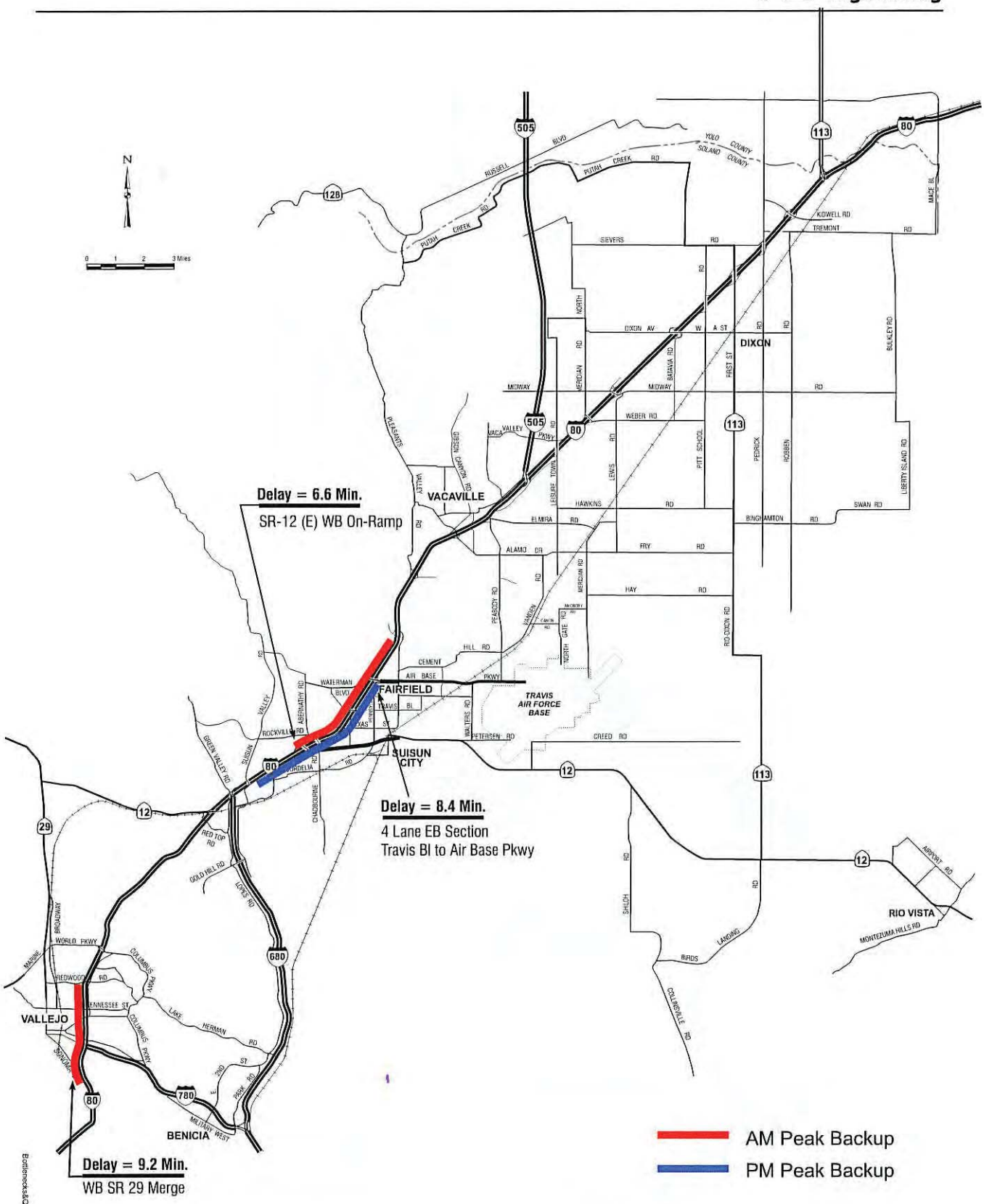
The I-80/I-680/I-780 study area is divided into seven discrete segments, as illustrated in Figure 1-5. These seven segments were chosen because they display distinctive individual travel issues. Segment boundaries are typically represented by major freeway to freeway interchange. Segment 1 (I-80) extends from Red Top Road to SR-12 East. The Major Investment Study for Segment 1 was completed in 2001. Segments 2 and 5 (I-80) extend from the Carquinez Bridge to Route 37 and from Route 37 to Red Top Road (Fairfield), respectively. Segment 3 (I-780) begins at the Benicia Bridge and I-680 and connects with I-80 in Vallejo, ending at Lemon Street/Curtola Parkway, one interchange west of I-80. Segment 4 (I-680) extends from the Benicia Bridge northward to connect with I-80 in Fairfield. Segment 6 (I-80) extends from SR-12 East to I-505 and Segment 7 extends from I-505 to SR-113 North.



I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 1-1

EXISTING WEEKDAY BOTTLENECKS AND QUEUES

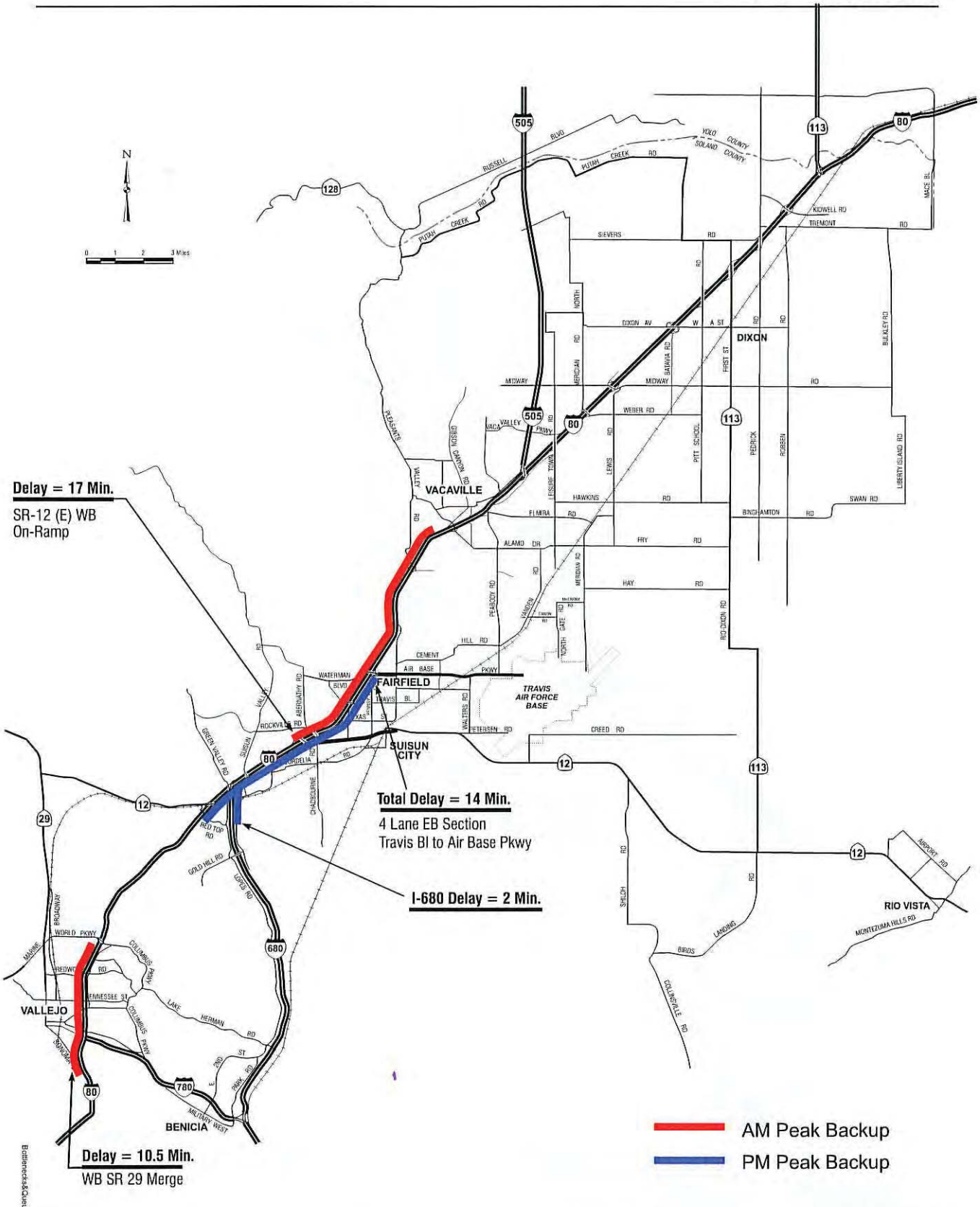


Bottlenecks&Queues 2.cdr
2-12-04
5-18-04

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 1-2

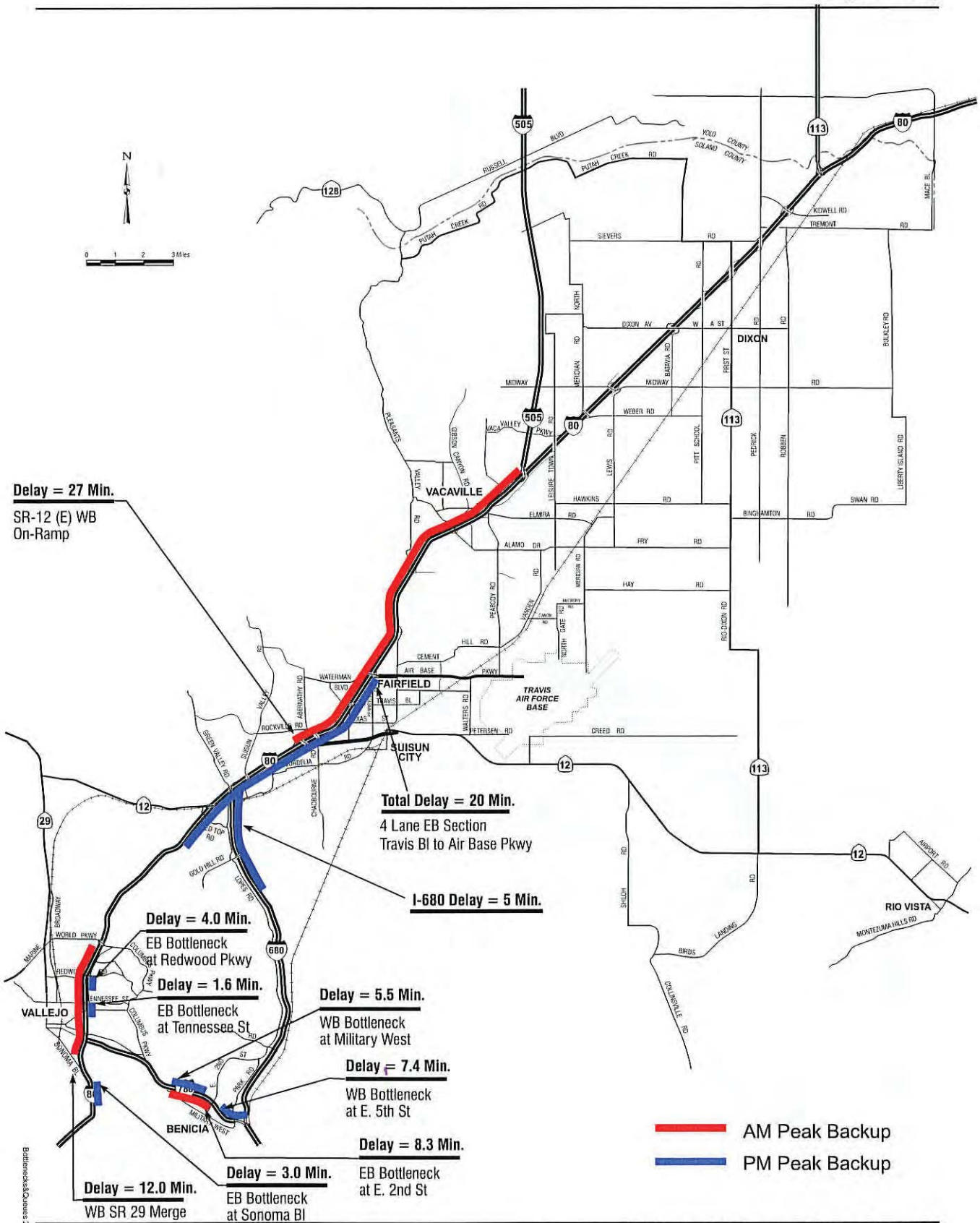
YEAR 2010 CONGESTION AND DELAY WITH FUNDED PROJECTS 1A THROUGH 1F



Bottlenecks&Queues 2.cdr
2-12-04
5-18-04

Figure 1-3

YEAR 2020 CONGESTION AND DELAY WITH FUNDED PROJECTS 1A THROUGH 1F



Bottlenecks&Queues 2.cdr
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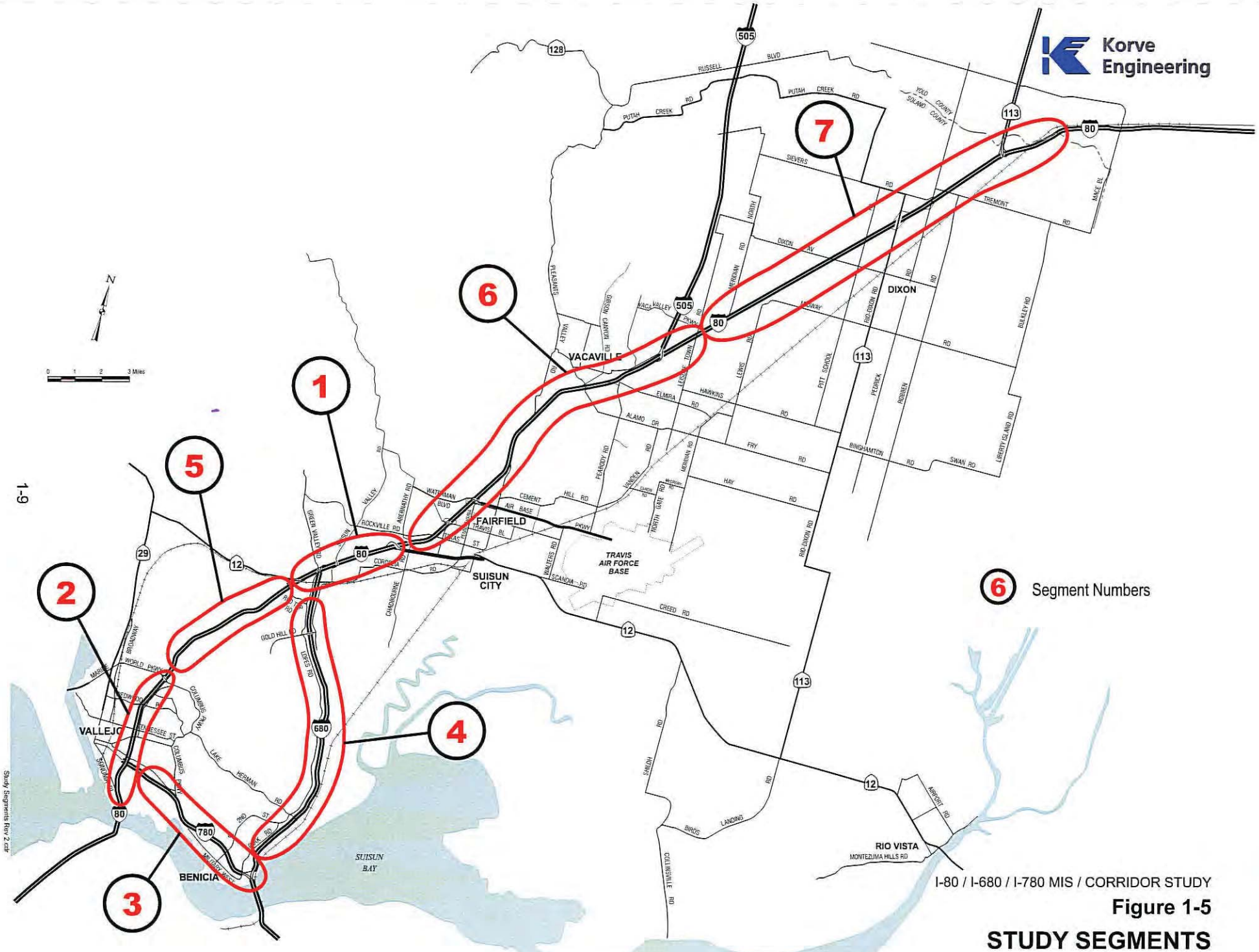
I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 1-4

YEAR 2030 CONGESTION AND DELAY WITH FUNDED PROJECTS 1A THROUGH 1F



Study Segments Rev 2.cdr

2 EXISTING CONDITIONS

This section summarizes existing highway and transit travel in the I-80/I-680/I-780 study corridors. The highway data evaluated and presented in this section includes: current traffic volumes, congestion levels, accident trends, truck traffic and carpooling information. The transit data evaluated and presented includes: ridership, routes and cost information. Existing highway and transit conditions serve as the basis for identifying travel problems and developing solutions for existing and future travel deficiencies.

2.1 Highway

2.1.1 Existing Traffic Volumes

The most recent available traffic volumes for I-80, I-680 and I-780 were obtained from the Caltrans District 4 Traffic Operations Department. The data sources range in dates from 1995 to 2001. Average daily traffic (ADT) and peak hour volumes for select portions of Segments 1-7 are presented in Table 2-1 through Table 2-6. Volume data for midweek weekdays (Tuesdays, Wednesdays and Thursdays), weekends (Saturdays and Sundays) and Fridays is summarized.

Table 2-1 I-80 Traffic Volume Summary at Selected Locations

Location	Data Year	No. of Lanes	Tues - Thurs		Friday		Sat - Sun	
			Daily	Peak Hour	Daily	Peak Hour	Daily	Peak Hour
Eastbound								
Georgia St.	2000	3	64,249	5,338 (4-5pm)	73,181	5,424 (4-5pm)	65,373	4,311 (3-4pm)
Rte. 37 Jct.	2000 1997	4+Truck Climbing Lane	55,122	4,611 (4-5pm)	65,102	5,185 (4-5pm)	57,703	3,959 (11am-12pm)
American Cyn.	1997-2002	4	50,288	4,412 (4-5pm)	61,251	5,044 (4-5pm)	52,611	3,761 (4-5pm)
East of SR-12 (W)	2000	4	68,157	6,320 (5-6pm)	83102	7,188 (4-5pm)	73555	5,032 (3-4pm)
West of SR-12 (E)	2000	5	91,185	8,360 (5-6pm)	112,590	9,877 (4-5pm)	102,393	7,028 (4-5pm)
West of North Texas St.	2000	4	68,196	6,163 (5-6pm)	83,533	6,432 (5-6pm)	81,524	5,147 (4-5pm)
East of Pleasant Valley/Pena Adobe	1998	4	69,356	6,242 (5-6pm)	89,164	7,242 (5-6pm)	75,419	5,440 (4-5pm)
West of Monte Vista Ave.	2000	4+Aux	71,705	5,359 (3-4pm)	87,615	6,209 (3-4pm)	81,554	5,536 (4-5pm)
East of Leisure Town Rd.	2001 2002	4	50,704	4,124 (3-4pm)	66,683	4,848 (3-4pm)	58,072	4,099 (4-5pm)
East of Dixon/West A	1997	3	41,091	3,152 (3-4pm)	55,866	4,269 (3-4pm)	49,654	3,669 (5-6pm)
East of Jct. SR-113 South	2000	3	52,286	3,994 (7-8am)	68,531	4,772 (3-4pm)	59,942	4,292 (5-6pm)
Solano/Yolo County Line	2002	3	58,082	4,503 (4-5pm)	72,765	5,020 (3-4pm)	58,549	3,839 (1-2pm)

Table 2-2 I-80 Traffic Volume Summary at Selected Locations (Con't)

Location	Data Year	No. of Lanes	Tues - Thurs		Friday		Sat - Sun	
			Daily	Peak Hour	Daily	Peak Hour	Daily	Peak Hour
Westbound								
Georgia St.	2000	3	64,815	4,706 (6-7am)	70,303	4,675 (6-7am)	68,120	4,912 (5-6pm)
Rte. 37 Jct.	2000 1997	4	60,952	4,442 (6-7am)	67,195	4,347 (5-6pm)	63,120	4,582 (5-6pm)
American Cyn.	1997 -2002	4	49,230	3,582 (7-8am)	54,804	3,467 (7-8am)	51,032	3,497 (4-5pm)
East of SR-12 (W)	2000	4	66,380	5,500 (7-8am)	73,434	4,916 (7-8am)	68,599	4,915 (7-8am)
West of SR-12 (E)	2000	4+Aux	107,574	8,240 (7-8am)	120,118	7,851 (6-7pm)	115,010	7,807 (11am-12pm)
West of North Texas St.	2000	4	73,554	6,214 (7-8am)	83,201	5,966 (7-8am)	81,524	5,745 (3-4pm)
West of Monte Vista Ave.	2000	4	65,714	4,560 (4-5pm)	76,169	5,418 (4-5pm)	75,833	5,767 (3-4pm)
East of Leisure Town Rd.	2000 2001	4	51,350	3,851 (5-6pm)	61,863	4,496 (4-5pm)	63,437	4,484 (4-5pm)
East of Dixon/West A	2000	3	47,330	3,433 (5-6pm)	55,610	4,232 (4-5pm)	55,643	4,267 (2-3pm)
Solano/Yolo County Line	1998	4	58,985	4,308 (5-6pm)	65,373	4,825 (4-5pm)	58,549	3,931 (4-5pm)

Source: Caltrans District 4 Traffic Operations.

Table 2-3 I-680 Traffic Volume Summary at Selected Locations

Location	Data Year	No. of Lanes	Tues – Thurs		Friday		Sat – Sun	
			Daily	Peak Hour	Daily	Peak Hour	Daily	Peak Hour
Northbound								
Industrial Way	1997 -1998	2	29,153	2,458 (4-5pm)	32,211	2,501 (4-5pm)	26,409	1,786 (4-5pm)
Marshview Rd.	1997 -2002	2	26,743	2,543 (4-5pm)	31,618	2,557 (4-5pm)	24,683	1,691 (4-5pm)
Cordelia Rd.	1997 -2002	2	26,565	2,285 (4-5pm)	30,749	2,107 (2-3pm)	26,798	1,918 (11am-12pm)
Southbound								
Industrial Way	1997 -1998	2	28,300	2,424 (6-7/ 7-8am)	29,181	2,048 (7-8am)	29,081	2,051 (4-5pm)
Marshview Rd.	1997 -2002	2	31,185	3,444 (6-7am)	33,436	3,176 (6-7am)	29,556	2,207 (4-5pm)
Cordelia Rd.	1997 -2002	2	28,448	2,927 (6-7am)	31,411	2,782 (6-7am)	28,680	2,227 (4-5pm)

Source: Caltrans District 4 Traffic Operations.

Table 2-4 I-780 Traffic Volume Summary at Selected Locations

Location	Data Year	No. of Lanes	Tues – Thurs		Friday		Sat – Sun	
			Daily	Peak Hour	Daily	Peak Hour	Daily	Peak Hour
Eastbound								
West 7th St.	1997 -2001	2	27,597	2,700 (7-8am)	29,048	2,611 (7-8am)	21,613	1,600 (5-6pm)
West Benicia	1997 -2001	2	30,382	2,472 (7-8am)	32,277	2,447 (7-8am)	25,375	1,905 (4-5pm)
Laurel St.	1995 1996	2	28,071	2,341 (5-6pm)	29,390	2,332 (5-6pm)	23,275	1,836 (4-5pm)
Westbound								
West 7th St.	1997 -2001	2	29,413	2,341 (5-6pm)	29,735	2,071 (5-6pm)	23,634	1,726 (12-1pm)
West Benicia	1997 -2001	2	30,251	2,372 (5-6pm)	31,201	2,306 (5-6pm)	24,717	1,848 (12-1pm)
Laurel St.	1995 1996	2	28,343	2,211 (7-8am)	30,443	2,167 (7-8am)	23,778	1,871 (11am-12pm)

Source: Caltrans District 4 Traffic Operations.

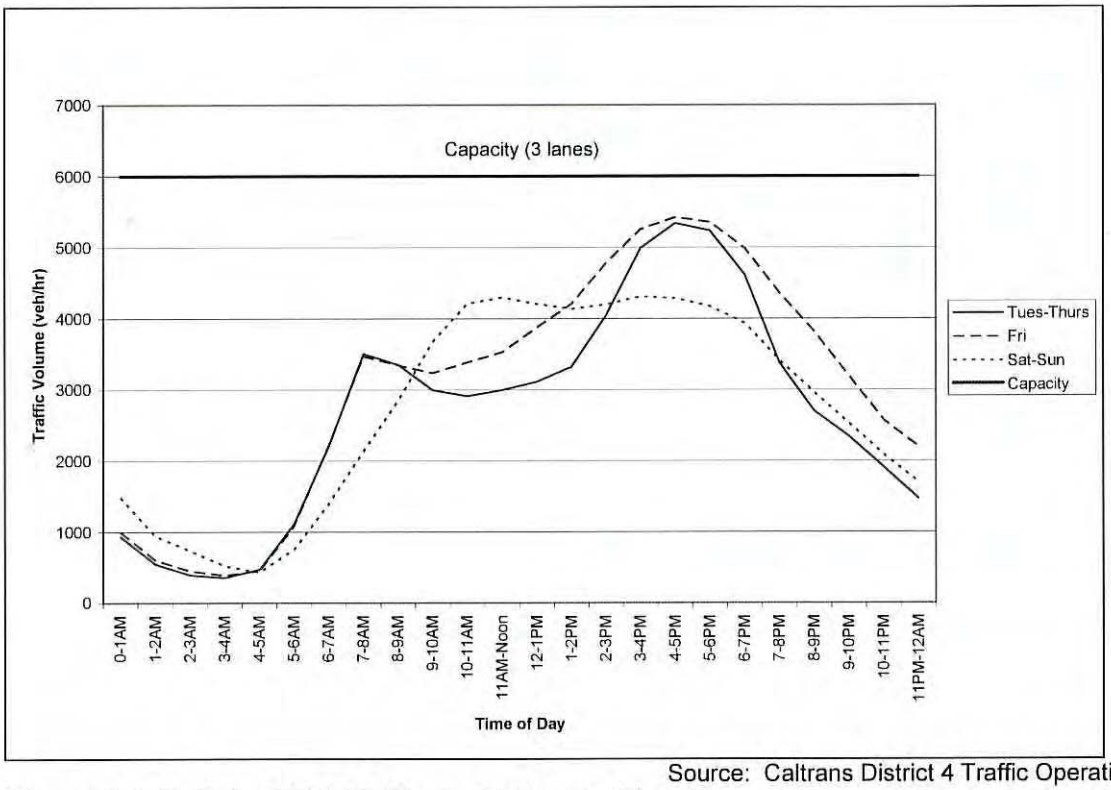
Table 2-5 SR-12 Traffic Volume Summary at Selected Locations

Location	Data Year	No. of Lanes	Tues – Thurs		Friday		Sat – Sun	
			Daily	Peak Hour	Daily	Peak Hour	Daily	Peak Hour
SR 12 (W) EB on-ramp at I-80	1999 -2000	1	14,100	1,296 (3-4 PM)	16,300	1,450 (3-4 PM)	12,800	974 (3-4 PM)
SR 12 (W) WB off-ramp at I-80	1999 -2000	1	16,600	1,465 (7-8 AM)	17,900	1,320 (7-8 AM)	14,800	1,310 (11-12 AM)

As shown in Table 2-1 through Table 2-5, weekdays typically have higher traffic levels than weekends on I-680 and I-780, especially during the peak hours. However, most sections of I-80 have higher traffic volumes on weekends. All three facilities carry more traffic on Fridays than on other weekdays, primarily due to the increase in recreational traffic through the study corridors.

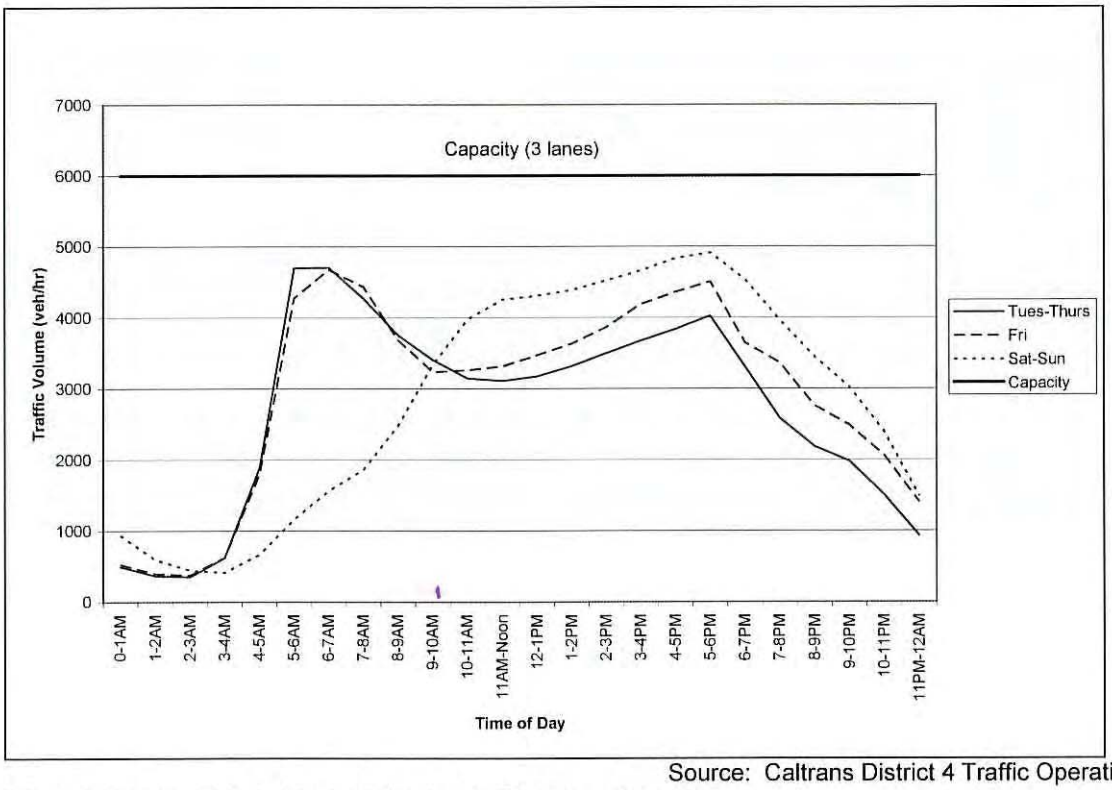
As shown in Figure 2-1 through Figure 2-18, traffic patterns on Tuesdays, Wednesdays and Thursdays reflect a typical workday traffic pattern, with spikes during the a.m. and p.m. peak hours and moderate traffic volumes in midday periods. On Fridays and weekends, traffic levels remain high throughout the day and early evening periods.

As with most of the study segments for I-80, in Segment 6 the a.m. peak direction is westbound, and the p.m. peak direction is eastbound; however, Figure 2-12 through Figure 2-16 illustrate that the peak direction in Segment 7 is not as distinctive as in Segment 6. The eastbound and westbound directional splits in the peak hours are fairly even.



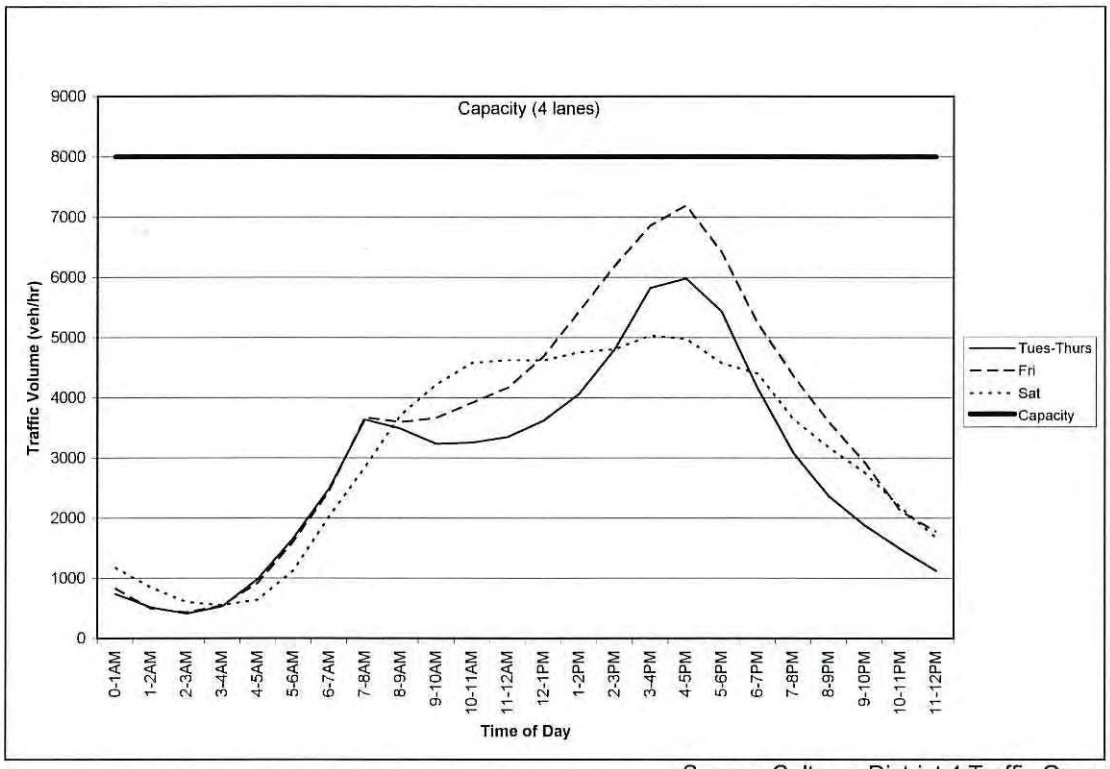
Source: Caltrans District 4 Traffic Operations.

Figure 2-1 Vallejo: EB I-80 West of Georgia Street



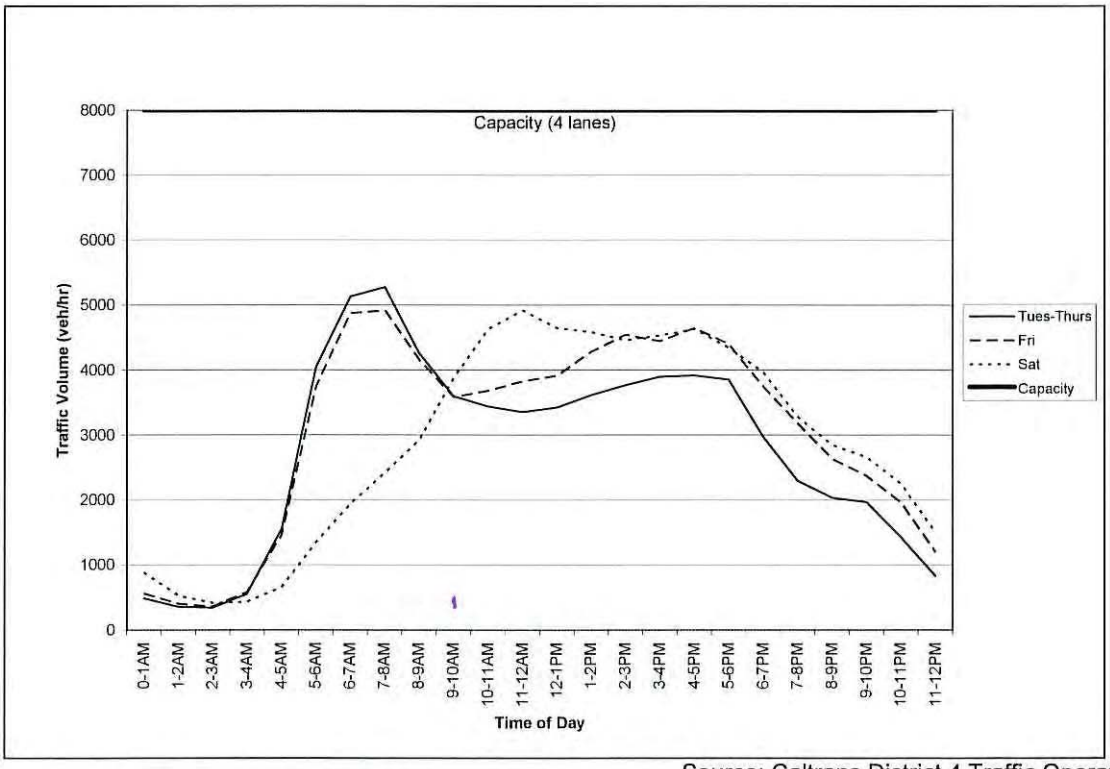
Source: Caltrans District 4 Traffic Operations.

Figure 2-2 Vallejo: WB I-80 East of Georgia Street



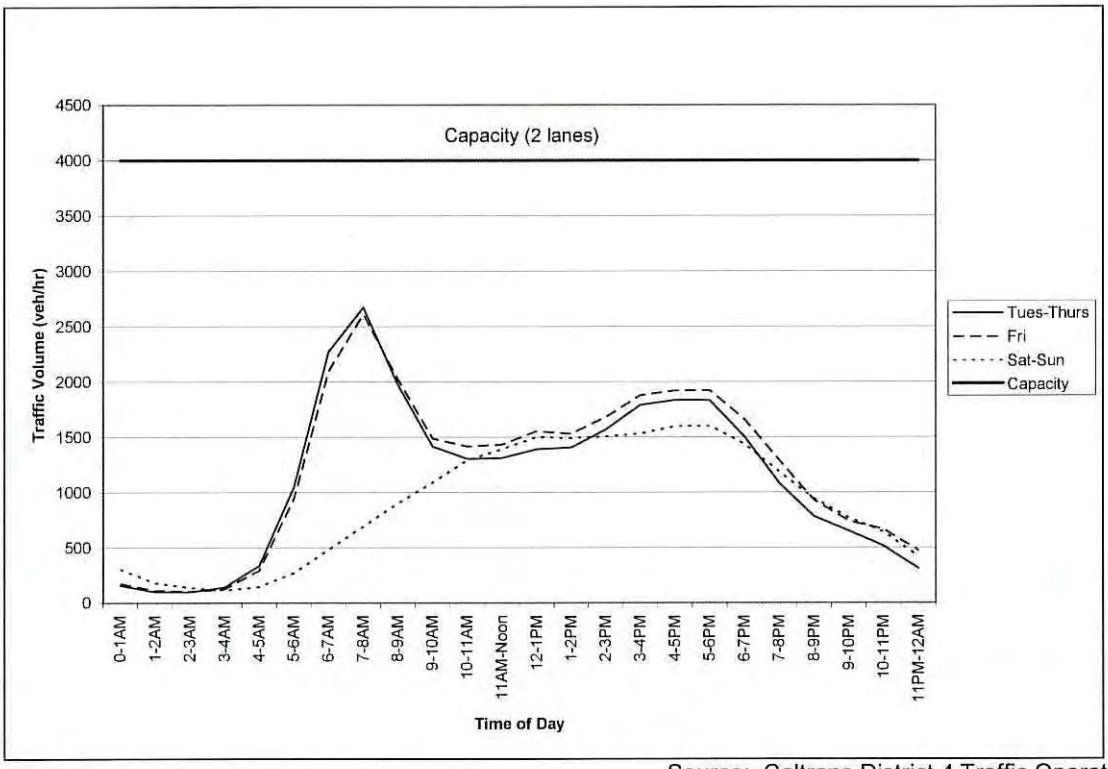
Source: Caltrans District 4 Traffic Operations

Figure 2-3 Fairfield: EB I-80 East of SR 12 (W)



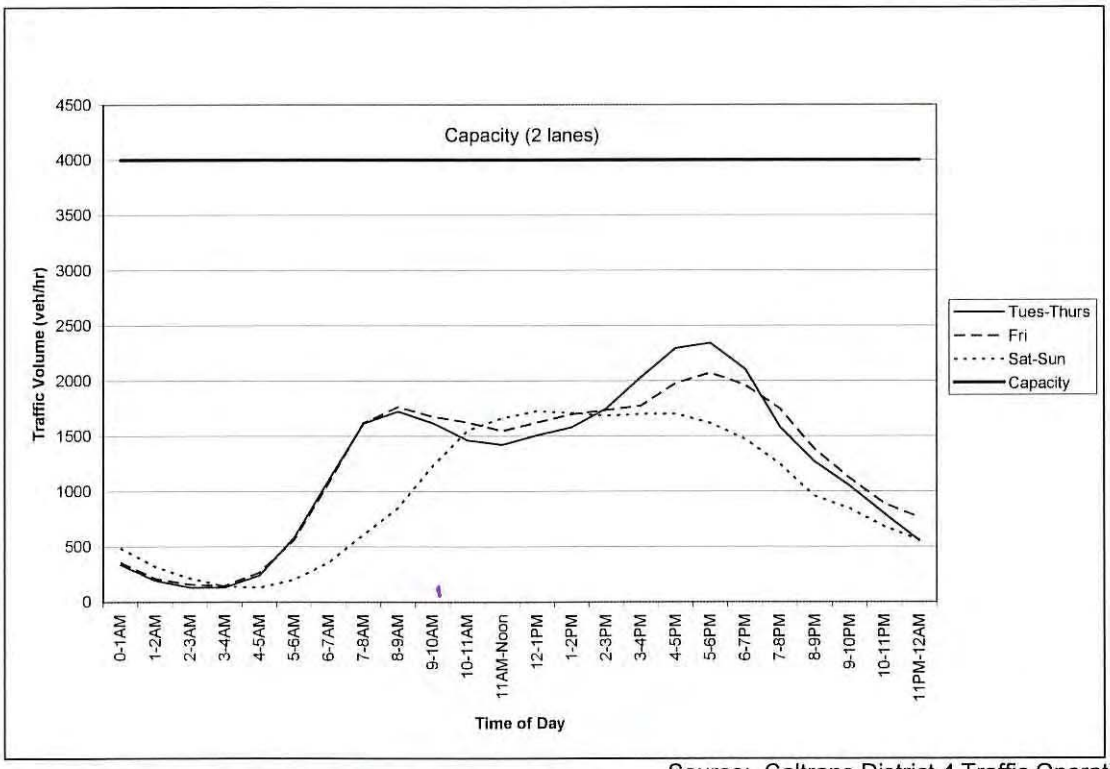
Source: Caltrans District 4 Traffic Operations

Figure 2-4 Fairfield: WB I-80 East of SR 12 (W)



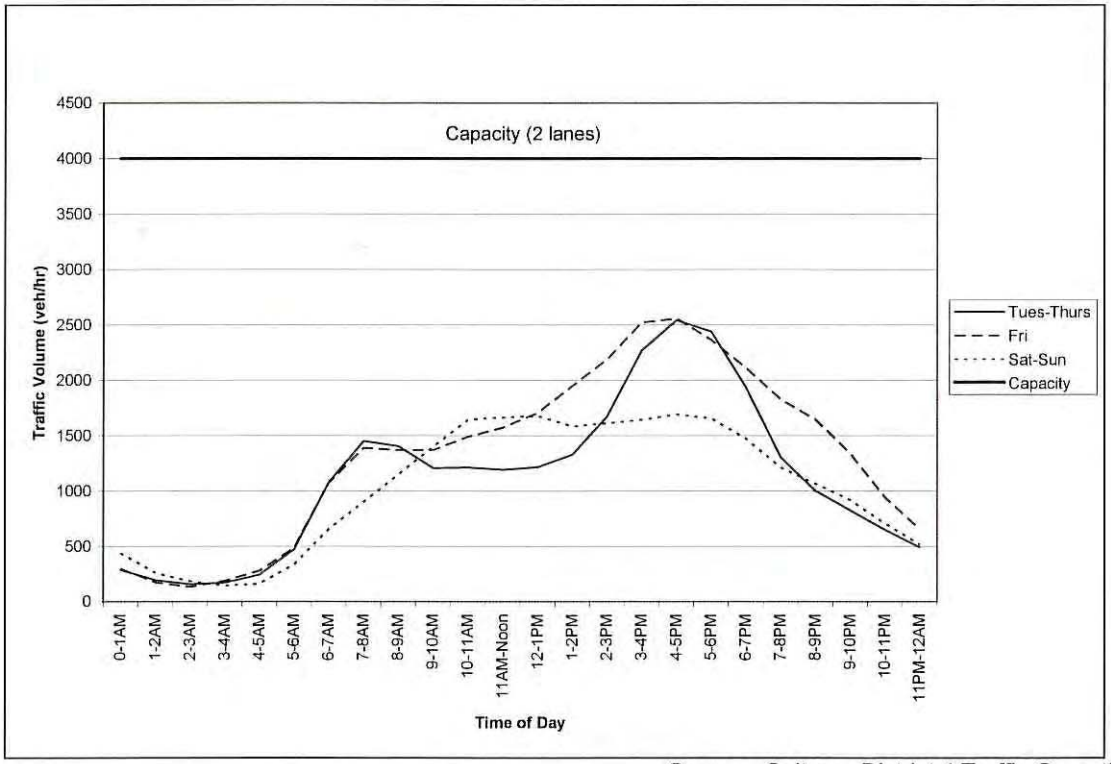
Source: Caltrans District 4 Traffic Operations.

Figure 2-5 Benicia: EB I-780 at West 7th Street



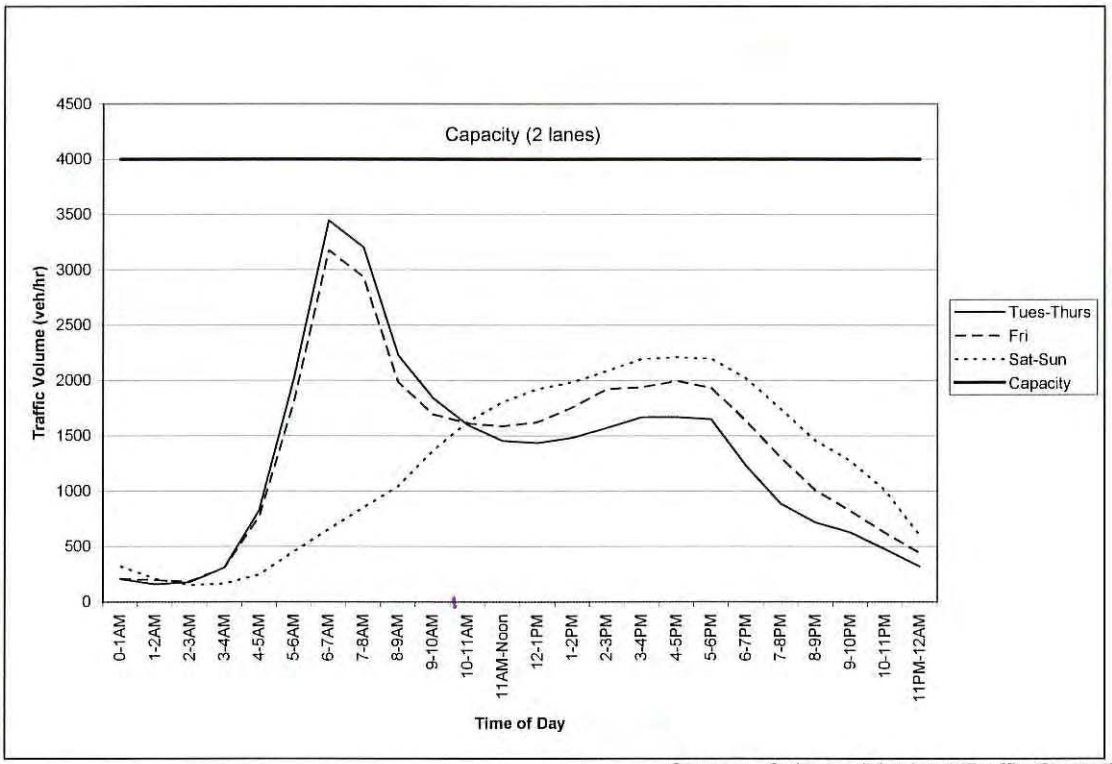
Source: Caltrans District 4 Traffic Operations.

Figure 2-6 Benicia: WB I-780 at West 7th Street



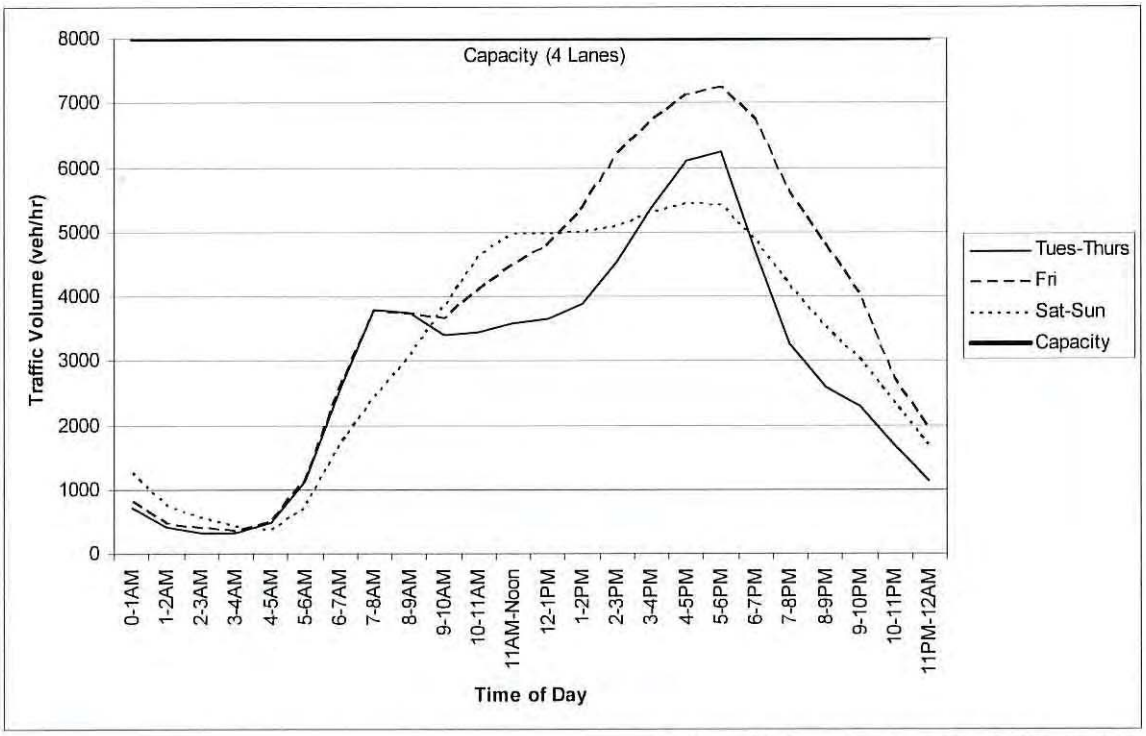
Source: Caltrans District 4 Traffic Operations.

Figure 2-7 Solano County: NB I-680 at Marshview Road



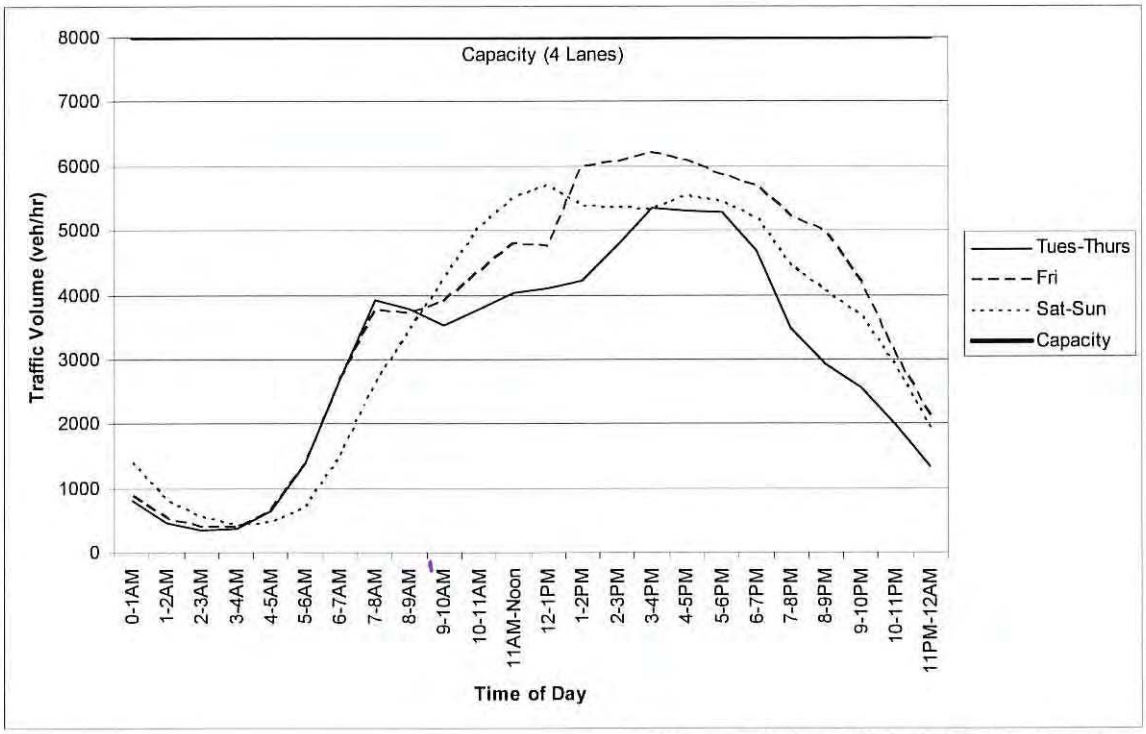
Source: Caltrans District 4 Traffic Operations.

Figure 2-8 Solano County: SB I-680 at Marshview Road



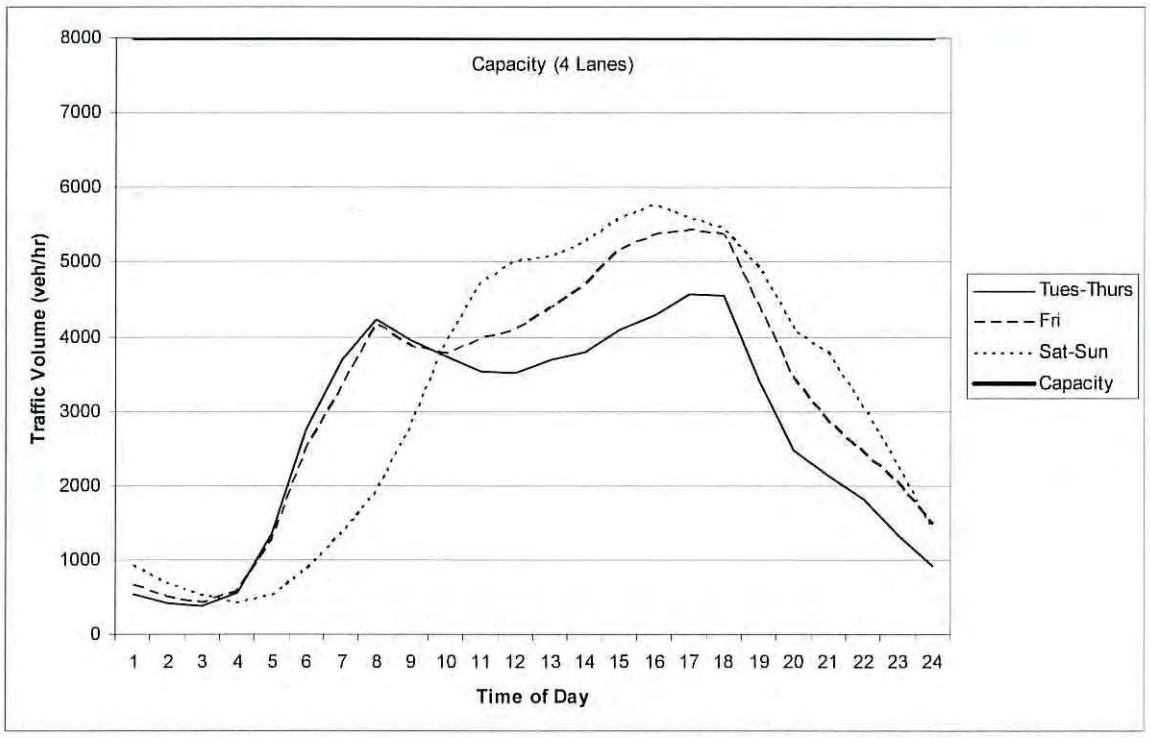
Source: Caltrans District 4 Traffic Operations.

Figure 2-9 Vacaville: EB I-80 East of Pleasant Valley Road/Pena Adobe Road



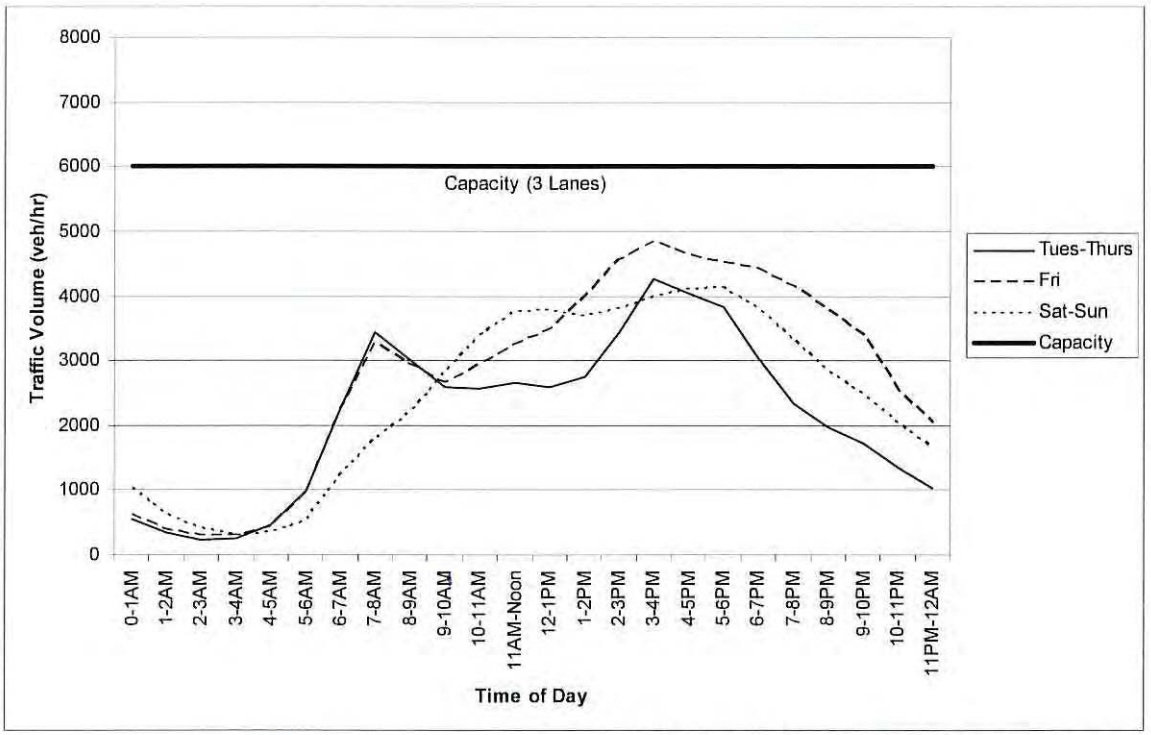
Source: Caltrans District 4 Traffic Operations.

Figure 2-10 Vacaville: EB I-80 West of Monte Vista Avenue



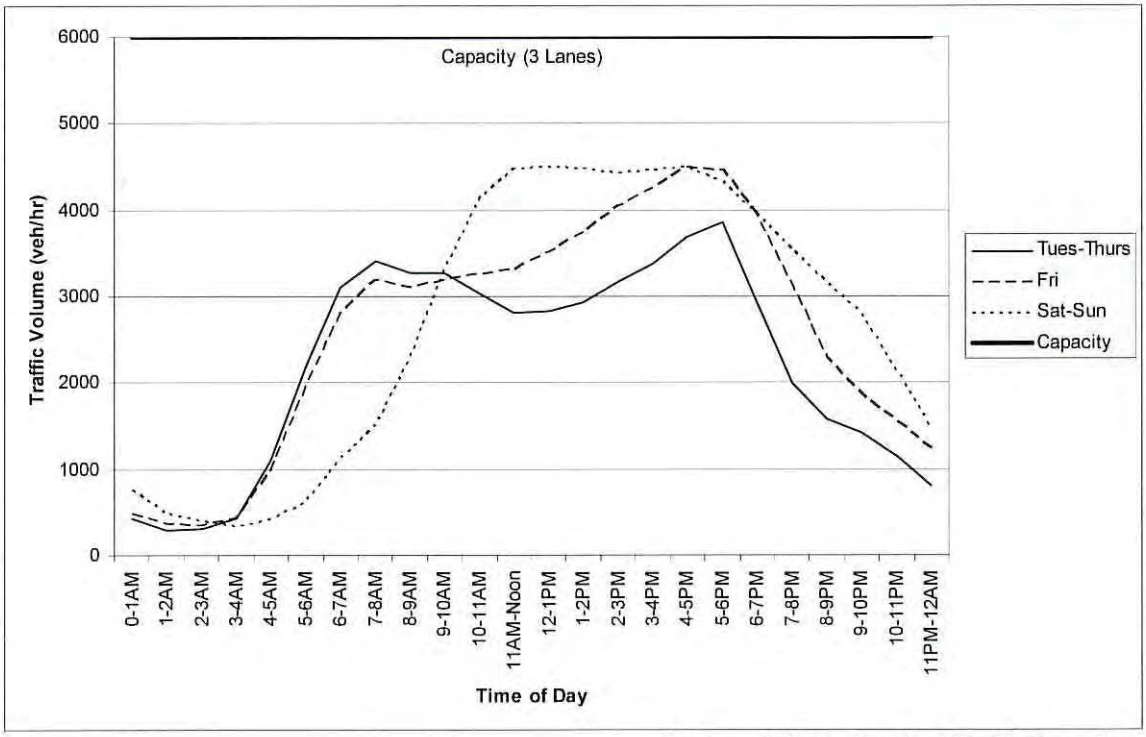
Source: Caltrans District 4 Traffic Operations.

Figure 2-11 Vacaville: WB I-80 West of Monte Vista Avenue



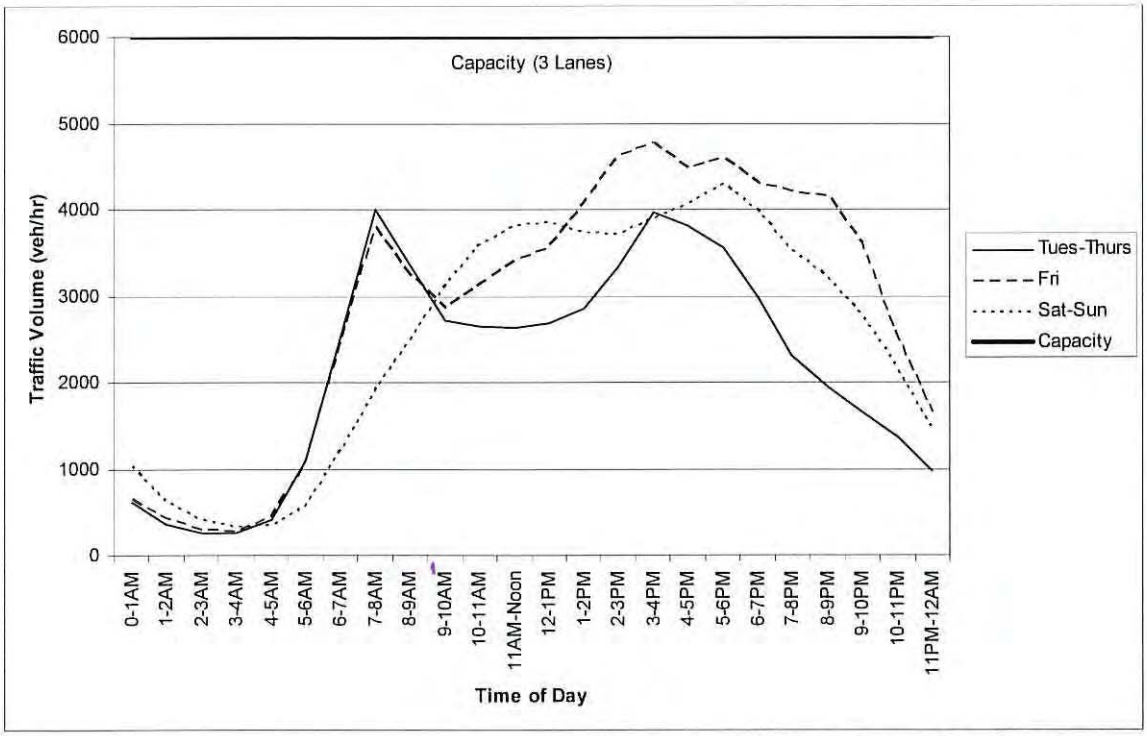
Source: Caltrans District 4 Traffic Operations.

Figure 2-12 Vacaville: EB I-80 East of Leisure Town Road



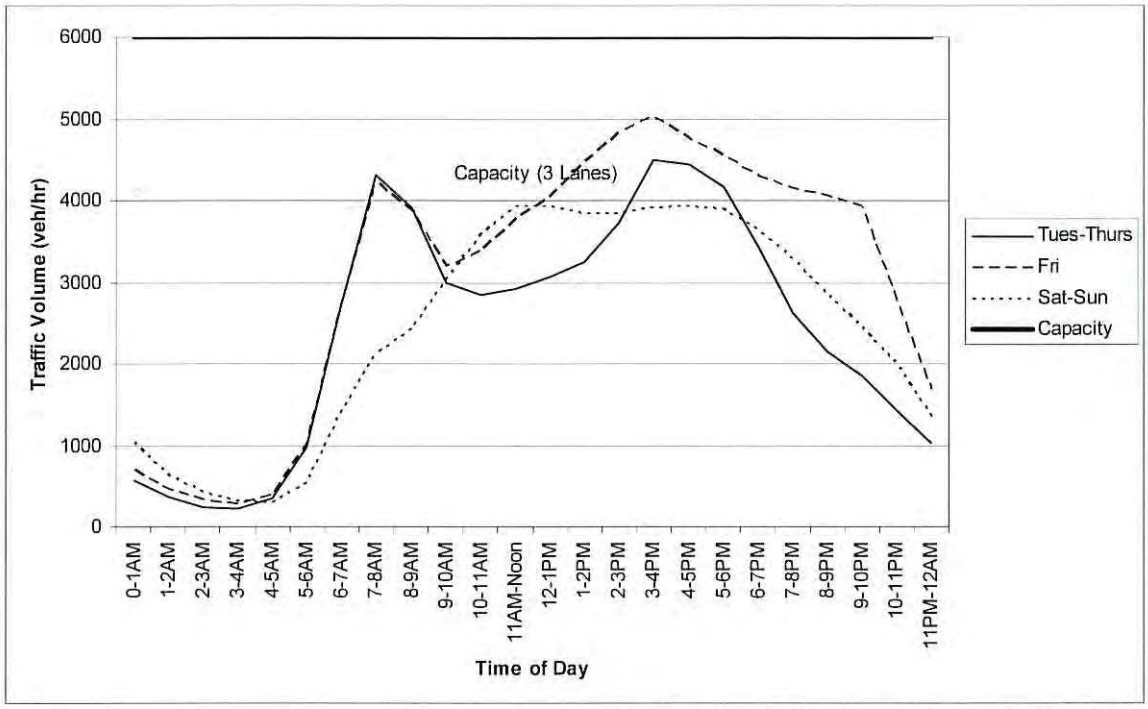
Source: Caltrans District 4 Traffic Operations.

Figure 2-13 Vacaville: WB I-80 East of Leisure Town Road



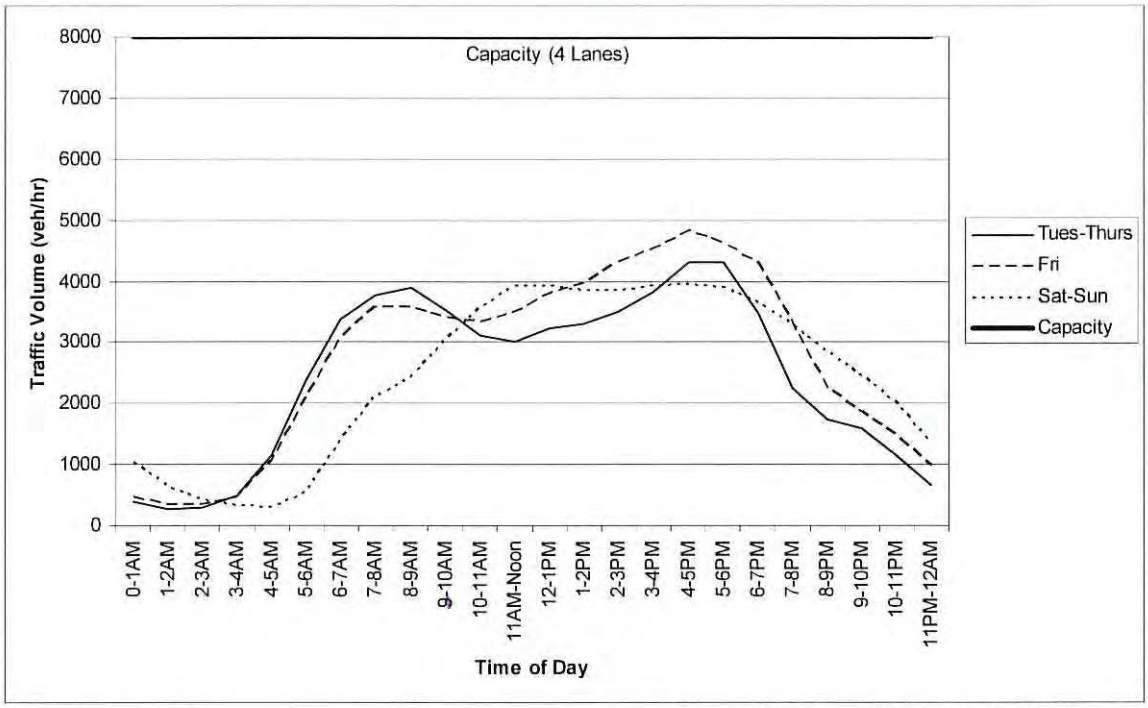
Source: Caltrans District 4 Traffic Operations.

Figure 2-14 Dixon: EB I-80 East of SR-113 South



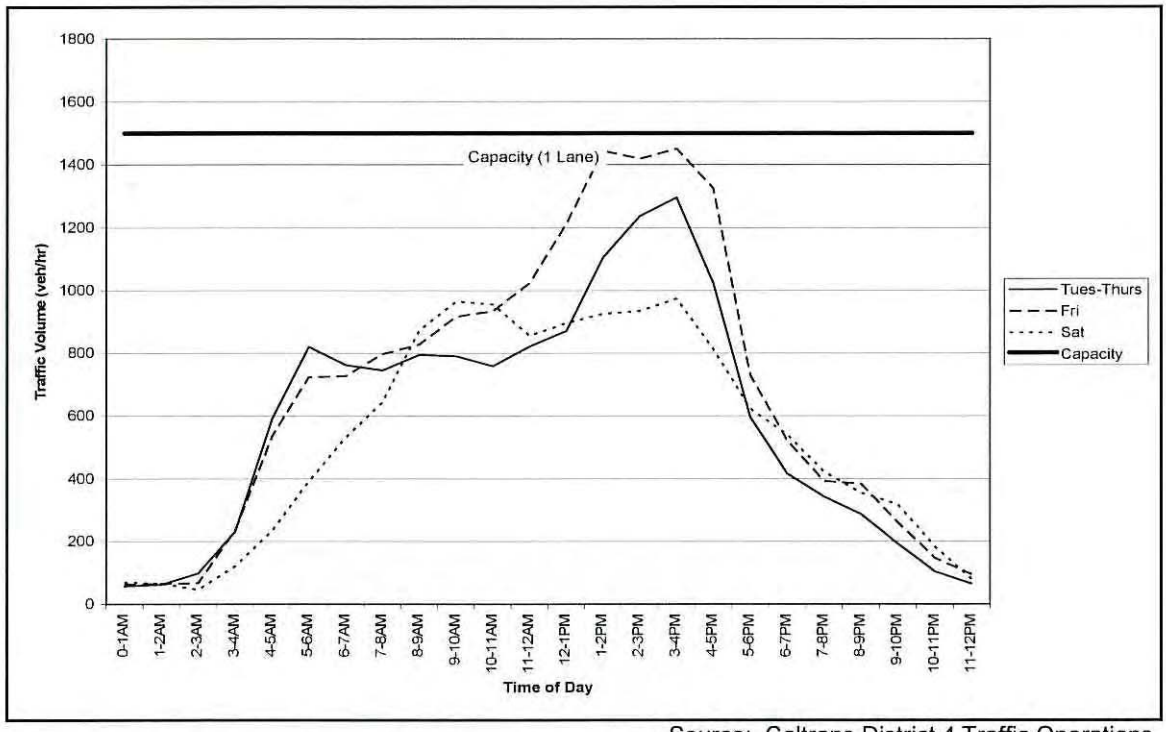
Source: Caltrans District 4 Traffic Operations.

Figure 2-15 Solano County: EB I-80 at Solano/Yolo County Line



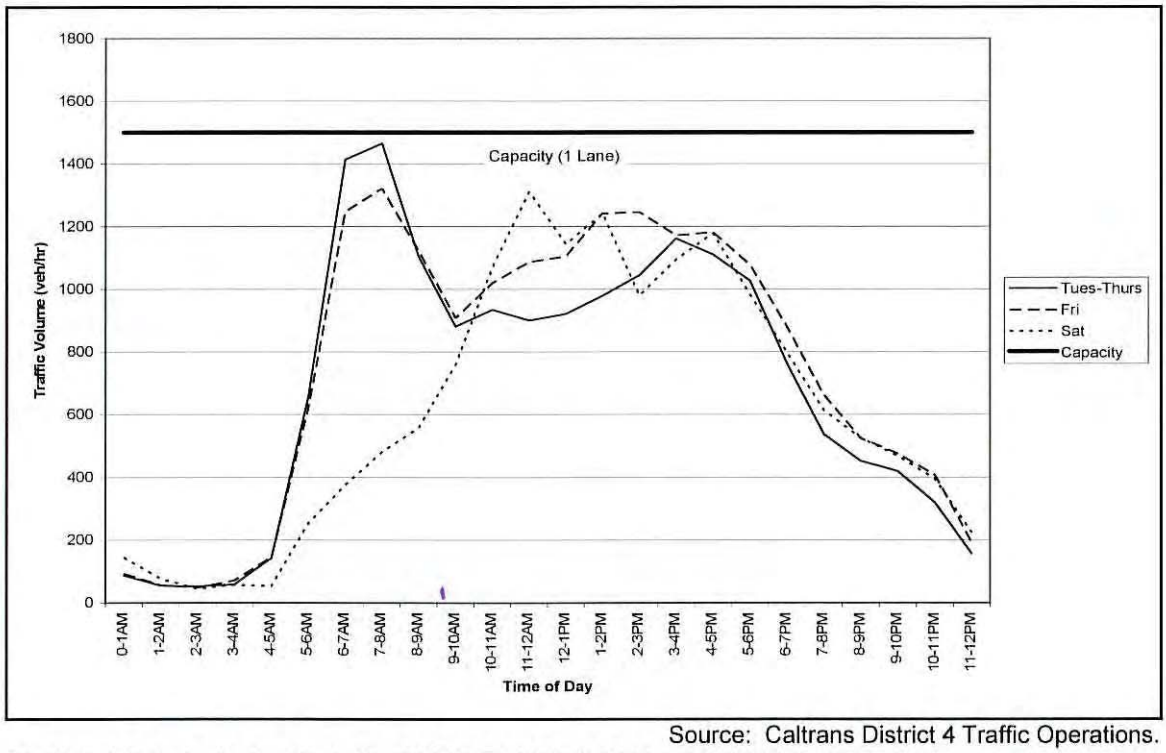
Source: Caltrans District 4 Traffic Operations.

Figure 2-16 Solano County: WB I-80 at Solano/Yolo County Line



Source: Caltrans District 4 Traffic Operations.

Figure 2-17 Solano County: EB SR 12(W) on-ramp at I-80



Source: Caltrans District 4 Traffic Operations.

Figure 2-18 Solano County: WB SR 12(W) off-ramp at I-80

2.1.2 Travel Time and Speed Data

Travel time surveys provide a measurement of the time required to traverse sections of the study corridors during peak hours. This data indicates the amount of delay, speeds and levels of congestion experienced by drivers for a typical weekday (Tuesday to Thursday) peak period. As part of their periodic survey efforts, Caltrans conducted morning and evening peak hour weekday travel time and speed surveys on I-80, I-680 and I-780 in March 2002. This type of study is performed using the "floating car" methodology, with a vehicle traveling in the center lane of traffic on the freeway. Thus, turbulence created from the backup of on- and off-ramps into the rightmost travel lane is not necessarily represented. These travel time surveys are used to assess existing peak hour bottlenecks and queues in the study corridor.

Additional weekday travel time surveys in Segment 1 were performed by Korve Engineering in 2001. Westbound I-80 from Abernathy Road to SR 12 (W) exit was observed on Wednesday, May 16, 2001 during the morning peak hour. Northbound I-680 from Gold Hill to the eastbound I-80/SR 12 (E) exit was observed on Thursday, May 3, 2001 during the evening peak hour. Additional travel time runs were conducted on Friday to compare the delays to a typical weekday.

In the westbound direction on I-80 in the morning peak period, traffic does not experience significant delay until it reaches the West Texas Street interchange. Speeds continue to drop from 65 mph to approximately 5 to 30 mph west of SR 12 East. Travel speeds in the rightmost I-80 lane deteriorate from the I-680 off-ramp to the SR 12 (W) exit. In effect, this lane becomes a defacto exit lane. Travel speeds slow at the Green Valley off-ramp and are further reduced at the SR 12 (W) off-ramp. Slow travel speeds are exacerbated in this location by slow moving trucks climbing the steep 5 percent grade on SR 12 (W) west of the SR 12 (W)/Red Top intersection. This single westbound lane on SR 12 (W) does not have sufficient capacity to serve the traffic demand and results in queues on I-80 in the rightmost travel lane. These ramp queues do not delay mainline traffic flows for vehicles traveling west on I-80.

I-80 traffic also experiences significant morning peak hour delay upon reaching the I-80/I-780 junction. Considerable traffic from both freeways is traveling toward the Carquinez Bridge and speeds drop to 30 mph near Georgia Street and then to 10 mph as I-80 reaches I-780. After the SR-29 southbound merge point, speeds rise to 35 mph.

On I-680 during the morning peak hour, traffic is at the speed limit from I-80 (Fairfield) to Industrial Way, where speeds begin a pattern of sharp rising and falling until the I-780 interchange. Speeds on I-780 slow to about 20 mph at East 2nd Street and continue at this pace until reaching the I-680 interchange.

In the evening peak hour, queues develop on eastbound I-80 east of Red Top Road due to the merger of I-80 downstream with northbound I-680 at the I-80/I-680 interchange. After traversing the interchange congestion, eastbound speeds on I-80 rise to 40 mph at the Beck Avenue on-ramp and drop again to 10 mph east of the Travis Boulevard interchange. Traffic returns to the 65 miles per hour speed limit east of the Air Base Parkway interchange. No significant traffic delays are currently experienced east of the Air Base Parkway interchange. Travel speeds fluctuate between 60 and 65 mph in both directions east of Air Base Parkway.

During the evening peak hour on a typical weekday, traffic on northbound I-680 experiences no delay or congestion north of the Benicia Bridge until it reaches the back of the queue near the Cordelia Road off-ramp. This queue is caused by the lack of capacity at the I-80/I-680 merge point and congestion on mainline I-80. After the I-80/I-680 merge, the travel speed gradually increases from less than 10 mph to 48 mph at the SR 12 (E) exit.

I-780 flows smoothly, at about 60 mph, along its entirety during the evening peak period.

2.1.3 Bottlenecks and Queues

The travel time and speed survey data described in Section 2.1.2 was referenced along with the traffic volumes from Section 2.1.1 to pinpoint queue and bottleneck locations along the three study freeways. As shown in Figure 2-19, queues and congestion occur at the following locations:

A.M. Peak Hour

1. WB I-80 – West Texas Street to Suisun Valley Road (Segment 1 and 6)
2. WB I-80 – Georgia Street to Carquinez Bridge Toll Plaza (Segment 2)
3. EB I-780 – I-680 to East 2nd Street (Segment 3)
4. SB I-680 – Industrial Way to Benicia Bridge Toll Plaza (Segment 4)

P.M. Peak Hour

1. EB I-80 – SR 12 (W) to Cordelia Truck Scales (Segment 1)
2. NB I-680 – South of Cordelia Road to I-80 (Segment 4)
3. EB I-80 – West Texas Street to Air Base Parkway (Segment 6)

Figure 2-20 illustrates the locations of the bottlenecks which create the queues and congestion presented above.

The I-80/I-680 junction and the Truck Scales in Cordelia create major congestion on I-80 in Fairfield during both the a.m. and p.m. peak periods. In Segment 6, a.m. peak hour congestion extends from the I-80/I-680 junction to West Texas Street, a distance of nearly 4.5 miles. Heavy westbound on-ramp volumes from the SR 12 (E) and Air Base Parkway interchanges also contribute to the congestion during the a.m. peak period. During the p.m. peak periods, heavy eastbound on-ramp volumes from the SR 12 (W) and the truck queues combines to create congestion on eastbound I-80 in Segment 1, while the heavy on- and off-ramp traffic along eastbound I-80 from West Texas Street to Air Base Parkway create congestion in Segment 6.

Heavy ramp volumes, high mainline volumes and substandard geometries create capacity constraints at the I-80/I-780 and I-780/I-680 junctions. Traffic congestion is worsened in Segments 3 and 4 by slow moving vehicles traveling to and from the Benicia Bridge and the toll plaza at the bridge's northern end, and in Segment 2 by the same conditions at the Carquinez Bridge toll plaza.

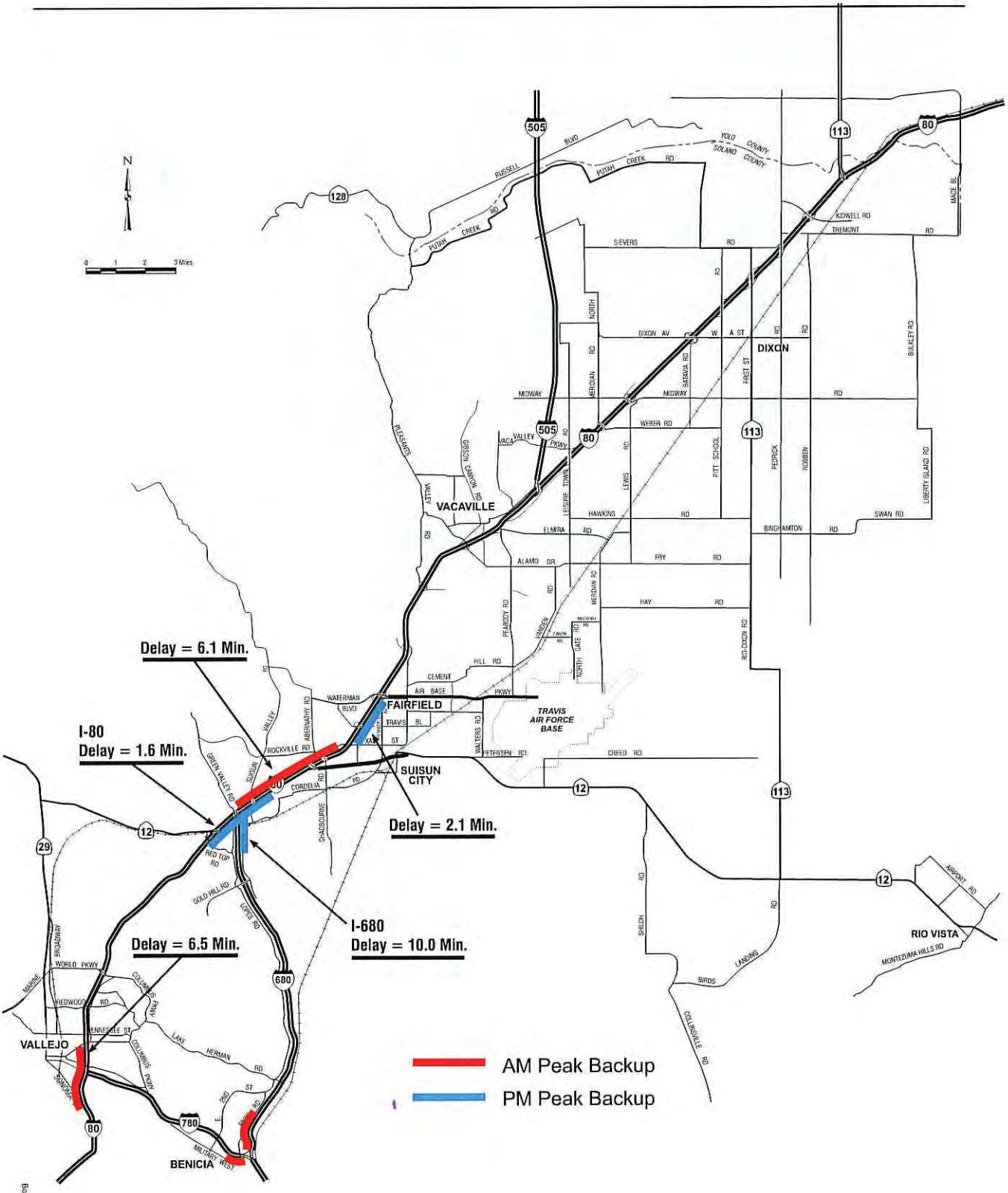
To illustrate the extent of traffic congestion, Table 2-6 shows the traffic speeds at selected points along the study corridors. For I-80, the distances are measured relative

to the Carquinez Bridge. I-680 and I-780 are measured relative to the Benicia Bridge. Figure 2-18 illustrates current levels of delay resulting from bottlenecks.

Table 2-6 Segment Speeds

Location		a.m.		p.m.	
		Speed (mph)	Postmile	Speed (mph)	Postmile
I-80		Westbound		Eastbound	
	Carquinez Bridge toll plaza	20-40	0.55		
	Toll plaza to I-780			10-35	<2.04
	Magazine Street/I-780	45-55	<2.45		
	East of I-780			30	2.45
	Columbus Pkwy./SR-37	50	<6.08		
	Red Top Road	50	11.20		
	I-680	10-30	13.07	5-30	12.6
I-680		Southbound		Northbound	
	Benicia Bridge toll plaza	0-30	0.60	20+	0.60
	Cordelia Road			0-25	11.80
	I-80	43	12.72	10	12.60
I-780		Eastbound		Westbound	
	I-680	0-30	0.55	50	0.55
	East 2nd Street	<10	1.75		

Source: *Travel Time and Speed,* Caltrans District 4 Traffic Operations (March 1-2, 2002).



Bottlenecks&Queues 3.cdr

2-20-04

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-19

EXISTING WEEKDAY BOTTLENECKS AND QUEUES

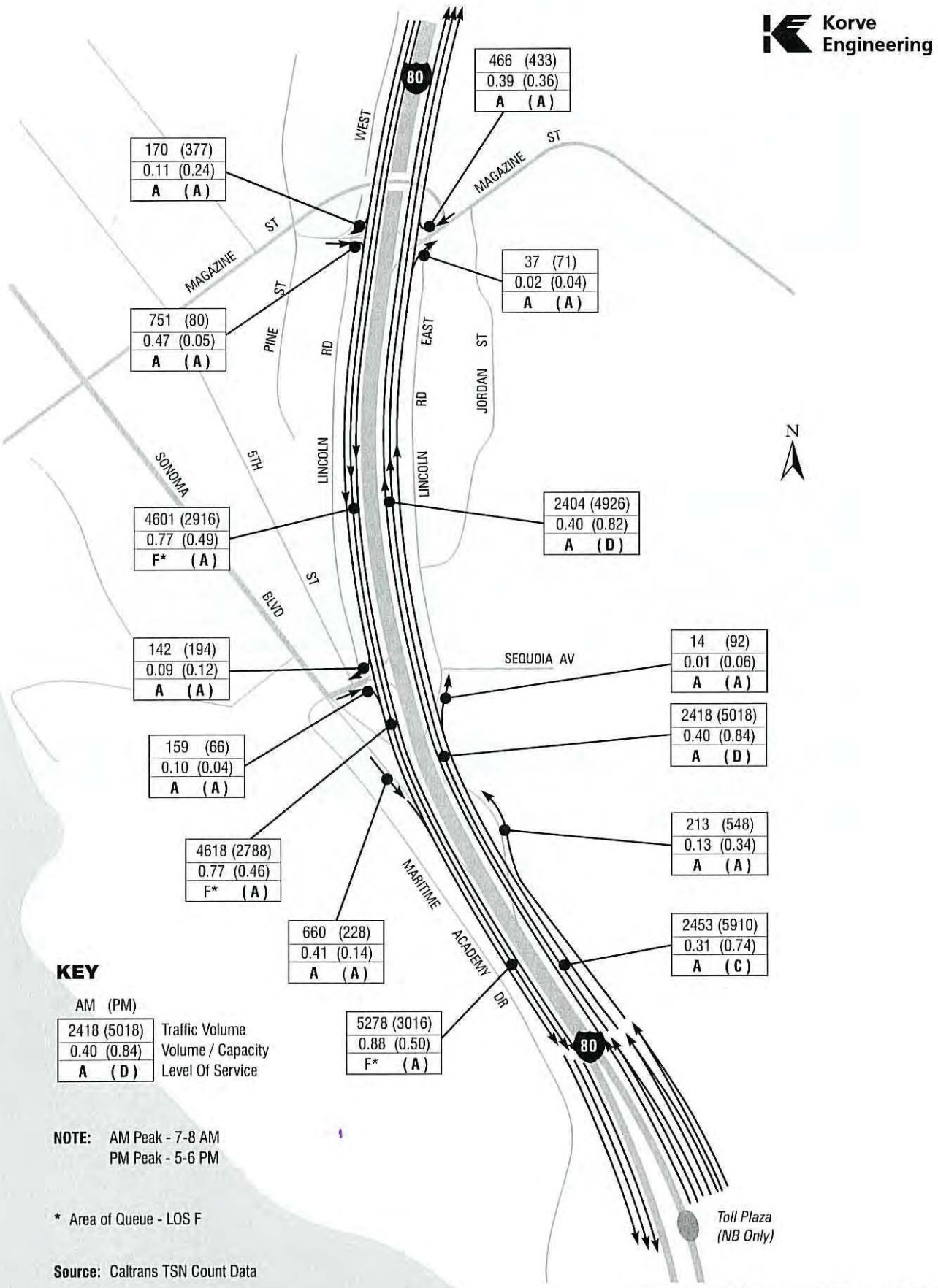
2.1.4 Level of Service

Operating characteristics of freeway components are described by the concept of Level of Service (LOS). LOS classifications for freeway sections are based on the ratio of actual traffic volumes to the available capacity on a segment of the roadway. LOS is a qualitative description of the freeway component's performance based on the volume-to-capacity (V/C) ratio. All of the analysis was based on the typical midweek weekday a.m. and p.m. peak hour traffic volumes. The relationship of V/C ratio to LOS is as follows:

V/C Ratio	LOS
<0.60	A
0.60-0.69	B
0.70-0.79	C
0.80-0.89	D
0.90-0.99	E
>1.0	F

Service levels range from A, which indicates free flow or excellent conditions, to F, which indicates breakdown in vehicular flow. The capacity for one freeway lane is assumed to be 2,000 vehicles per lane per hour (vplph). On- and off-ramps are assumed to have a capacity of 1,600 vplph for diamond interchanges and 1,200 vplph for clover/loop interchanges. Two-lane ramps are assumed to have a capacity of 3,000 vplph (equal to 1.5 times the capacity of one through lane). V/C ratios and LOS ratings for each of the freeway sections and ramps are shown on Figure 2-20 through Figure 2-42. These figures also show the a.m. and p.m. peak hour traffic volumes for selected locations in Segments 1-7.

Because of the breakdown in travel speeds and flows, calculated volume to capacity ratios will be artificially low in areas of queue. This topic is discussed in detail in Section 4. To account for these conditions, sections under queue are denoted by LOS F* in Figure 2-20 through Figure 2-42.

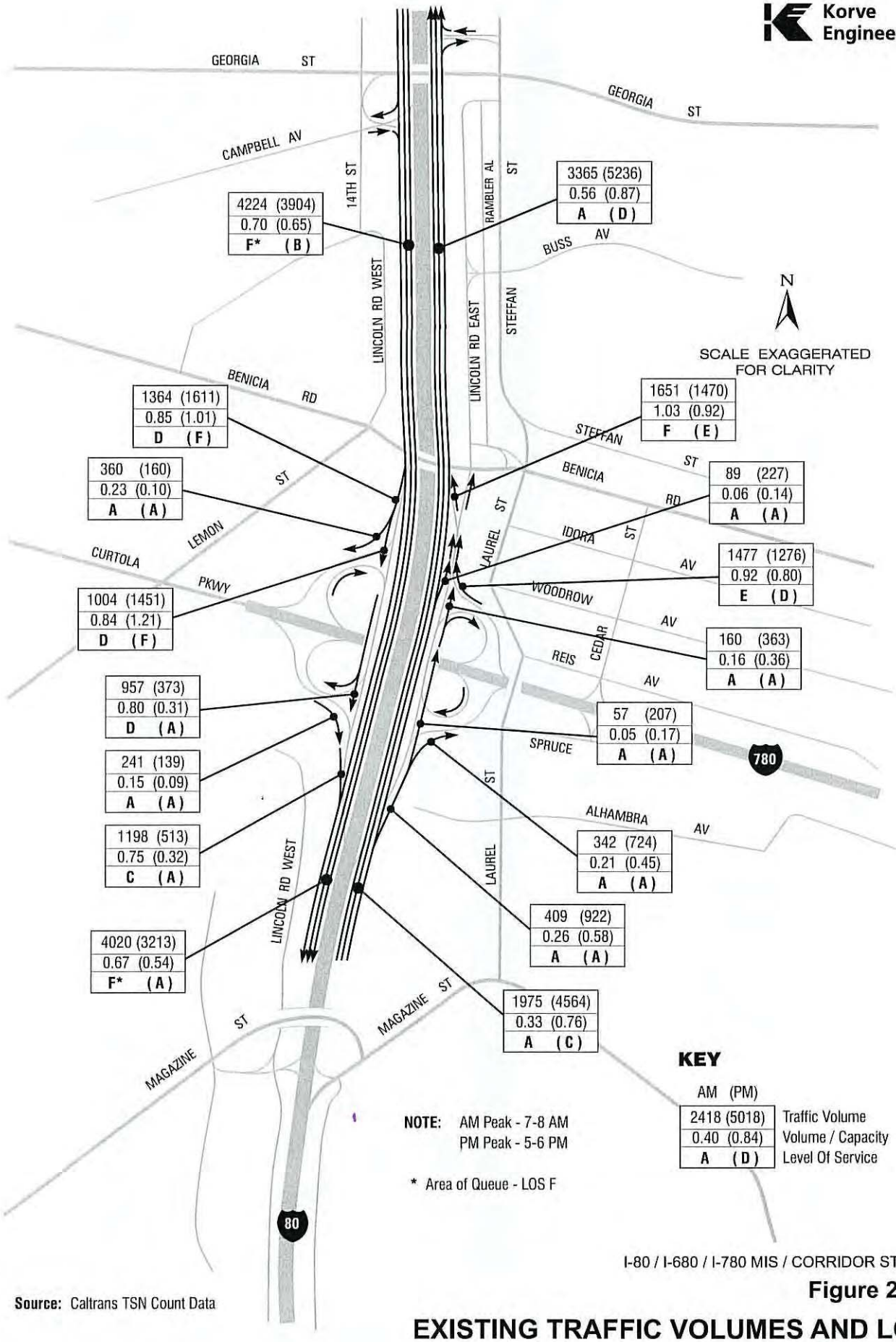


I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-20

EXISTING TRAFFIC VOLUMES AND LOS
Segment 2

Seg 2-1 Ramp Vols.cdr



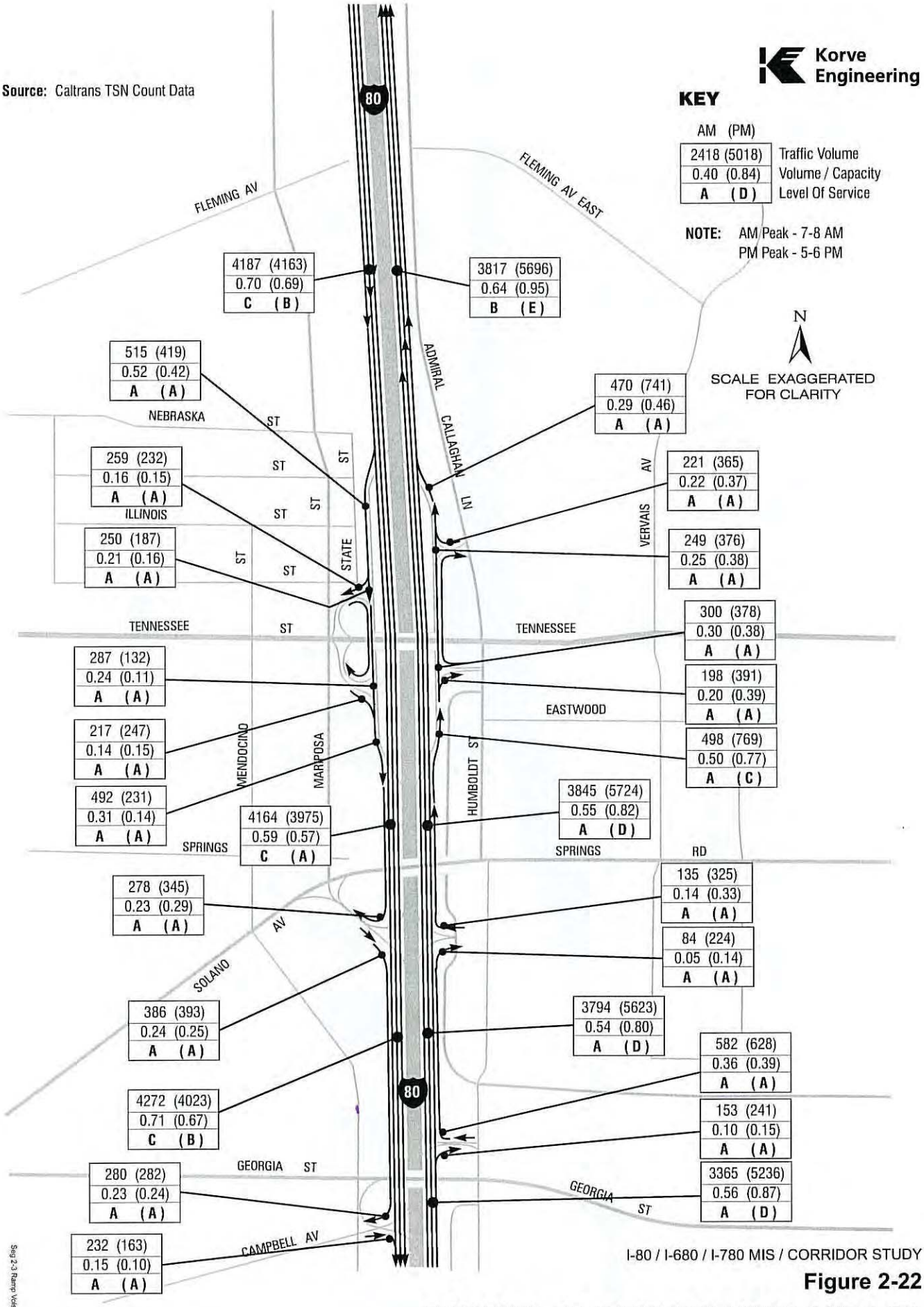
Source: Caltrans TSN Count Data

Seg 2-2 Ramp Vols.cdr

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-21

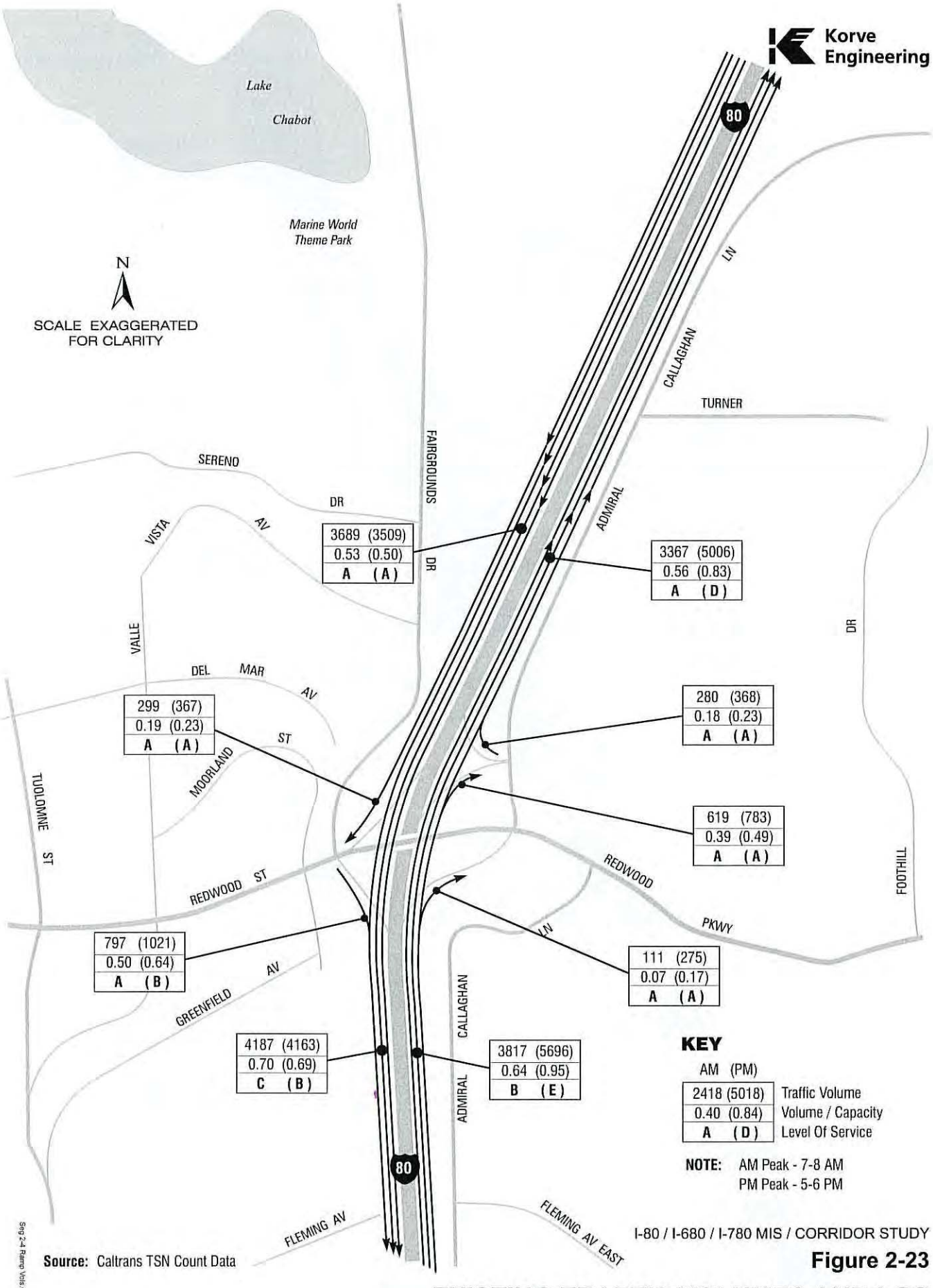
EXISTING TRAFFIC VOLUMES AND LOS
Segment 2
(cont'd)



I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-22

EXISTING TRAFFIC VOLUMES AND LOS
Segment 2
(cont'd)



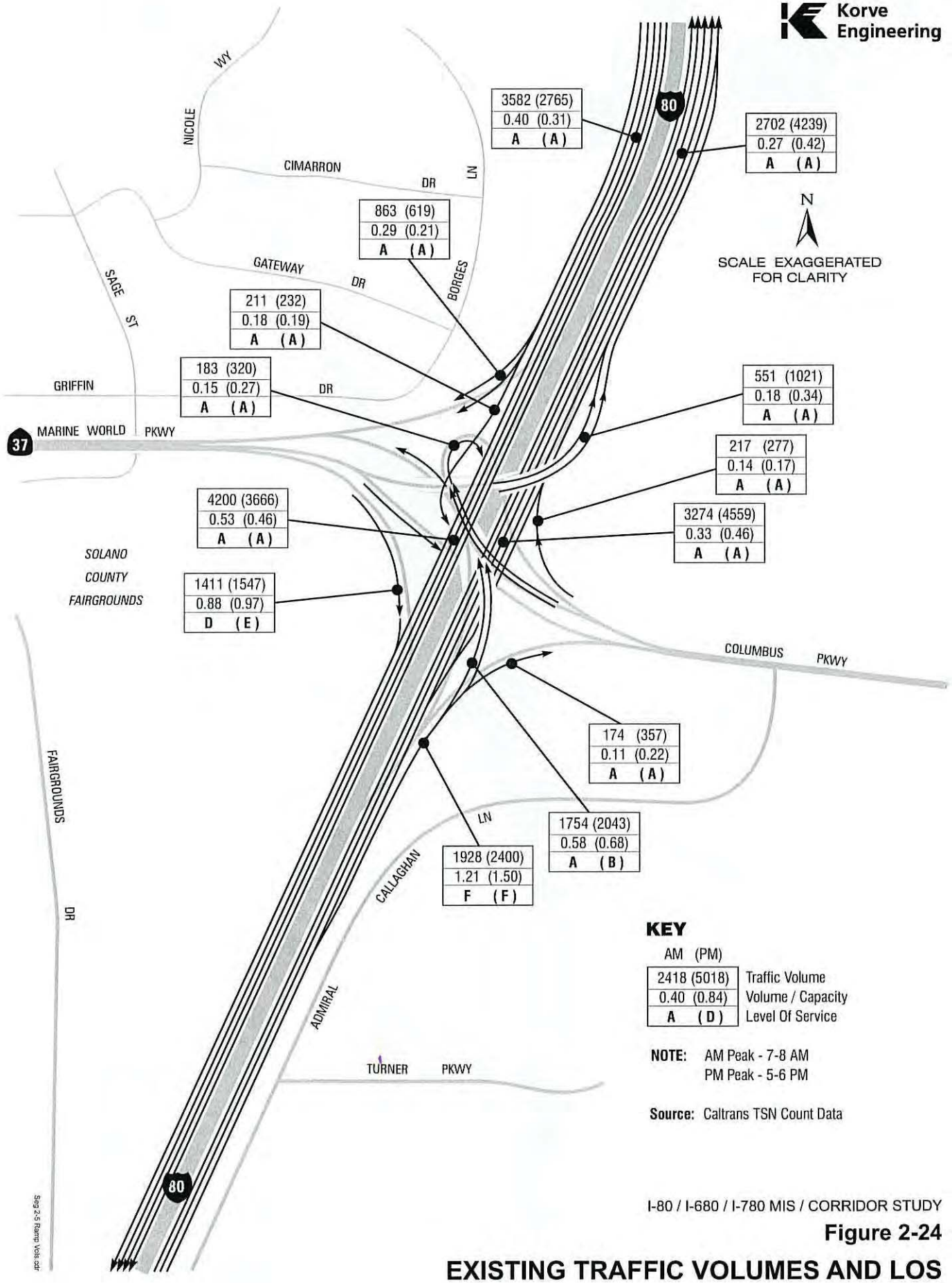
Seg 2-4 Ramp Vols.cdr

Source: Caltrans TSN Count Data

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-23

EXISTING TRAFFIC VOLUMES AND LOS
Segment 2
(cont'd)

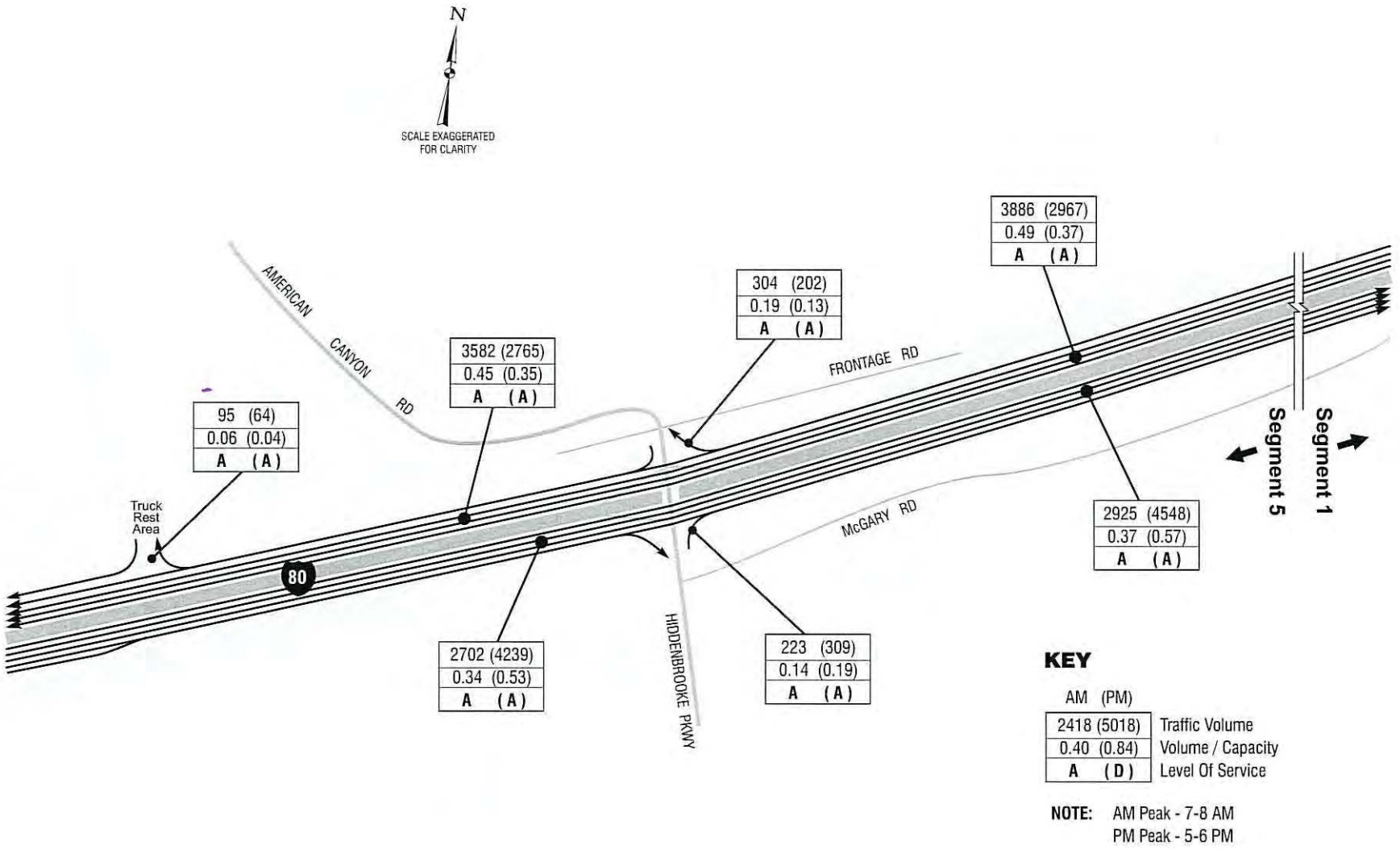


I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-24

EXISTING TRAFFIC VOLUMES AND LOS
Segment 2
(cont'd)

Seg 2-5 Ramp Vols.cdr



Source: Caltrans TSN Count Data

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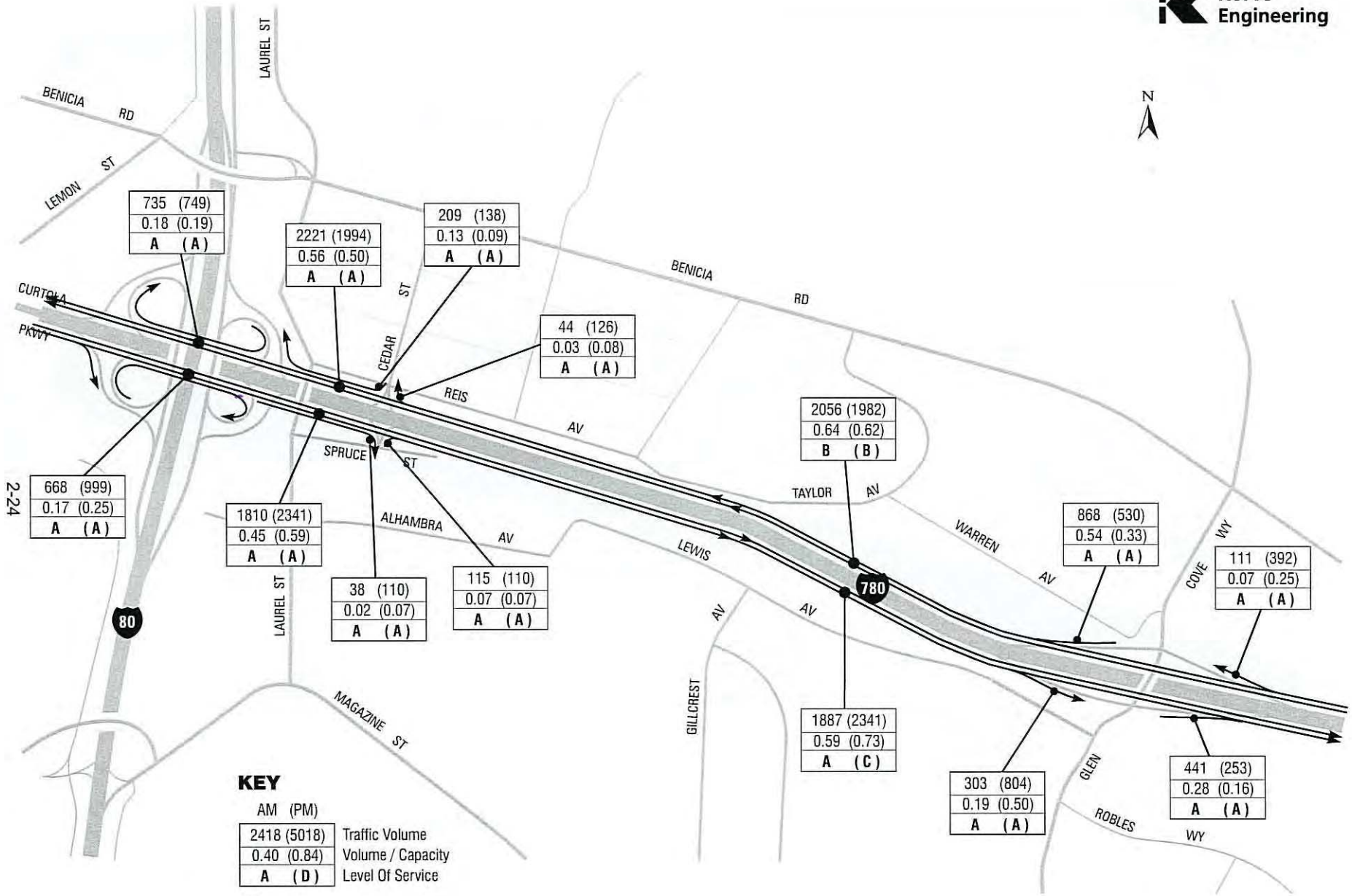
I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-25

EXISTING TRAFFIC VOLUMES AND LOS
Segment 5



NOTE: AM Peak - 7-8 AM
PM Peak - 5-6 PM

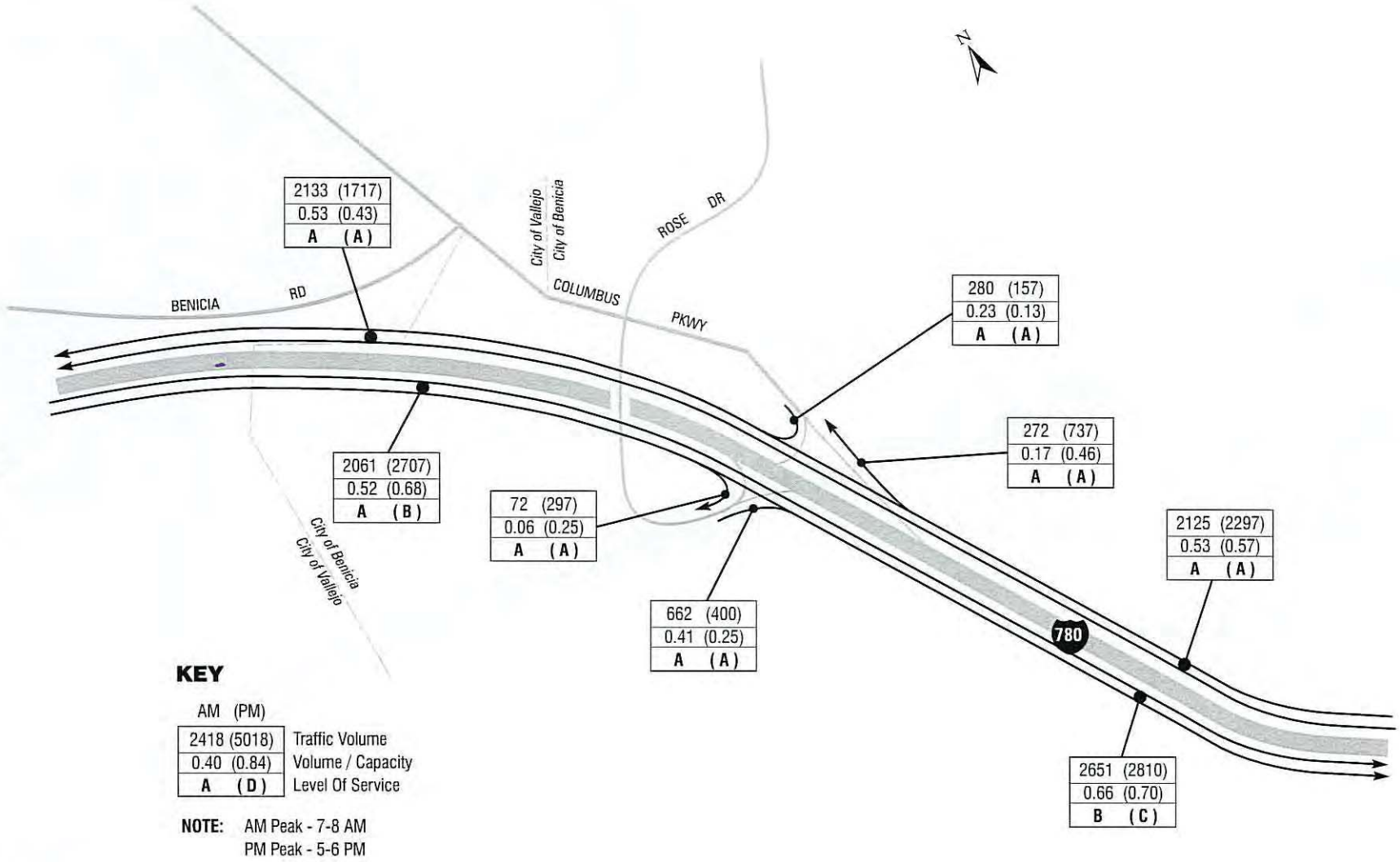
Source: Caltrans TSN Count Data

Seg 3-1 Ramp Vols.cdr

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-26

EXISTING TRAFFIC VOLUMES AND LOS
Segment 3



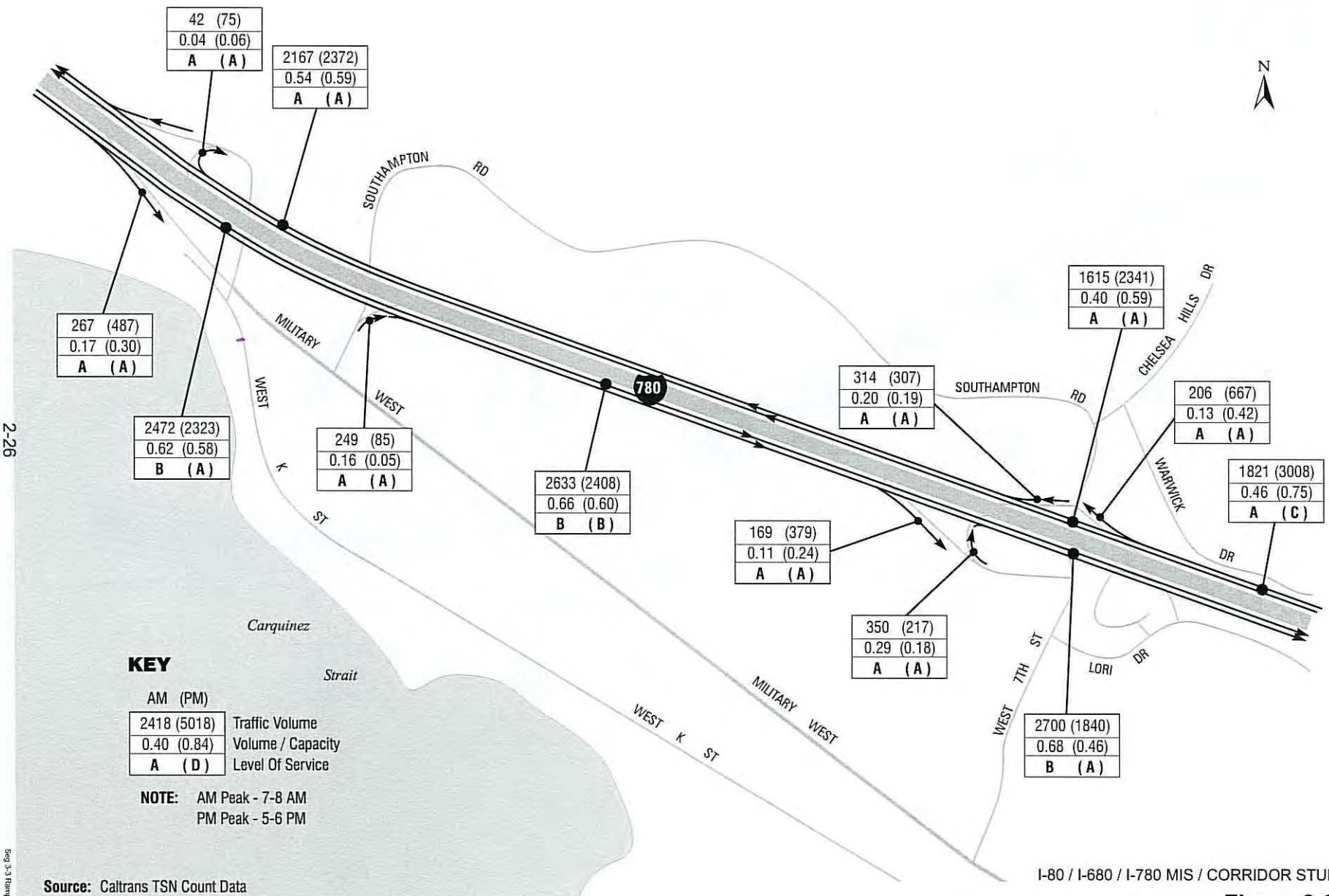
Source: Caltrans TSN Count Data

Seg 3-2 Ramp Vols.cdr

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-27

EXISTING TRAFFIC VOLUMES AND LOS
Segment 3
(cont'd)

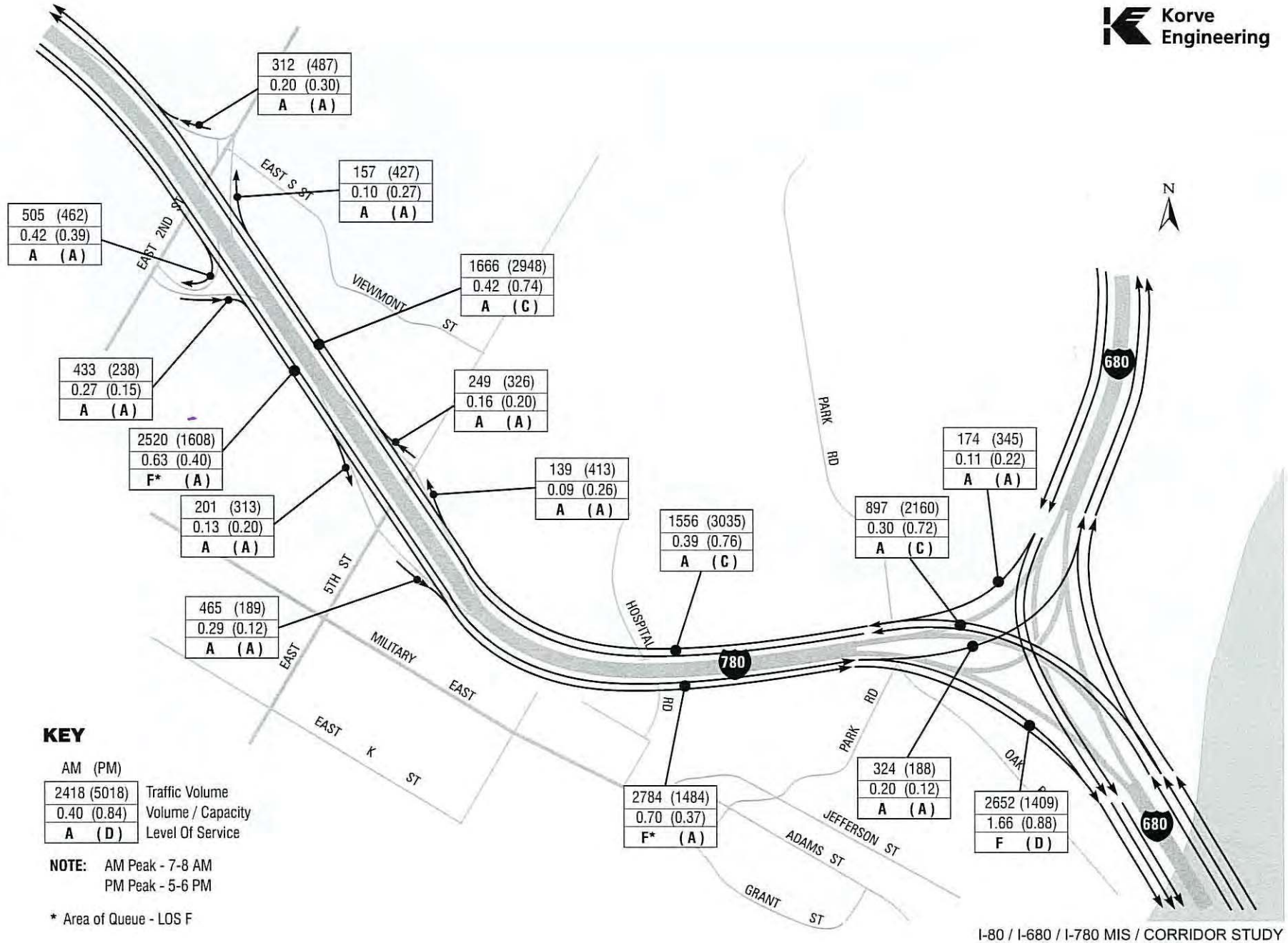


Seg 3-3 Ramp Vols.cdr

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-28

EXISTING TRAFFIC VOLUMES AND LOS
Segment 3
(cont'd)



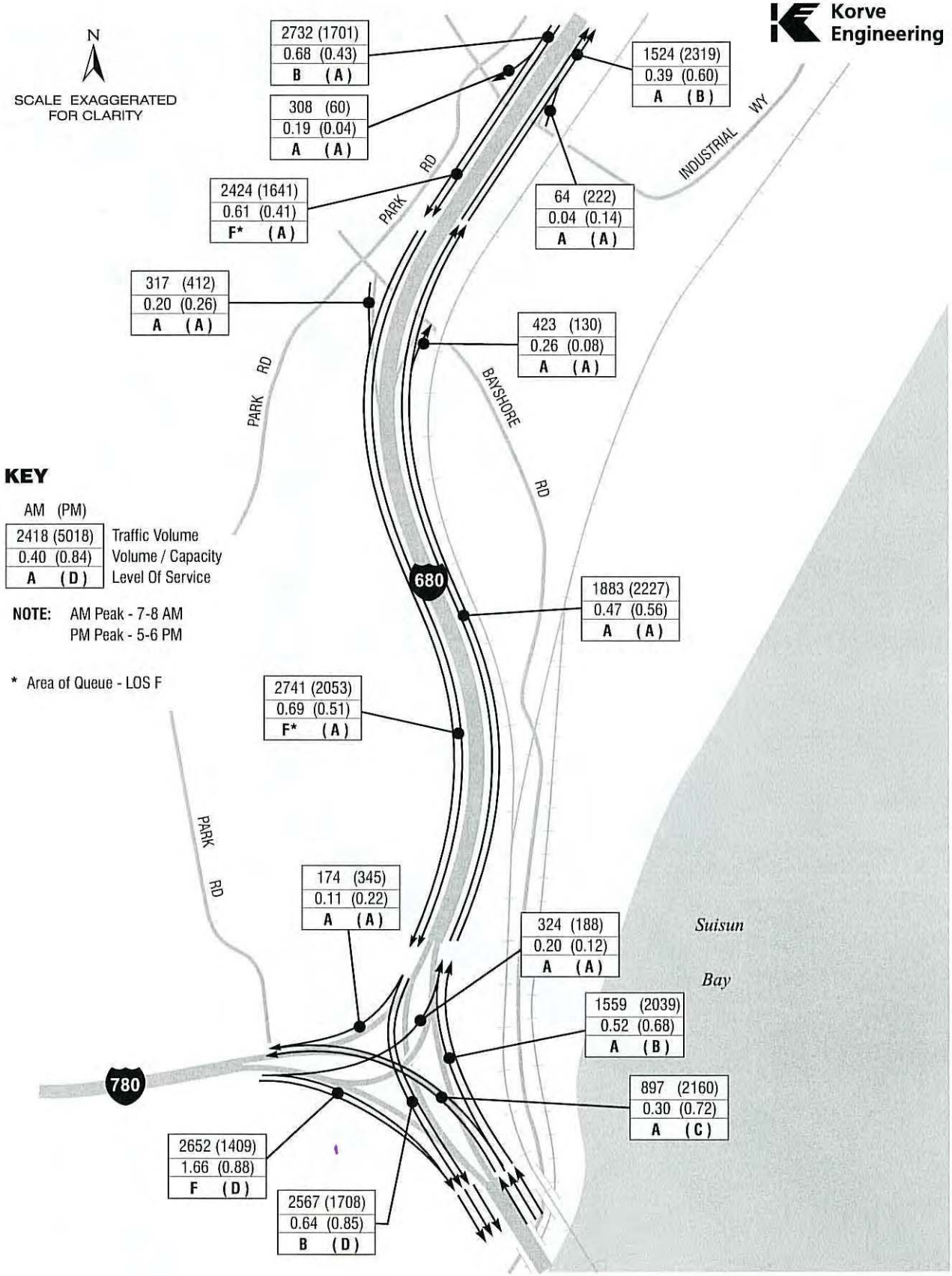
Source: Caltrans TSN Count Data

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-29

EXISTING TRAFFIC VOLUMES AND LOS
Segment 3
(cont'd)

Seg 3-4 Ramp Vols.cdr



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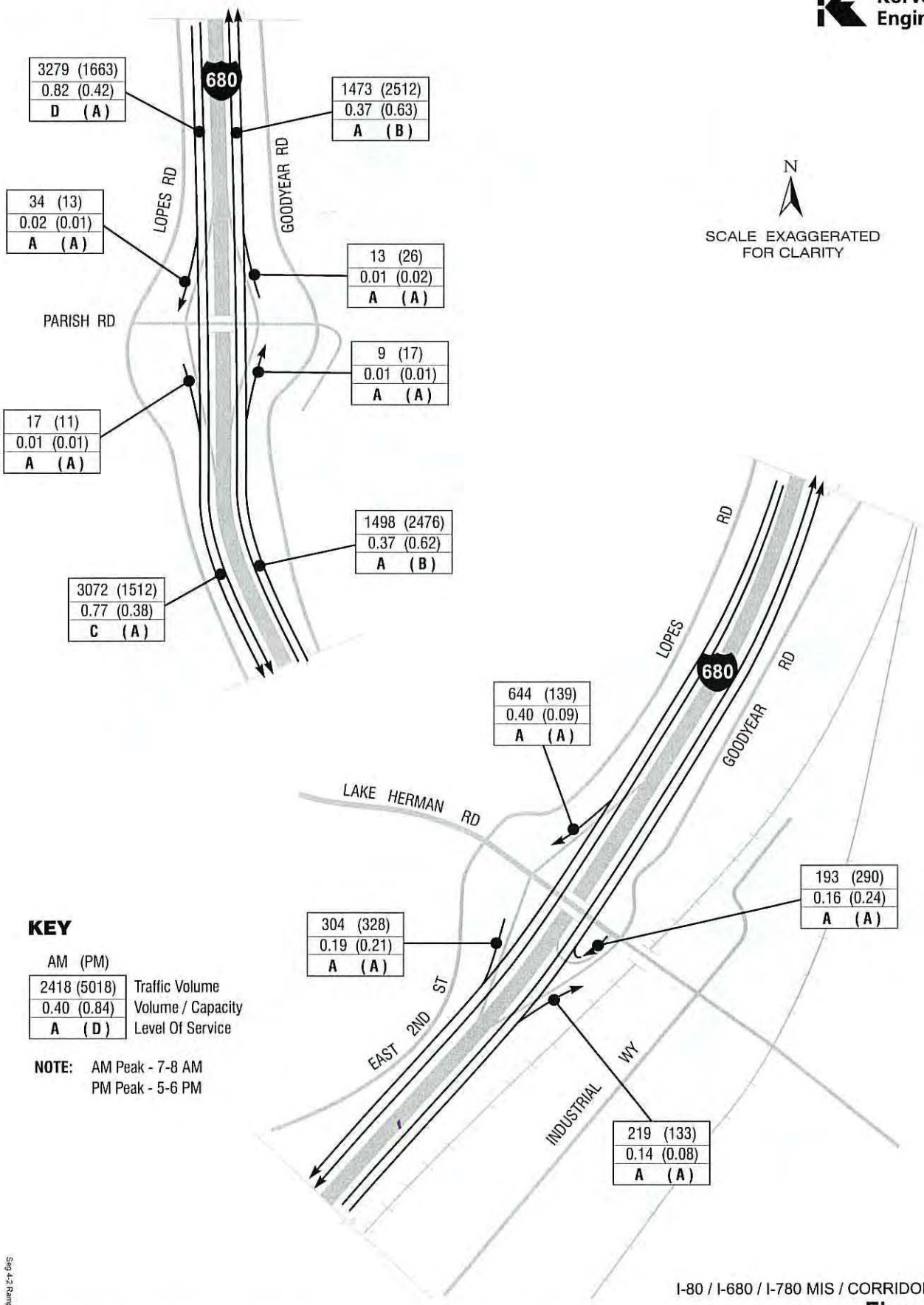
Seg 4-1 Ramp Vols.cdr

Source: Caltrans TSN Count Data

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-30

EXISTING TRAFFIC VOLUMES AND LOS
Segment 4



Source: Caltrans TSN Count Data

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

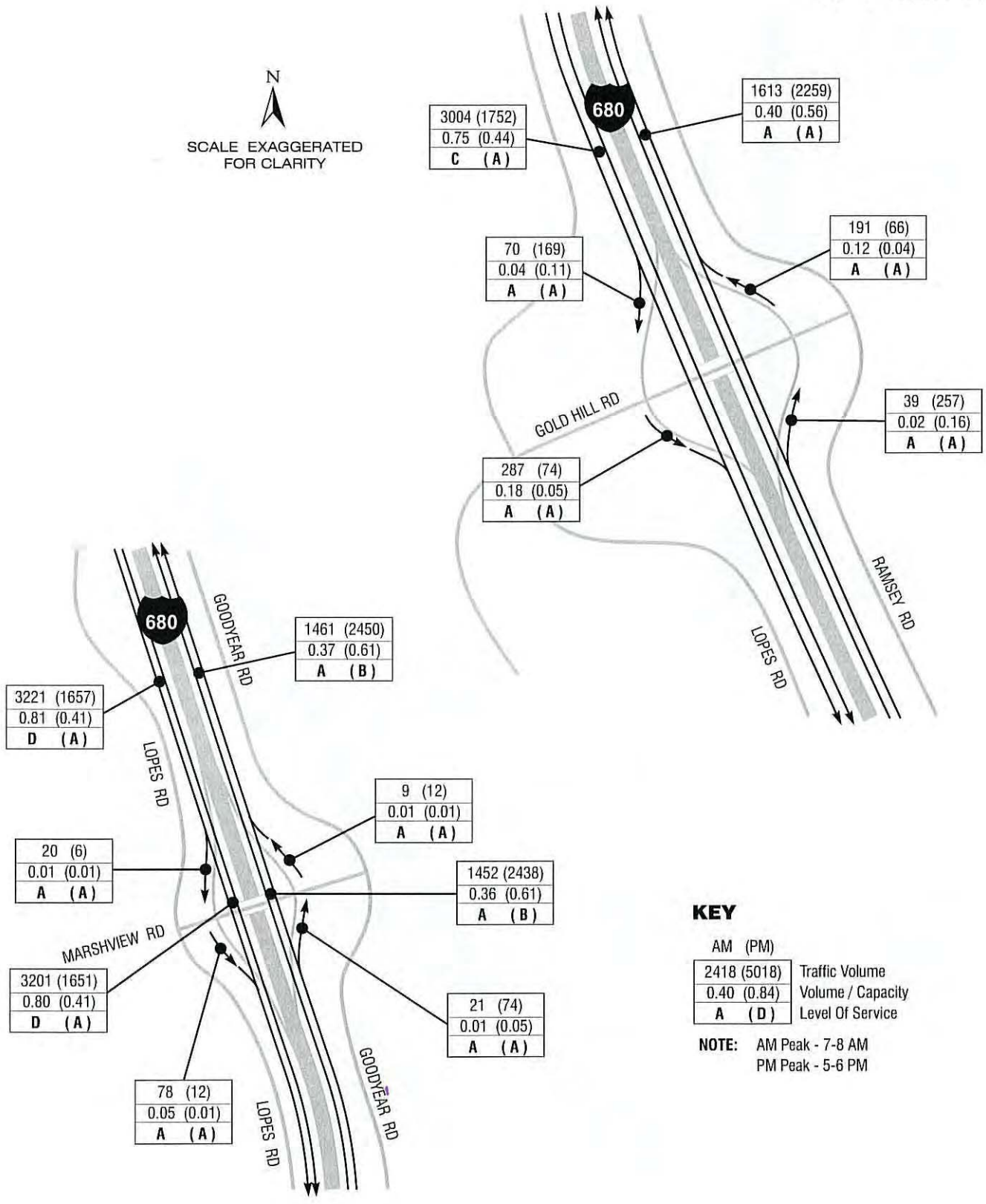
Figure 2-31

EXISTING TRAFFIC VOLUMES AND LOS

Segment 4

(cont'd)

Seg 4-2 Ramp Vols.cdr



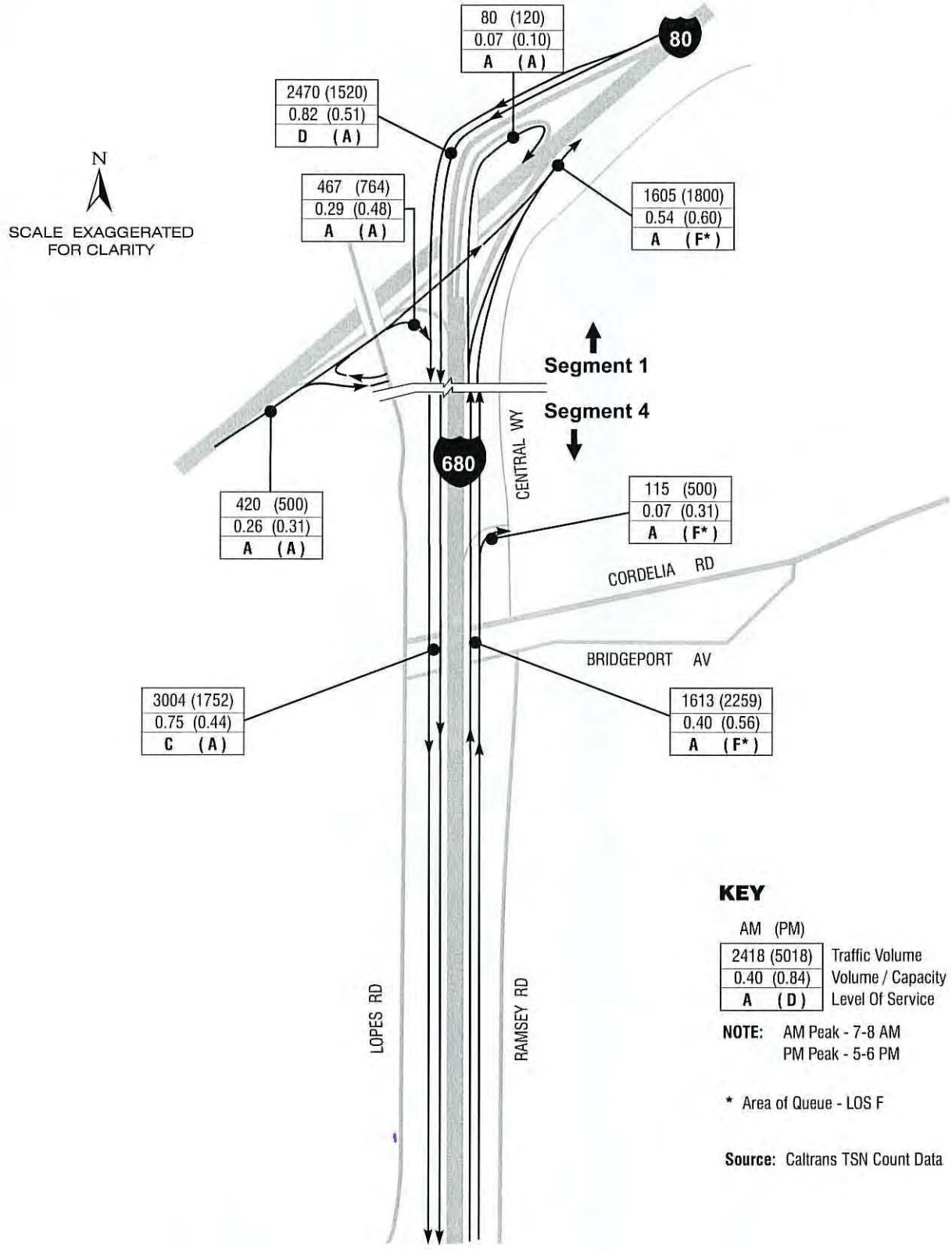
Seg 4-3 Ramp Vols.cdr

Source: Caltrans TSN Count Data

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-32

EXISTING TRAFFIC VOLUMES AND LOS
Segment 4
(cont'd)



Seg 4-4 Ramp Vols.cdr

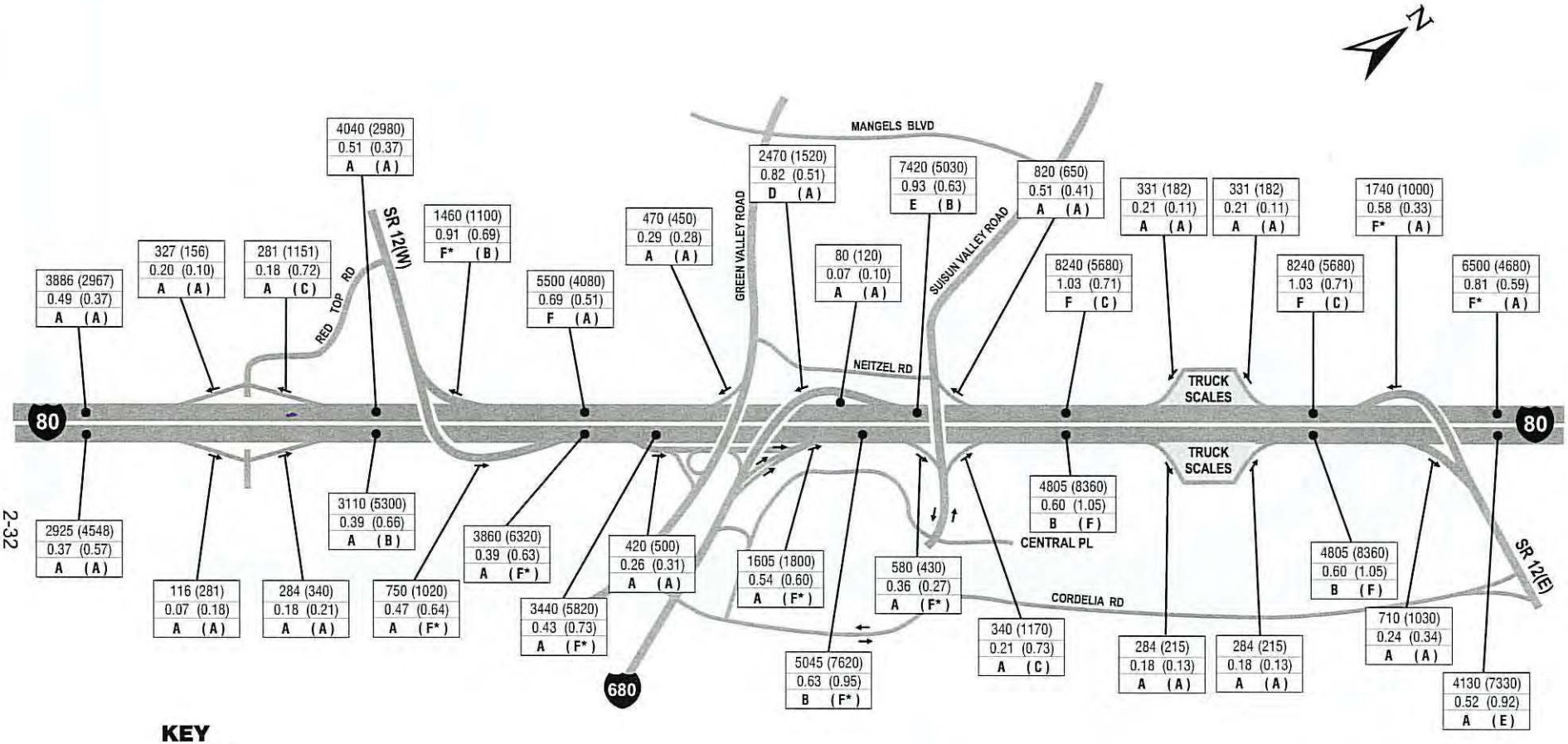
I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-33

EXISTING TRAFFIC VOLUMES AND LOS

Segment 4

(cont'd)



KEY

AM (PM)	
2418 (5018)	Traffic Volume
0.40 (0.84)	Volume / Capacity
A (D)	Level Of Service

NOTE: AM Peak = 7-8 AM
PM Peak = 5-6 PM

* Area of Queue - LOS F

Source: Caltrans TSN Count Data

Existing Vols Rev 2.cdr

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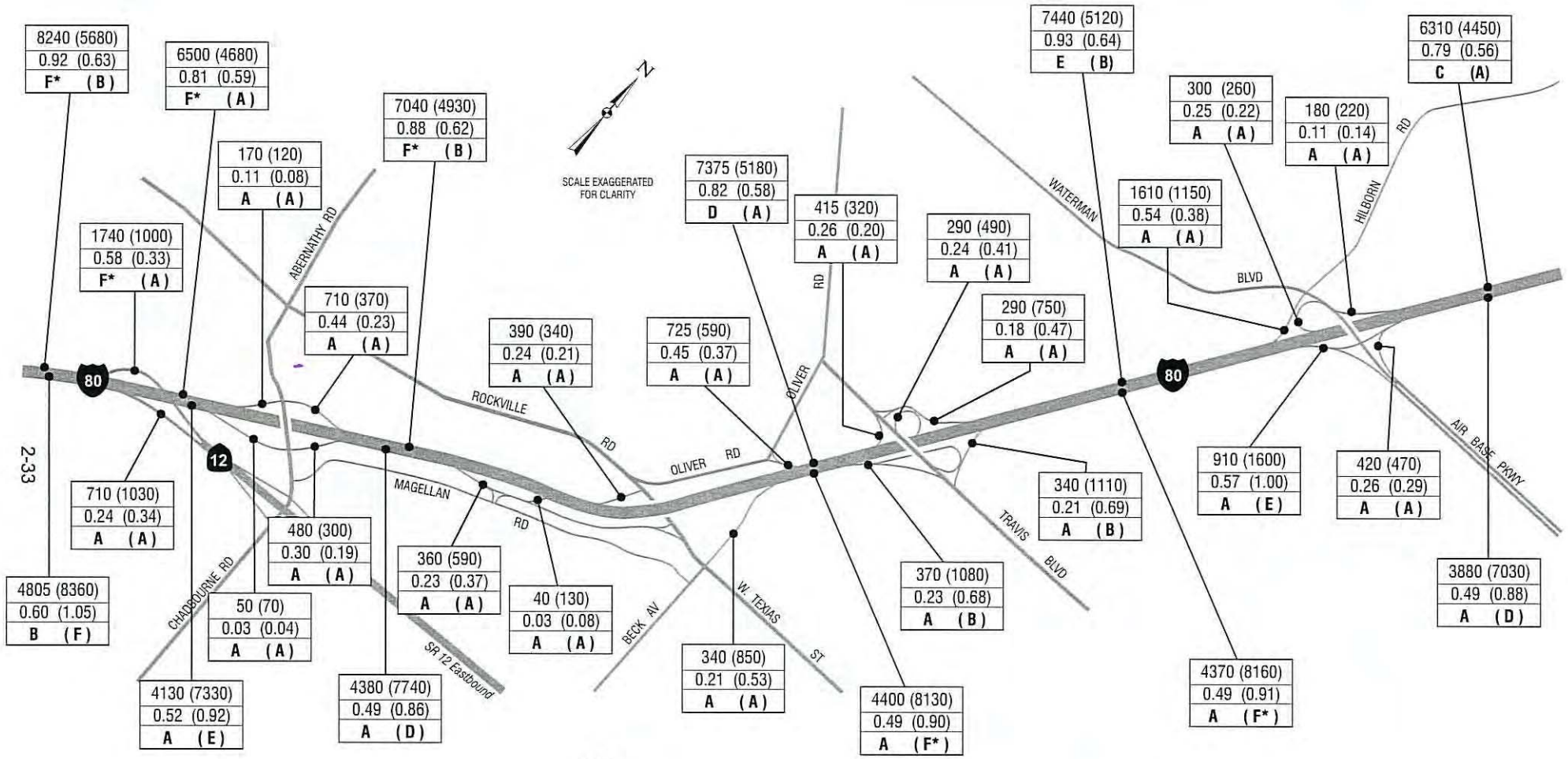
I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-34

EXISTING TRAFFIC VOLUMES AND LOS

Segment 1

May 17, 2004



KEY

AM (PM)	
2418 (5018)	Traffic Volume
0.40 (0.84)	Volume / Capacity
A (D)	Level Of Service

NOTE: AM Peak - 7-8 AM
PM Peak - 5-6 PM

* Area of Queue - LOS F

Source: Caltrans TSN Count Data

6-1 Vols Rev.cdr

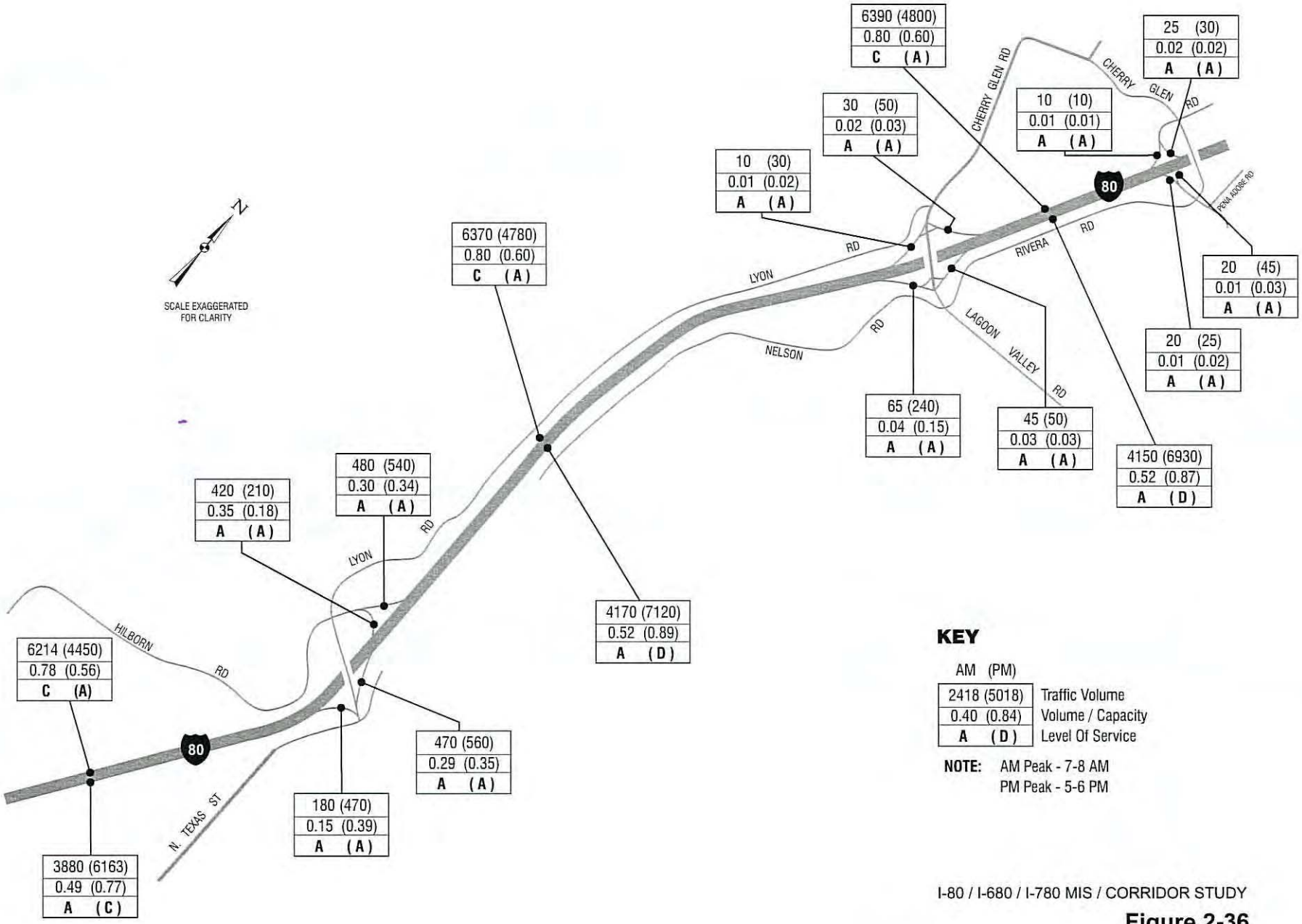
Korve Engineering

January 2004

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-35

EXISTING TRAFFIC VOLUMES AND LOS
Segment 6



6-2 Vols Rev.cdr

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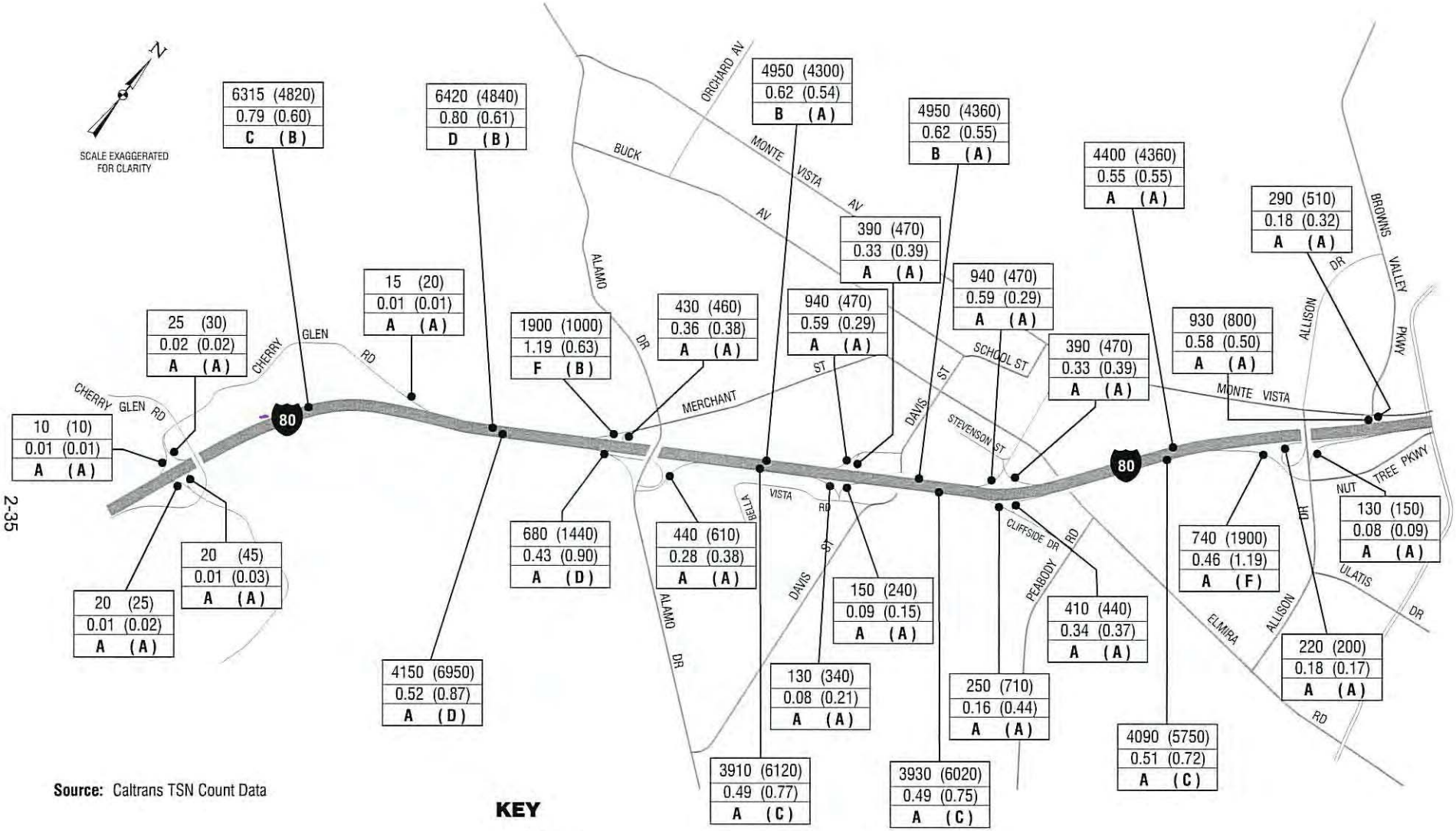
May 2004

Source: Caltrans TSN Count Data

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-36

EXISTING TRAFFIC VOLUMES AND LOS
Segment 6
(cont'd)



Source: Caltrans TSN Count Data

KEY

AM (PM)	
2418 (5018)	Traffic Volume
0.40 (0.84)	Volume / Capacity
A (D)	Level Of Service

NOTE: AM Peak - 7-8 AM
PM Peak - 5-6 PM

6-3 Vols Rev.cdr

Korve Engineering

January 2004

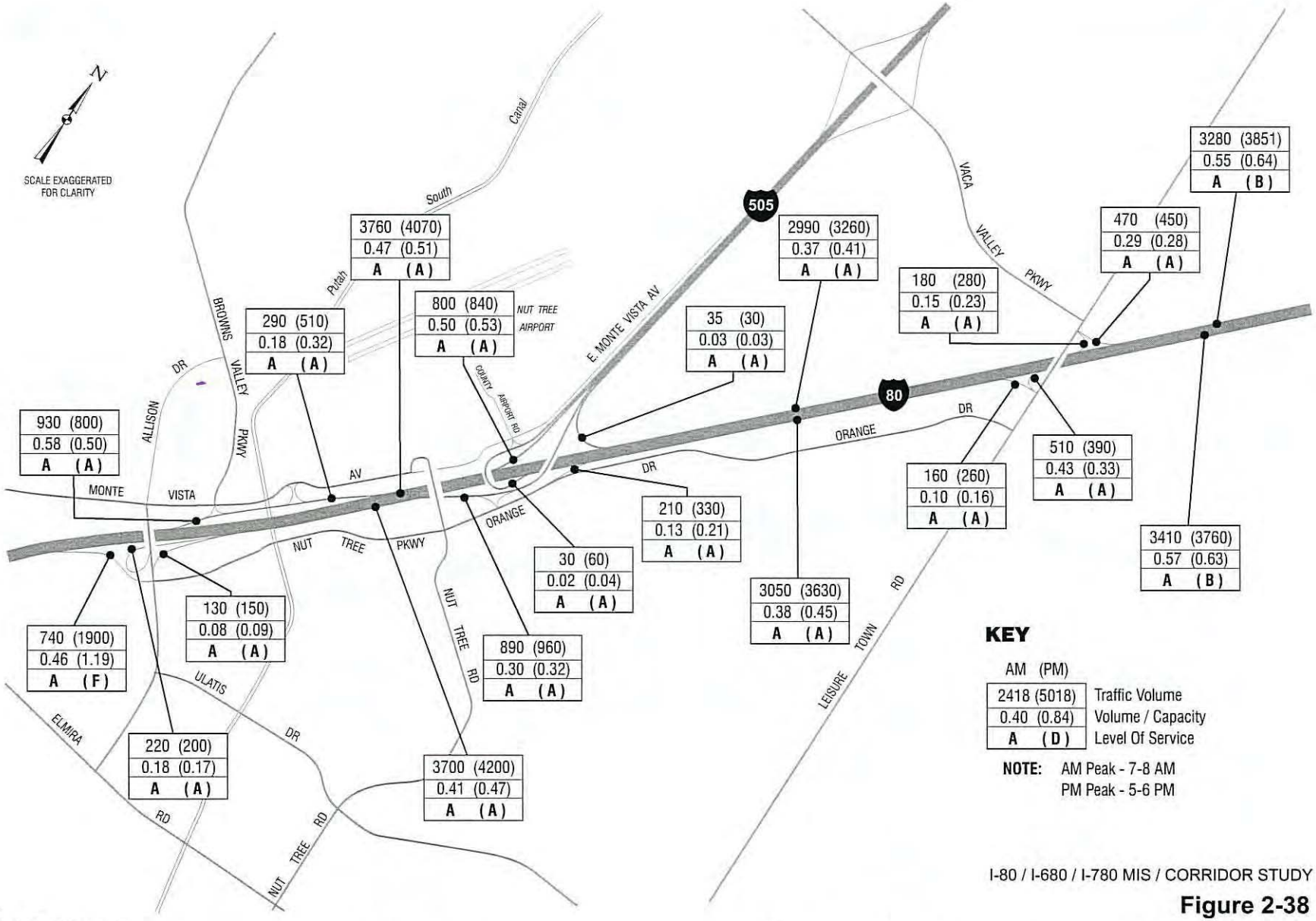
I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-37

EXISTING TRAFFIC VOLUMES AND LOS

Segment 6

(cont'd)



6-4 Vols Rev.cdr

Korve Engineering

May 2004

Source: Caltrans TSN Count Data

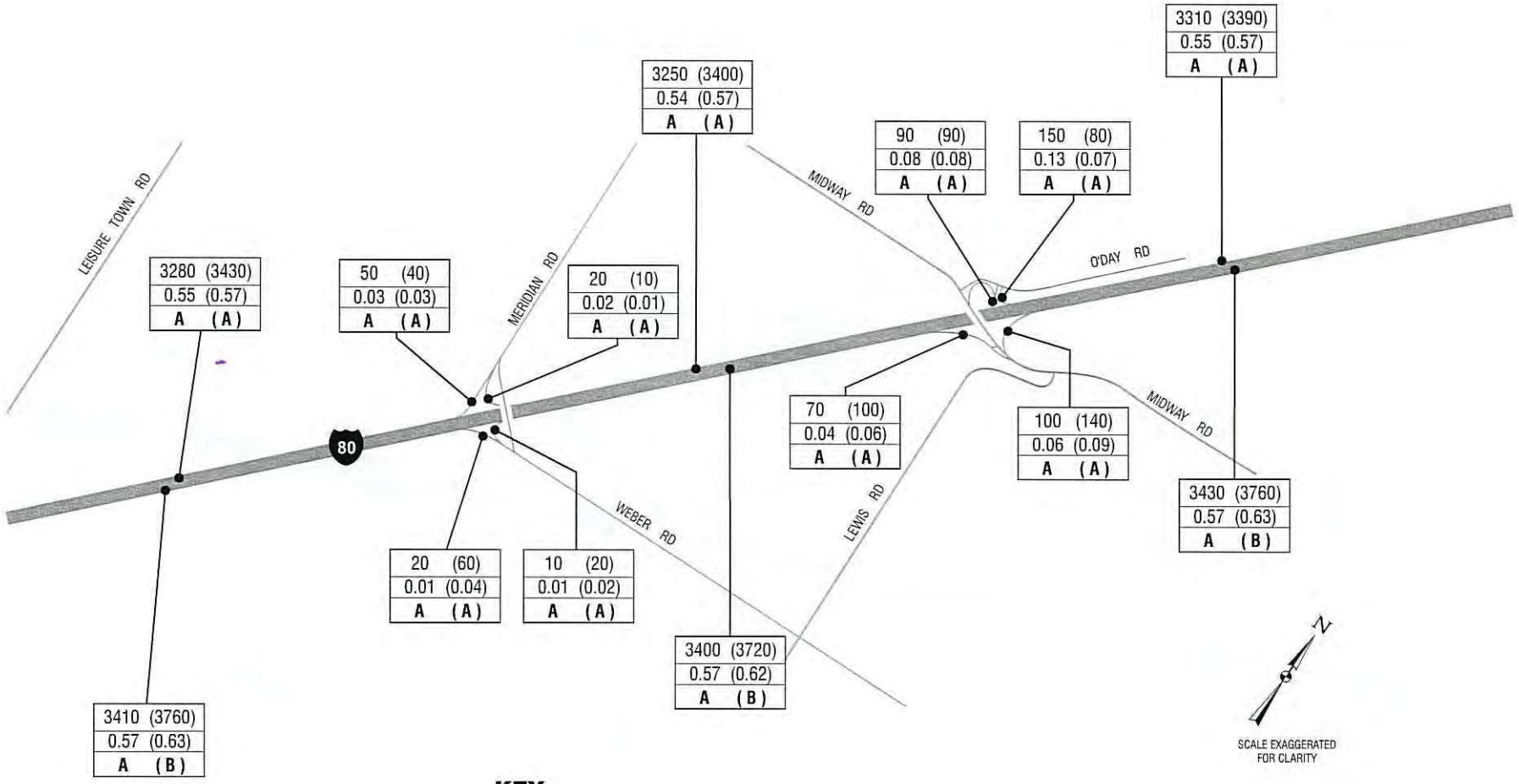
I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-38

EXISTING TRAFFIC VOLUMES AND LOS

Segment 6

(cont'd)



KEY

AM (PM)	
2418 (5018)	Traffic Volume
0.40 (0.84)	Volume / Capacity
A (D)	Level Of Service

NOTE: AM Peak - 7-8 AM
PM Peak - 5-6 PM

Source: Caltrans TSN Count Data

7-1 Vols Rev.cdr

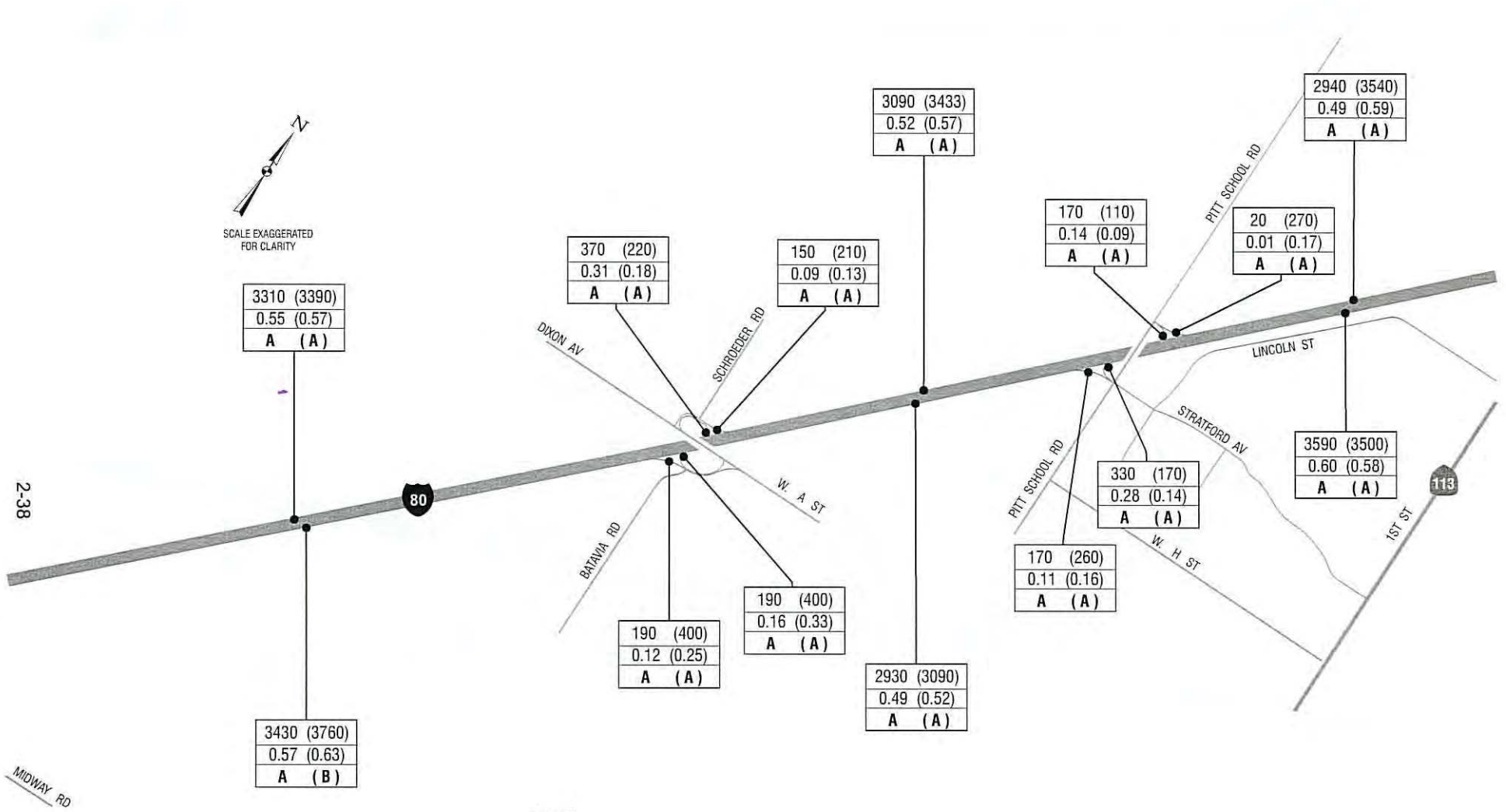
Korve Engineering

January 2004

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-39

EXISTING TRAFFIC VOLUMES AND LOS
Segment 7



KEY

AM	(PM)	
2418	(5018)	Traffic Volume
0.40	(0.84)	Volume / Capacity
A	(D)	Level Of Service

NOTE: AM Peak - 7-8 AM
PM Peak - 5-6 PM

Source: Caltrans TSN Count Data

7-2 Vols Rev.cdr

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May 2004

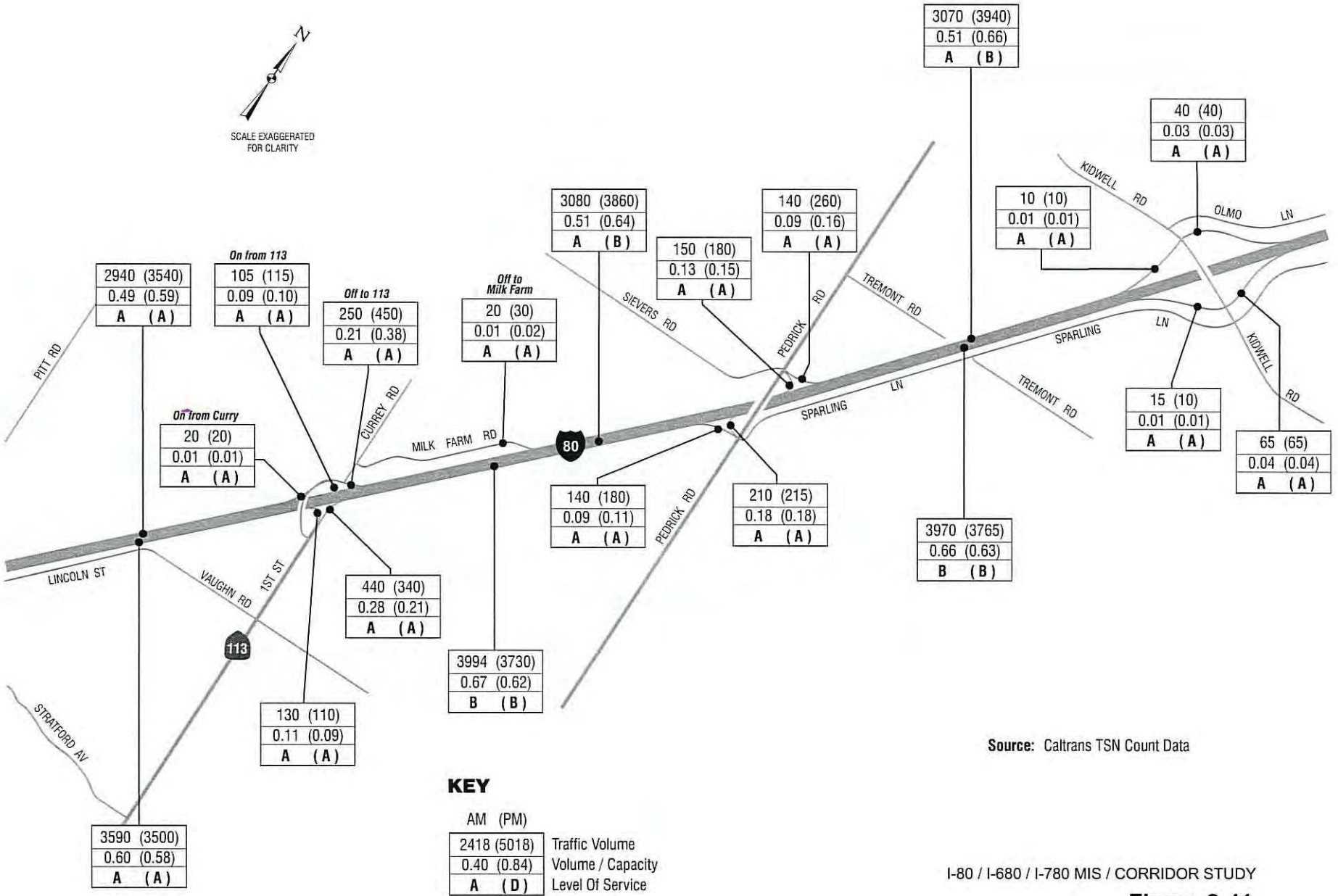
I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-40

EXISTING TRAFFIC VOLUMES AND LOS

Segment 7

(cont'd)



Source: Caltrans TSN Count Data

KEY

AM (PM)	
2418 (5018)	Traffic Volume
0.40 (0.84)	Volume / Capacity
A (D)	Level Of Service

NOTE: AM Peak - 7-8 AM
PM Peak - 5-6 PM

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-41

EXISTING TRAFFIC VOLUMES AND LOS
Segment 7
(cont'd)

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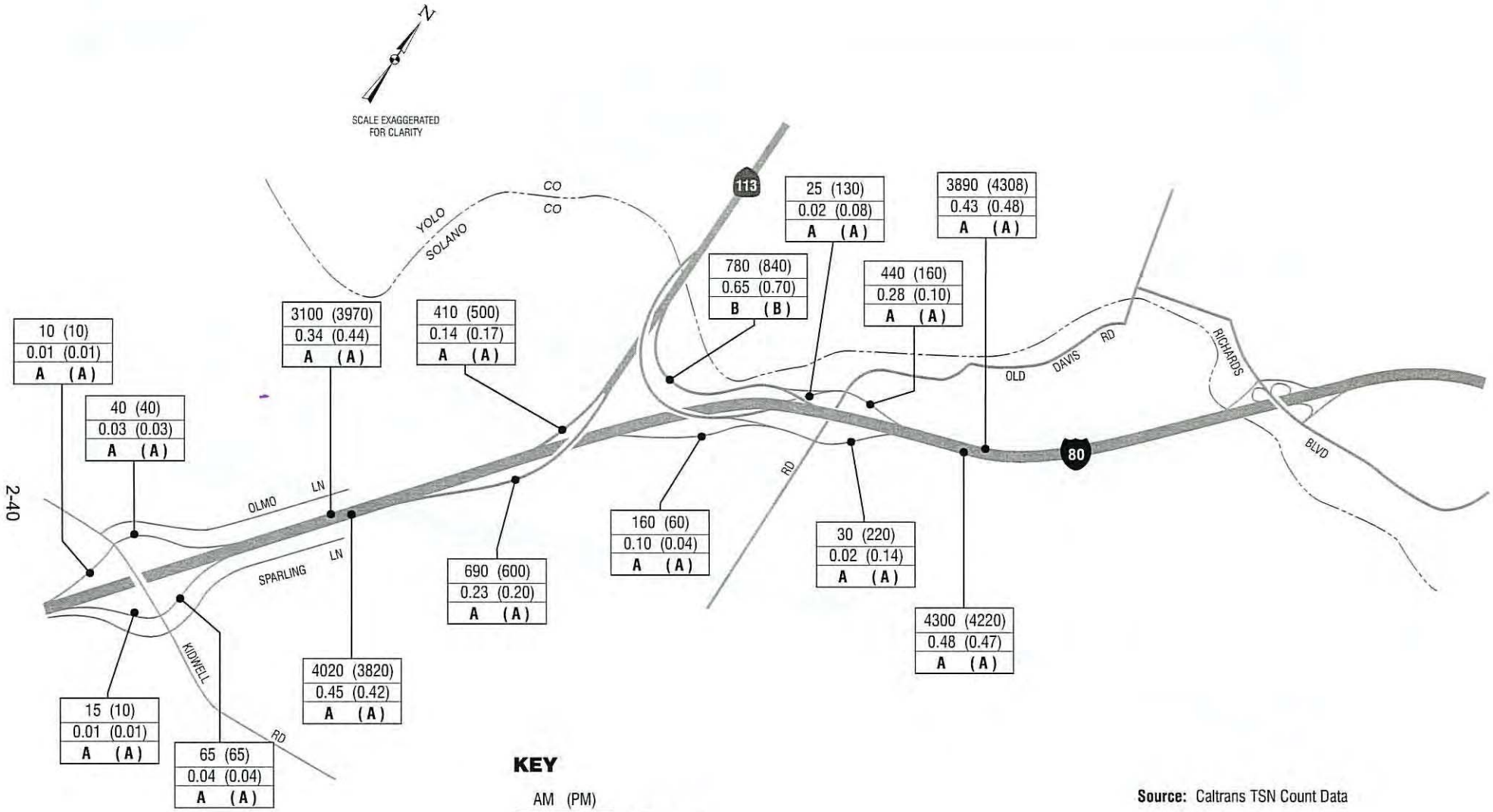
January 2004

7-3 Volo Rev.cdr



KEY

AM (PM)	
2418 (5018)	Traffic Volume
0.40 (0.84)	Volume / Capacity
A (D)	Level Of Service

NOTE: AM Peak - 7-8 AM
PM Peak - 5-6 PM

Source: Caltrans TSN Count Data

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-42

EXISTING TRAFFIC VOLUMES AND LOS
Segment 7
(cont'd)

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2.1.5 Accidents

For Segment 1, accident data for the three-year period between July 1, 1997 and June 6, 2000 was obtained from the Caltrans Accident Surveillance and Analysis System (TASAS).

For Segments 2, 3, 4 and 5, accident data for the three-year period between April 1, 1999 and March 31, 2002 was obtained from TASAS. The following freeway sections experienced the greatest number of accidents:

1. I-80 North of the Carquinez Bridge;
2. I-80 at and between the I-80/I-780 and I-80/SR 37 junctions; and
3. I-680/I-780 junction.

For Segments 6 and 7, accident data for the five-year period between October 1, 1996 and September 30, 2001 was obtained from TASAS. The highest concentration of accidents on these two segments occurred near Fairfield between West Texas Street and Air Base Parkway, and between North Texas Street and Lagoon Valley Road.

Table 2-7 and Table 2-8 present the number of accidents recorded during the periods stated above. It also summarizes the actual accident rates and the statewide average rates for similar facilities. The statewide average rates were developed based on specific facility types and traffic levels.

Table 2-7 Year Accident Data Summary (Segment 1)

Corridor	Fatal (F)	Injury (I)	PDO [1]	Total	Actual Accident Rate[2]		Statewide Average Accident Rate[2]	
					F+I	Total	F+I	Total
I-80 EB	1	119	245	365	0.22	0.66	0.28	0.87
I-80 WB	3	138	313	454	0.26	0.82	0.28	0.87
I-680 NB	1	34	55	90	**0.50**	**1.29**	0.34	0.93
I-680 SB	0	4	13	17	0.06	0.24	0.34	0.93

[1] PDO = Property Damage Only.
[2] Accident rate is measured as number of accidents per million vehicle miles traveled.
Source: Caltrans Accident Surveillance and Analysis System (TASAS).

Table 2-8 Year Accident Data Summary (Segment 2 – 7)

Segment	Fatal (F)	Injury (I)	PDO[1]	Total	Actual Accident Rate[2]			Statewide Average Accident Rate[2]		
					F	F+I	Total	F	F+I	Total
2	7	315	812	1,134	0.009	**0.42**	**1.48**	0.008	0.33	1.05
4	4	193	360	557	0.005	0.23	0.66	0.015	0.31	0.79
3	4	105	203	312	0.011	0.29	0.82	0.010	0.33	0.92
5	8	211	399	618	0.010	**0.27**	**0.75**	0.006	0.23	0.67
6 and 7	17	958	1,957	2,932	0.003	0.16	0.48	0.009	0.28	0.87

[1] PDO = Property Damage Only.
[2] Accident rate is measured as number of accidents per million vehicle miles traveled.
Source: Caltrans Accident Surveillance and Analysis System (TASAS).

Segment 1 shows higher than average accident rates at the north end of northbound I-680 and the west end of SR 12 (E). Segments 2 and 5 on I-80 both show higher than average accident rates. Segment 2 is 40 percent higher than the statewide average, with

60 percent of recorded accidents occurring in the eastbound direction. The accident rate in Segment 5 is 15 percent higher than the statewide average, with an even distribution in the eastbound (47 percent) and westbound (53 percent) directions.

The observed accident rates on I-680, I-780 and Segments 6 and 7 of I-80 are less than the statewide average accident rates for similar facility types. The accidents are distributed in a 60/40 split for the northbound/southbound directions on I-680 and for the eastbound/westbound directions on I-780. Accidents in Segments 6 and 7 are evenly distributed in the eastbound (49 percent) and westbound (51 percent) directions.

A review of the TASAS summary report indicates that the primary type of collision (TOC) reported for all of the study segments included "hit objects" accidents (22-48 percent, depending on the segment), "rear-end" accidents (30-67 percent, segment-dependent), and "sideswipe" accidents (7-18 percent, segment-dependent). The primary collision factors (PCF) for these accidents were unsafe speed (28-53 percent, segment-dependent), improper turn (11-31 percent, segment-dependent), and other violations (16-22 percent, segment-dependent).

Approximately 15 percent of the accidents occurred between 6:00 and 8:00 a.m. on I-80 and I-680, compared to approximately 20 percent on I-780. Approximately 15 percent of the accidents occurred between the 4:00 and 6:00 p.m. peak period for all three freeways. The accidents were spread fairly evenly throughout the weekday and weekend periods. A typical weekday accounts for about 11 to 15 percent of the weekly accidents on the study segments.

2.1.6 Truck Traffic

Year 2002 Annual Average Daily Truck Traffic data was gathered from Caltrans. Truck traffic in the study corridor ranges from a low of 1.5 percent of total traffic on I-780 at the junction with I-80, to a high of 13.5 percent on I-80 at the SR 113 south junction. The percentage of truck traffic in the travel stream is relatively high on I-680 at the I-80 interchange, which is located just upstream of the truck scales in Cordelia.

Segments 6 and 7 have the highest percentage of truck traffic among all the study segments. Truck traffic on I-80 east of SR 12 East ranges from 8.4 to 13.5 percent of the AADT totals.

Truck counts were conducted at the Cordelia Truck Scales on March 28, 2001 (eastbound) and on May 11, 2001 (westbound). In the westbound a.m. peak direction, 104 (23%) trucks bypassed the truck scale; in the eastbound p.m. peak direction, 48 (18%) trucks bypassed the truck scale. It should be noted that in the eastbound direction, the a.m. peak hour truck volume (421 trucks/hour) was higher than the p.m. peak hour truck volume (263 trucks/hour).

Table 2-6 summarizes the truck traffic counts throughout the study corridors. Mileages for I-80 are measured relative to the Carquinez Bridge. I-680 and I-780 are measured relative to the Benicia Bridge.

Table 2-9 Truck Traffic

Postmile	Description	Leg[1]	AADT Total	Total Trucks	Total Percent	Year	V or E[2]
	I-80						
1.14	Vallejo, Jct. SR-29 NW	B	113,000	5,650	5	01	E
1.14	Vallejo, Jct. SR-29 NW	A	106,000	5,300	5	01	E
2.22	Vallejo, Jct. I-780 SE	B	114,000	5,700	5	01	E
5.63	Vallejo, Jct. SR-37 West	B	131,000	6,393	4.9	00	V
5.63	Vallejo, Jct. SR-37 West	A	103,000	6,046	5.9	00	V
R11.98	Jct. SR 12 (W)	B	107,000	5,992	5.6	01	E
R11.98	Jct. SR 12 (W)	A	136,000	7,072	5.2	01	E
12.840	Jct. I-680 South	B	136,000	8,922	6.6	00	V
12.840	Jct. I-680 South	A	179,000	10,275	5.7	00	V
15.820	Fairfield, Jct. SR 12 (E)	B	190,000	11,590	6.1	97	E
15.820	Fairfield, Jct. SR 12 (E)	A	170,000	11,560	6.8	97	E
20.93	Fairfield, North Texas Street	B	148,000	13,912	9.4	97	E
20.93	Fairfield, North Texas Street	A	154,000	12,936	8.4	97	E
28.36	Jct. I-505 North	A	97,000	11,677	12.0	00	V
28.36	Jct. I-505 North	B	119,000	11,424	9.6	97	E
38.21	Jct. SR-113 South	B	98,000	13,225	13.5	00	V
38.21	Jct. SR-113 South	A	104,000	8,944	8.6	97	E
42.67	Jct. SR-113 North	B	107,000	10,165	9.5	97	E
	I-680						
0.68	Jct. I-780 NW	B	97,000	5,529	5.7	95	E
0.68	Jct. I-780 NW	A	64,000	6,528	10.2	97	E
R2.820	Lake Herman Road	B	59,000	3,145	5.3	00	V
R2.820	Lake Herman Road	A	58,000	3,109	5.4	00	V
13.13	Cordelia, Jct. I-80	B	57,000	2,970	5.2	00	V
	I-780						
0.68	Benicia, Jct. I-680	A	51,000	2,642	5.2	01	V
4.00	West Benicia	B	55,000	3,020	5.5	01	V
4.00	West Benicia	A	60,000	2,892	4.8	01	V
4.77	Columbus Pkwy.	A	51,000	2,504	4.9	01	V
7.19	Vallejo, Jct. I-80	B	59,000	897	1.5	01	V
7.44	Lemon Street	B	38,000	2,185	5.8	01	V

1. According to ascending order of postmile (route direction) and a post mile reference at the center of the interchange, B = Back Leg, and A = Ahead Leg.
2. Counts are either verified (counted continuously or quarterly) = V, or estimated = E.

Source: Caltrans District 4 Traffic Operations.

2.1.7 High Occupancy Vehicles

High Occupancy Vehicle (HOV) counts were collected in March and April 2001 as part of the Solano County Comprehensive Transportation Plan. This information was collected to determine existing levels of HOV traffic on these freeways and to estimate the proportion of HOV traffic that would use an exclusive HOV-lane if it were available. This information is important for the consideration of future HOV lanes on Solano County freeways because Caltrans has established a minimum volume threshold of 700 HOVs/hour/lane for evaluating the feasibility of exclusive HOV lanes. HOV lanes

currently begin along I-80 south of the Carquinez Bridge at the Highway 4 interchange in Contra Costa County.

Table 2-7 summarizes the existing 2+ HOV traffic (2 or more occupants/vehicle) on I-80 at the Magazine Street overpass, Meridian Road overpass and Suisun Valley Road overpass; on I-680 at the Lake Herman Road overpass; and on I-780 at the Rollingwood overpass. Counts were performed again on I-80 to provide a breakdown of HOVs into two-passenger vehicles and vehicles with three or more passengers (3+ HOVs). The table also shows the percentage of total mainline traffic consisting of Single-Occupancy Vehicles (SOVs) and HOVs.

Table 2-10 I-80 HOV Traffic

Location	Existing 2+ HOV Count (HOVs/hr)							
	a.m. Peak Hour				p.m. Peak Hour			
	WB/ SB	% of total	EB/ NB	% of total	WB/ SB	% of total	EB/ NB	% of total
I-80: Magazine St. Overpass	975	19%	574	21%	795	25%	1,517	28%
I-780: Glen Cove Rd. Overpass	517	25%	320	21%	410	23%	451	22%
I-680: Lake Herman Rd. Overpass	320	13%	223	16%	485	32%	427	17%
SR 12: Red Top Rd. Overpass	243	21%	120	12%	319	28%	318	25%
I-80: Suisun Valley Rd. Overpass	1,221	20%	927	20%	1,266	21%	1,657	24%
I-80: Meridian Rd. Overpass	540	15%	619	17%	946	25%	881	23%

Location	Existing 3+ HOV Count (HOVs/hr)							
	a.m. Peak Hour				p.m. Peak Hour			
	WB	% of total	EB	% of total	WB	% of total	EB	% of total
I-80: Magazine St. Overpass	208	4%	146	5%	160	5%	340	6%
SR 12: Red Top Rd. Overpass	58	5%	14	1%	57	5%	81	6%
I-80: Suisun Valley Rd. Overpass	218	3%	172	4%	324	7%	417	6%
I-80: Meridian Rd. Overpass	117	3%	72	2%	180	5%	118	3%

Source: Solano County Comprehensive Transportation Plan.
Counts performed on March 26-27 for I-780 at Glen Cove Road Overpass and for I-680 at Lake Herman Rd. Overpass. Counts performed on April 25-26 for other locations.

2.2 Transit

Information presented in Section 2.2 is primarily based on the *I-80/I-680/I-780 Transit Corridor Study* prepared by Wilbur Smith and Associates (WSA) in December 2003.

2.2.1 Express Bus Services

Background

A brief summary of key service features for each of the intercity transit operators is provided in this section by provider and route. Intercity routes are those that serve more than one city. Summary comparisons of service and performance are presented at the end of this section. Figure 2-43 shows the intercity bus routes serving Solano County, along with the passenger rail corridor.

Vallejo Transit Bus Service

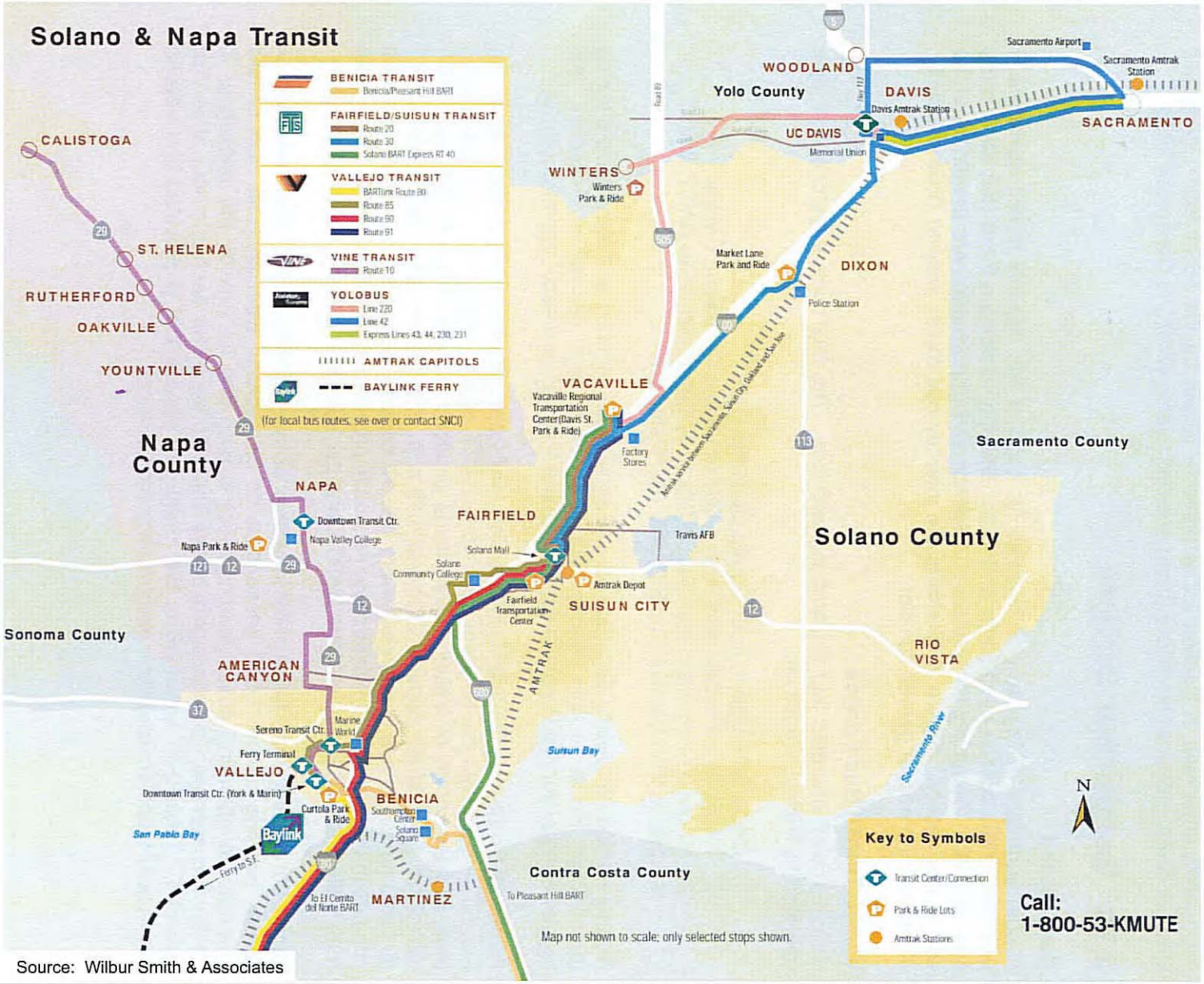
Vallejo Transit operates four regional bus services. The four current regional bus lines operated by Vallejo Transit are:

1. Route 80 – Vallejo to El Cerrito del Norte BART;
2. Route 85 – Fairfield and Suisun City to Vallejo via Solano College;
3. Route 90 – Fairfield and Suisun City to El Cerrito del Norte BART; and
4. Route 91 – Vacaville to El Cerrito del Norte BART.

Routes 80 and 85 provide Saturday as well as weekday service and also operate during the midday. Route 91 only operates during commute peak periods on weekdays. No regular Sunday service is provided on any of the four Vallejo Transit operated routes.

Route 80 is the original BARTLink service, and connects downtown Vallejo (near the Ferry Terminal) with the El Cerrito del Norte BART station. Some morning peak period trips originate north of Vallejo. Service is provided Monday through Saturday. On weekdays, the first trip departs Vallejo at 4:15 a.m. and the last return trip leaves BART at 11:00 p.m. Service is provided every 8 to 15 minutes during the peak, and every 30 minutes in the midday. On Saturdays, service is provided every 30 minutes. Travel time from Vallejo to El Cerrito del Norte BART using the I-80 HOV lanes is about 25 minutes.

Route 80 currently has the highest ridership of the eight Solano County intercity bus routes, carrying almost 1,500 passengers on an average weekday. Its ratio of fare revenues to operating costs (farebox ratio) is 61.5 and its subsidy per passenger is $1.29. On average, 23 passengers board Route 80 buses for each bus hour of service provided. Table 2-11 summarizes the amount of service that is provided and several key measures of efficiency and performance for Route 80.



Source: Wilbur Smith & Associates

Existing Intercity Bus Services 2.ai

Korve Engineering

I-80/I-680/I-780 MIS / CORRIDOR STUDY

Figure 2-43

EXISTING INTERCITY TRANSIT SERVICE

Table 2-11 Route 80 Service/Performance Characteristics

Indicator	Amount	Indicator	Amount	Indicator	Amount
Annual Hours	19,301	Revenue	$908,828	Subsidy/Pass	$1.29
Annual Miles	693,516	Subsidy	$575,761	Annual Passengers	444,821
Speed	NA	Cost/Hour	$76.92	Weekday Passengers	1,454
Bus Trips	140	Ratio	0.61	Passengers/Hour	23.0
Buses	8	Subsidy/Bus	$71,970	Passengers/Bus Trip	10.4
Cost	$1,484,589	Subsidy/Hour	$29.83	Passengers/Bus	182

Source: Table 2-1, *I-80/I-680/I-780 Transit Corridor Study* (WSA, December 2003).

Route 85 links Vallejo and Fairfield via the Solano Community College. Service is provided Monday through Saturday. On weekdays, the first trip departs at 6:33 a.m. from Fairfield and 5:35 a.m. from Vallejo. Morning peak period commute service operates on 30-minute frequencies and service continues at hourly frequencies until 9:30 p.m. from Vallejo and 10:30 p.m. from Fairfield. On Saturday mornings, service starts one hour later. All trips connect with the Vallejo Ferry Terminal and with Route 80. Travel time from Vallejo to Fairfield is about 55 minutes.

Approximately 482 passengers board Route 85 buses on a typical weekday. The route's fare box recovery ratio is 38 percent and the subsidy per passenger served is $2.84. On average, 12.8 passengers board Route 85 buses for every bus hour of service. Table 2-12 summarizes key features for Route 85 service and usage.

Table 2-12 Route 85 Service/Performance Characteristics

Indicator	Amount	Indicator	Amount	Indicator	Amount
Annual Hours	11,526	Revenue	$261,548	Subsidy/Pass	$2.84
Annual Miles	256,788	Subsidy	$418,918	Annual Passengers	147,554
Speed	NA	Cost/Hour	$59.04	Weekday Passengers	482
Bus Trips	36	Ratio	0.38	Passengers/Hour	12.80
Buses	3	Subsidy/Bus	$139,639	Passengers/Bus Trip	13.39
Cost	$680,466	Subsidy/Hour	$36.35	Passengers/Bus	161

Source: Table 2-2, *I-80/I-680/I-780 Transit Corridor Study* (WSA, December 2003).

Route 90 links Fairfield and Suisun City with the El Cerrito del Norte BART Station via Suisun City Amtrak Station. Service is provided weekdays at 60-minute service frequencies with additional service in the peak periods (15 to 20 minute frequencies). The first trip departs at 5:00 a.m., with the last trip returning at 7:30 p.m. from BART. Travel time from Fairfield to BART is about 40 minutes. Fairfield-Suisun Transit covers all subsidy needs for Route 90.

Approximately 543 passengers board Route 90 buses on a typical weekday. The route's fare box recovery ratio is 45 percent and the subsidy per passenger is $3.09. Approximately, 15 passengers board Route 90 buses for every hour of service.

Table 2-10 summarizes key features of Route 90 service and usage.

Table 2-13 Route 90 Service/Performance Characteristics

Indicator	Amount	Indicator	Amount	Indicator	Amount
Annual Hours	9,300	Revenue	$342,189	Subsidy/Pass	$3.09
Annual Miles	335,412	Subsidy	$423,053	Annual Passengers	136,895
Speed	NA	Cost/Hour	$82.28	Weekday Passengers	543
Bus Trips	38	Ratio	0.45	Passengers/Hour	14.7
Buses	5	Subsidy/Bus	$84,611	Passengers/Bus Trip	14.3
Cost	$765,242	Subsidy/Hour	$45.49	Passengers/Bus	108.6

Source: Table 2-3, *I-80/I-680/I-780 Transit Corridor Study* (WSA, December 2003).

Route 91 provides four morning trips from Vacaville, and four evening trip returns from the El Cerrito del Norte BART station to Vacaville. There is no midday or weekend service. The first trip departs at 5:00 a.m., with the last trip returning at about 8:15 p.m. from BART. Travel time from Vacaville to BART is about 55 minutes.

Route 91 serves about 206 passengers daily. The Route covers 50 percent of its operating cost from fare box revenues and averages a $2.42 subsidy for each passenger. On average, 19 passengers board Route 91 buses for each hour of service that is provided. Table 2-14 summarizes key features for Route 91.

Table 2-14 Route 91 Service/Performance Characteristics

Indicator	Amount	Indicator	Amount	Indicator	Amount
Annual Hours	2,746	Revenue	$126,633	Subsidy/Pass	$2.42
Annual Miles	102,816	Subsidy	$125,714	Annual Passengers	51,989
Speed	NA	Cost/Hour	$91.90	Weekday Passengers	206
Bus Trips	11	Ratio	0.50	Passengers/Hour	18.93
Buses	2	Subsidy/Bus	$62,857	Passengers/Bus Trip	18.73
Cost	$252,347	Subsidy/Hour	$45.78	Passengers/Bus	103

Source: Table 2-4, *I-80/I-680/I-780 Transit Corridor Study* (WSA, December 2003).

Support Facilities.
Passenger facilities are generally good, with on-going planning for additional improvements. At the El Cerrito del Norte BART Station, buses use the improved bus waiting areas. There is good signage and adequate passenger shelter. Passenger queues often extend beyond the shelters at the Vallejo Transit pickup points. The Curtola Park and Ride facility's 450 auto spaces are often full by 7 a.m. The City of Vallejo is in the process of developing a major improvement to the ferry terminal. This $52 million "Vallejo Station" project would provide 1,200 parking spaces and enhanced bus transfer facilities, which will potentially attract more people to commute by transit.

Fairfield-Suisun Transit (FST)

FST operates three intercity routes: Route 20 links Fairfield and Vacaville, Route 30 links Fairfield, Vacaville, Dixon, UC Davis and Sacramento, and Route 40 links Vacaville, Fairfield and the Pleasant Hill BART station. Service frequencies on all three lines are limited. Service is fully linked at various locations in northern Solano County. A major new facility, the Fairfield Transportation Center, opened in 2001. Other key transfer nodes include the Vacaville Regional Transportation Center and Solano Mall. FST intercity route 40 serves the Pleasant Hill BART station, allowing easy connections to BART for trips to Oakland and San Francisco.

Route 20 operates weekdays and Saturday, whereas Routes 30 and 40 only operate on weekdays. No Sunday service is provided on these three intercity bus routes. Route 30 and 40 are each served by more than one bus because during the commute hour, the two-way running time is longer than the time between two consecutive departures.

Route 20 is an I-80 freeway connector between Fairfield's Solano Mall and the Vacaville Regional Transportation Center, with intermediate stops at the Vacaville Wal-Mart, the Vacaville Factory Stores, and the Vacaville Nut Tree. Route 20 provides the primary midday intercity bus service between Fairfield and Vacaville. The buses depart from the Solano Mall and travel directly on I-80 to the Vacaville Factory Stores, where they loop back west on local streets serving Wal-Mart, the Vacaville Transit Center and the Davis Street Transit Center. Buses are then routed back onto I-80 to the Solano Mall. Buses continue past the Mall to serve the Fairfield County offices and return back to the Mall for another EB trip to the Vacaville Factory Stores. Service operates hourly from about 7:30 a.m. to 6:30 p.m. and the total round trip running time is 53 minutes (one bus is assigned to the service).

Route 20 carries approximately 196 passengers on an average weekday. The average subsidy per passenger is $3.17 and fares cover 17 percent of operating costs. Each one direction trip serves about eight passengers as shown in Table 2-12.

Table 2-15 Route 20 Service/Performance Characteristics

Indicator	Amount	Indicator	Amount	Indicator	Amount
Annual Hours	3,134	Revenue	$35,532	Subsidy/Pass	$3.52
Annual Miles	80,669	Subsidy	$177,648	Annual Passengers	50,443
Speed	25.7	Cost/Hour	$68.02	Weekday Passengers	196
Bus Trips	25	Ratio	0.17	Passengers/Hour	16.10
Buses	1	Subsidy/Bus	$177,648	Passengers/Bus Trip	7.84
Cost	$213,180	Subsidy/Hour	$56.68	Passengers/Bus	196

Source: Table 2-6, *I-80/I-680/I-780 Transit Corridor Study* (WSA, December 2003).

Route 30 is primarily a Sacramento connector. Until recently, this route terminated at UC Davis. One a.m. and one p.m. trip continue to connect Fairfield, Vacaville and Dixon with UC Davis, with a new extension to downtown Sacramento. Sacramento service includes one direct express trip to Fairfield in the morning, with the reverse trip back to Sacramento in the afternoon. One a.m. and one p.m. trip connect Fairfield, Vacaville, and Dixon to Sacramento (with no stops in Davis), with one reverse run from Sacramento in the p.m. Two buses are assigned to this service.

Based on extrapolation of July 2003 data, Route 30 carries approximately 82 passengers on an average weekday. Fares cover about 16 percent of operating costs and subsidies per passenger average $8.03 (previous year data showed a subsidy per passenger of $14.67). On average, about eight passengers board a typical one-way bus trip on Route 30. Table 2-16 summarizes key features of this route.

Table 2-16 Route 30 Service/Performance Characteristics

Indicator	Amount	Indicator	Amount	Indicator	Amount
Annual Hours	3,456	Revenue	$33,624	Subsidy/Pass	$8.03
Annual Miles	126,464	Subsidy	$173,880	Annual Passengers	21,648
Speed	36.6	Cost/Hour	$60	Weekday Passengers	82
Bus Trips	10	Ratio	0.16	Passengers/Hour	6.26
Buses	2	Subsidy/Bus	$86,940	Passengers/Bus Trip	8.20
Cost	$207,504	Subsidy/Hour	$50	Passengers/Bus	41

Source: Table 2-7, *I-80/I-680/I-780 Transit Corridor Study* (WSA, December 2003).

Route 40 provides a link between Vacaville and Fairfield to the Pleasant Hill BART Station. Service points include the Vacaville Davis Street park-and-ride lot, Solano Shopping Mall at Fairfield, Fairfield Transportation Center and Pleasant Hill BART. In the SB direction, four morning trips and five evening trips are offered, while NB four morning trips and five afternoon trips serve Solano County commuters. Travel time from the Pleasant Hill BART station to Fairfield is about 45 minutes, and about one hour to Vacaville. The first trip departs at 5:05 a.m., and the last trip returns at 8:31 p.m. (allowing a 6:30 p.m. departure from San Francisco). The distance from Pleasant Hill BART to Fairfield is about 30 miles.

Route 40 serves an average of 122 passenger trips on an average weekday as shown in Table 2-14. Fares cover 23 percent of operating cost for the service and subsidies per passenger trip are $7.09.

Table 2-17 Route 40 Service/Performance Characteristics

Indicator	Amount	Indicator	Amount	Indicator	Amount
Annual Hours	4,800	Revenue	$66,141	Subsidy/Pass	$7.09
Annual Miles	160,134	Subsidy	$221,859	Annual Passengers	31,294
Speed	33	Cost/Hour	$60.00	Weekday Passengers	122
Bus Trips	18	Ratio	0.23	Passengers/Hour	6.52
Buses	3	Subsidy/Bus	$73,953	Passengers/Bus Trip	6.78
Cost	$288,000	Subsidy/Hour	$46.22	Passengers/Bus	41

Source: Table 2-8, *I-80/I-680/I-780 Transit Corridor Study* (WSA, December 2003).

Support Facilities. Few passenger facilities currently exist. However, the city is aggressively emphasizing park and ride facilities including the Fairfield Transportation Center, which combines a 400-space park and ride garage with a large bus transfer area.

Benicia Transit (Route 1)

One intercity bus route is operated by Benicia Transit, as shown in Figure 2-44 (Route 1 is referred to as "Regular Service" in Figure 2-44). The Benicia Flyer has been discontinued. The route provides connections to the Pleasant Hill BART Station, the Vallejo Ferry Terminal and Downtown Vallejo's York-Marin Transit Center. The peak one-direction running time for Route 1 is about 70 minutes to Pleasant Hill BART. Only one peak direction trip is possible per bus.

Route 1 operates from the Vallejo Ferry Terminal and the Vallejo Transit Center to the Pleasant Hill BART Station via the Curtola Park and Ride Lot, Military West, Solano

Square, First Street, B Street, East 2nd Street, H Street, East Fifth Street and Sun Valley Mall. This trip takes about 20 minutes between Vallejo and H Street, 18 minutes from H Street to Sun Valley Mall and another 16 minutes to reach the Pleasant Hill BART Station. Service operates from 5 a.m. to 7 p.m. Table 2-18 summarizes ridership and cost information for Route 1.

Table 2-18 Route 1 Service/Performance Characteristics

Indicator	Amount	Indicator	Amount	Indicator	Amount
Annual Hours	13,238	Revenue	$147,408	Subsidy/Pass	$4.72
Annual Miles	276,991	Subsidy	$601,622	Annual Passengers	127,557
Speed	21	Cost/Hour	$56.58	Weekday Passengers	456
Bus Trips	39	Ratio	0.20	Passengers/Hour	9.6
Buses	5	Subsidy/Bus	$120,324	Passengers/Bus Trip	11.7
Cost	$749,030	Subsidy/Hour	$45.45	Passengers/Bus	91

Source: Table 2-11, *I-80/I-680/I-780 Transit Corridor Study* (WSA, December 2003).

VINE Transit (Napa County)

VINE Transit operates Route 10 between Calistoga, St. Helena, Oakville, Yountville, Napa and Vallejo. About 15 roundtrips are made daily. Stops within Vallejo include the Sereno Transit Center, Kaiser Hospital, Ferry Terminal and the York-Marin Transit Center. Most southbound trips serve the ferry terminal prior to the York-Marin Transit Center, and all NB trips stop at the ferry terminal after leaving the York-Marin Transit Center.

YoloBus

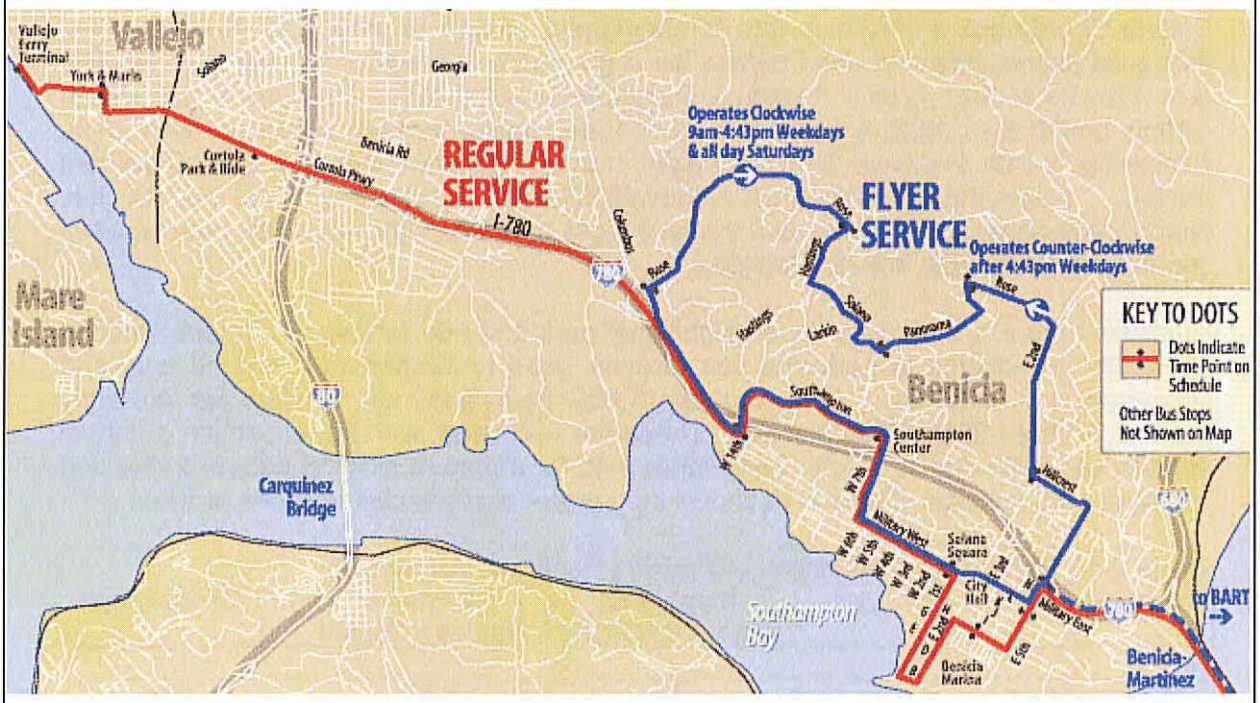
YoloBus operates Route 220 from Davis to Vacaville via Winters. It makes three roundtrips daily to Vacaville (with stops at Safeway and Wal-Mart).

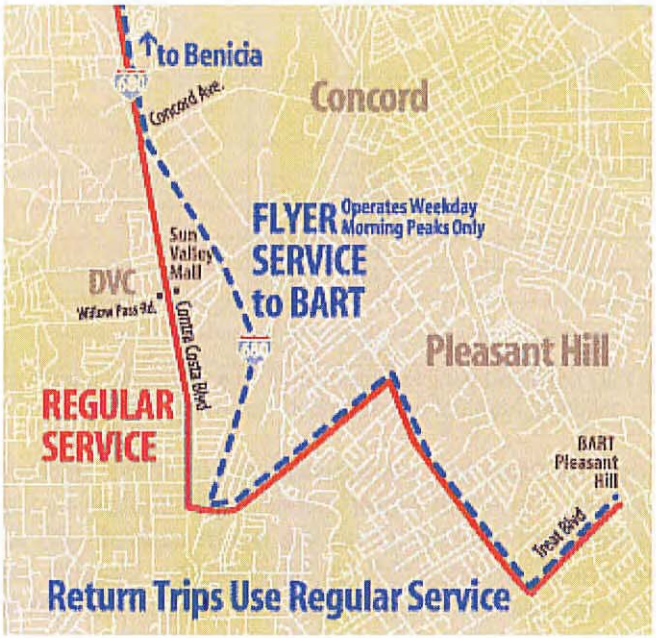
Summary

Eight intercity bus routes are operated by Solano County agencies. One (Route 30) extends to Davis and Sacramento, two (Routes 40 and Benicia) connect to the Pleasant Hill BART Station, two (Route 85 and Benicia) connect to the Vallejo Ferry Terminal and three (Routes 80, 90 and 91) connect to the El Cerrito del Norte BART Station. Intercity bus connections to Napa from Vallejo are provided by VINE Transit and YoloBus provides connections to Winters and Davis from Vacaville. Among the routes mentioned above, one (Route 85) connects to Solano Community College and one (Route 90, commute hour only) connects to Suisun City Amtrak Station. Three of the eight routes operate on Saturdays, but none operate on Sundays. Capitol Corridor passenger rail service and BayLink ferry service operate seven days a week.

While Figure 2-41 suggests that frequent service exists along the I-80 Corridor, it is very limited east of Vacaville (only Route 30). The segment between Vacaville and Fairfield is served by four routes (FST Routes 20, 30 and 40 and Vallejo Transit Route 91). The segment between Vallejo and the El Cerrito del Norte BART Station is served by 70 bus trips in both directions on an average weekday. There are on-time performance difficulties due to traffic congestion at the I-80/680 interchange and on I-80 through Vallejo. Schedule reliability problems tend to have the greatest effect on patronage for infrequent bus routes.

Current bus operations data show that the subsidy per peak bus required for service is approximately $125,000 per year for routes that operate commute service, midday service and Saturday service and $80,000 per peak bus required for routes that operate commute period only service (and therefore have fewer hours of service per bus). The average passenger boardings per bus hour of service is about 15 and ranges from 6 to 23. The intercity buses do not currently operate on Sunday.





Source: Wilbur Smith & Associates

Benicia Transit Service.ai

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-44

BENICIA TRANSIT SERVICE

2.2.2 Park and Ride Lots and Transit Center Facilities

Corridor Overview

Solano County has a very high rate of ridesharing relative to other Bay Area counties. Its transit usage, however, lags behind the region-wide average. According to RIDES, San Francisco Bay Area's Regional Rideshare organization, 24 percent of Solano County commuters rideshare and two percent use transit for their journey-to-work trips. Similar figures for the entire Bay Area Region are 17 percent rideshare and 10 percent transit. Napa and Sonoma Counties have similar transit rates as Solano County. It is important to consider rideshare and transit access needs together because both types of commuters share park and ride facilities.

At present there are about a dozen significant park and ride facilities in Solano County. These are in addition to park and ride facilities used to support the BayLink ferry and passenger rail services. Approximately 1,600 park and ride spaces are currently provided in the I-80/680/780 corridor. These are well used, with the exception of lots in eastern Vacaville and in Dixon. See Figure 2-45 for a map of existing park-and-ride and transit center facilities. Table 2-19 shows the current occupancies of these facilities.

Table 2-19 Parking Occupancies of Parking Facilities Along I-80

Location	Number of Spaces Available	Number of Vehicles Parked	Occupancy
I-80			
Magazine Street	19	19	100%
Curtola Parkway	500	600	120%*
Vallejo - York Street and Marin Street (Serving Vallejo Ferry Terminal)	100	100	100%
Red Top Road	Unmarked	15	N/A
Green Valley Road	61	35	57%
Fairfield Transportation Center	400	450	113%*
Davis Street	250	190	76%
Cliffside Drive	129	5	4%
Leisure Town Road	45	10	22%
Pitt School Road	100	7	7%
I-780			
East 2nd Street	15	7	47%

* The parking facilities are fully used and vehicles spillover to adjacent parking garages or on-street spaces.
** Informal parking lots are not listed here but are described below.

No formal park and ride facilities are established along I-680, although a few rideshare commuters appear to use the Vista Point parking lot located at Lake Herman Road. There is also another informal parking lot on the south side of I-80 at the Hiddenbrooke Parkway interchange which provides 15 to 20 spaces. Suisun bus commuters and rideshare commuters also use the SR 12 East lot at Main Street that serves Capitol Corridor passengers.

Immediate plans exist to expand the Vacaville Davis Street park-and-ride facilities with construction of a new lot on the south side of the interchange (Bella Vista Park and Ride). This lot is designed to provide an additional 201 spaces to the current Davis Street supply. Work is currently underway to add 234 spaces to the Fairfield

Transportation Center. Together these two projects will add 435 spaces to the current total of 1,500 spaces (a 30 percent increase).

I-80 Corridor
With respect to the I-80 corridor, major transit hubs are located at Curtola Parkway, West Texas Street-Fairfield Transportation Center (FTC) and Davis Street. The spacing of these transit center facilities is approximately 15 miles between Curtola Parkway and the FTC and about 9 miles between the FTC and Davis Street. No major transit centers are presently located along I-680 or I-780.

Magazine Street Park and Ride Lot
A small park and ride lot is located on the west side of I-80 at the Magazine Street interchange. It has capacity to park 19 vehicles and is generally full. No intercity bus routes serve this small facility.

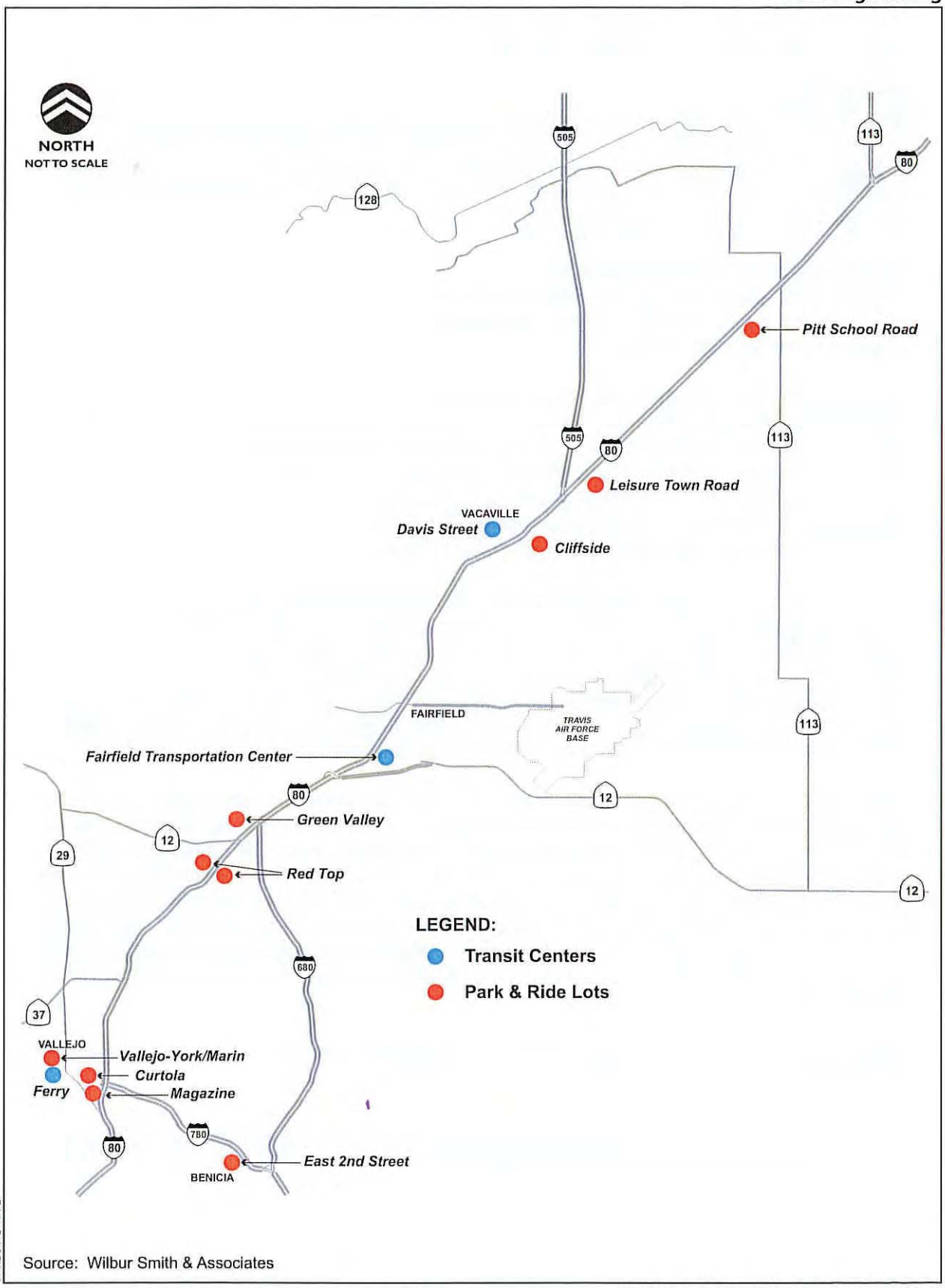
Curtola Parkway Transit Center Park and Ride Lot
The Curtola Parkway Transit Center is located just west of the Lemon Street intersection. Most of the parking facilities (410 spaces) are also located on the west side of the intersection, but approximately 90 spaces are provided in a small lot on the east side of the intersection. Both lots are full by 6:30 a.m., at which time motorists begin to park on adjacent streets. Observations suggest that up to 100 cars park on the adjacent streets, bringing the total parking usage to 600 vehicles.

Vallejo Transit serves the transit center with its Route 80 buses, which operate six days a week and provide frequent service during commute periods (six buses an hour in the peak direction). The Benicia bus route also serves the Curtola stop and provides opportunities for Benicia passengers to transfer to buses headed to the El Cerrito del Norte BART station. Vallejo passengers can connect to destinations in Benicia and to the Pleasant Hill BART station at Curtola using the Benicia bus service. No local Vallejo Transit buses stop at Curtola although Greyhound Bus Lines has a staffed stop there.

The current design of the Curtola transit stop is very efficient for westbound buses destined to Benicia and El Cerrito del Norte BART. Buses simply use the bus pullout located along the EB curb of Curtola Parkway. The design is not very efficient for buses outbound towards Vallejo. Buses must turn left onto Lemon Street from Curtola, turn right into the park and ride lot driveway, circulate 500 feet into the lot to pick up passengers and return to Lemon Street in order to reach Curtola Parkway. This adds delay for passengers bound for central Vallejo, costs to bus operators, and traffic to park and ride driveways. Passengers particularly dislike circuitous bus routings that reverse direction along their commute route.

Aside from the parking capacity shortfalls, other features of the parking element of the Curtola Transportation Center are:

1. Location of some parking on the east side of Lemon Street and most of the parking located on the west side.



Source: Wilbur Smith & Associates

Existing Park & Ride.ai

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-45

EXISTING PARK & RIDE AND TRANSIT CENTER FACILITIES

2. Limitation of driveway access for both parking lots to a single driveway onto Lemon Street, which is quite close to the Curtola signalized intersection (often traffic stacks back, hindering exit maneuvers from the lots).
3. A driveway for the west side lot that must be shared with large Greyhound, Vallejo Transit and Benicia transit buses as well as with PG&E yard traffic.
4. Concentration of all driveway access onto Lemon Street, which also concentrates all access traffic (cars and buses) at the Curtola Parkway/Lemon Street signalized intersection.
5. A long, narrow configuration of the lot that complicates security.
6. Discontinuous internal circulation in the west side lot, mainly due to the need to accommodate westbound transit buses and Greyhound buses and due to the physical dimensions of the lot. This situation complicates efficient search patterns for parkers.
7. Inadequate pedestrian access to the transit stop.

Drivers that do not arrive in time to find a space in the parking lots must park on the streets. Parking on the adjacent streets tends to upset local property owners. In summary, this facility is located at an ideal location, has less than desired access and circulation efficiency and urgently needs added capacity.

Downtown Vallejo (York-Marin)
York-Marin is the central transfer point for Vallejo Transit buses. Benicia Transit and VINE (Napa) buses also stop at this key passenger transfer point. Buses board passengers from all curb-faces at this intersection. Vallejo Transit's Route 80 and 85 intercity buses serve this lot. Approximately 100 park and ride spaces are located adjacent to the transit center to serve long distance commuters. This facility suffers from a parking capacity shortfall. This site is being expanded to support additional ferry patronage.

Hiddenbrooke (American Canyon) Park and Ride Lot
On the south side (EB) of I-80 at the Hiddenbrooke Parkway interchange, motorists park on a graveled area. This is not a formally designated parking area, but between 15 and 20 cars regularly park at this location. No bus service is provided.

Red Top Road Park and Ride Lot
Graveled areas have been provided on both the south and north side of I-80 at Red Top Road and are used by park and ride patrons. On a typical day about 15 cars can be found in each of these two lots. No intercity bus service stops at these lots. The City of Fairfield has acquired right-of-way for a future park-and-ride lot west of I-80, south of the railroad track and east of Red Top Road.

Green Valley Road Park and Ride Lot
A small park and ride lot is embedded into the westbound ramps of the Green Valley Road interchange. The lot has capacity for 61 vehicles. Observations indicate that 35 cars use the lot on a typical weekday. During the height of the recent economic boom, this lot was regularly filled. The Green Valley Road park and ride lot serves I-680 commuters as well as commuters east and westbound on I-80. No transit service is provided to the lot. Future plans to improve the I-80/680 interchange will eliminate this

lot. It will be replaced by an expanded lot at Red Top Road. Replacement parking will be provided by the new park-and-ride lot at I-80/Red Top Road.

West Texas Street (Fairfield Transportation Center)
The Fairfield Transportation Center (FTC) is located adjacent to the eastbound off-ramp to I-80 at West Texas Street. It consists of a 400-space parking garage and an eight-bay bus transit center. A special rideshare pick-up and drop-off point is integrated into the facility (rideshare users are separated from the transit users). The parking garage is fully used and about 50 motorists regularly spillover and park in the Home Depot parking lot on the opposite side of Cadenasso Road from the Transit Center. FTC is a popular vanpool and casual carpool assembly point. Interior circulation in the garage is excellent as is its pedestrian access. The City of Fairfield is in the process of adding another 234 spaces in a new parking lot located on the west side of the Transit Center. FTC is served by Vallejo Transit Routes 90 and 91, Fairfield-Suisun Transit intercity routes 30 and 40, and FST local Routes 3A, 3B and 7.

Access to the Transit Center for intercity buses is more circuitous than is desired. Eastbound buses exit I-80 at Magellan (Auto Mall Drive) 0.5 miles to the west of the Transit Center, loop through the Transit Center and re-enter I-80 via the Beck Street on-ramp. This path is relatively direct. Westbound buses on I-80, however, exit at the Oliver Road off-ramp, which is located 0.4 miles east of West Texas Street, turn left onto West Texas Street, turn right onto Cadenasso Road, loop through the Transit Center and re-enter I-80 via Magellan Drive and the Abernathy Road on-ramp. The left turn movement from Oliver onto West Texas often does not clear in one signal cycle and buses are therefore delayed at this intersection. The need for westbound buses to pass the Transit Center on West Texas Street and double back to it via Cadenasso Road also adds running time (and runs buses through two more traffic signals). See Figure 2-46 for a schematic of Phase II of the FTC.

Vacaville Davis Street Transit Center (Vacaville Regional Transportation Center)
The Davis Street Transit Center and park and ride lot is located adjacent to the westbound I-80 on- and off-ramps at Davis Street. The site provides 250 parking spaces and two passenger islands for buses to load. During the recent economic peak this park and ride lot was regularly full. Recent observations indicate that it is 76 percent full, with 190 cars parked in the lot. It is a popular vanpool assembly point.

The site is served by FST Routes 20, 30 and 40 as well as Vallejo Transit's Route 91 and local Vacaville City Coach bus Route EX. Westbound buses access the site very directly via the Davis Street on- and off-ramps located adjacent to it. Eastbound buses, however, have much more circuitous access. Eastbound buses exit I-80 at the Bella Vista hook ramp, turn left onto Bella Vista Road, turn left again onto Davis Street at its signalized intersection, pass through the new Hume Way signal, loop through the transit center, turn right onto Davis Street, pass through the Hume Way signal and turn right onto Bella Vista Road to the on-ramp. The Davis Street/Bella Vista Road intersection is often congested and causes delays to buses.

The City of Vacaville is in the process of constructing a new 201-space park and ride lot on Bella Vista Road near the Davis Street Transit Center. This new lot would expand parking capacity to serve future needs. Buses will continue to serve the Davis Street lot and passengers will need to walk from the new Bella Vista Road lot in order to access bus services. See

Figure 2-47 for a schematic of the Bella Vista site.

Cliffside Drive Park and Ride Lot
This lot is located near the eastbound I-80 Cliffside Drive on- and off-ramps in Vacaville. It is directly linked to the Vacaville Greyhound Terminal, but is somewhat obscured by landscaping and is not as convenient for park and ride and Greyhound passengers as other parking. It is not served by any intercity bus lines and it is scarcely used. Observations indicate that less than five vehicles are parked in this 129-space lot on a typical weekday. Access to the lot by automobile and bus is not very good. Caltrans has indicated plans to decommission it due to lack of use.

Leisure Town Road Park and Ride Lot
The City of Vacaville opened this new 46-space lot in the fall of 2003. It is located at the southwest quadrant of the Leisure Town Road interchange adjacent to a Jack-in-the-Box restaurant. Early experience is that about five vehicles use the lot on a typical weekday, with another five vehicles parking on the more accessible adjacent street. The latter parking will be lost when the interchange improvements are completed. No intercity bus services serve this site. Figure 2-28 shows a schematic of this site.

Pitt School Road (Market Lane) Park and Ride Lot
This 100-space lot is located south of I-80 along Pitt School Road with its access immediately provided from Market Lane. On a typical weekday about seven cars are parked in this lot. FST's Route 30 serves the lot several times a day. The site is well located, but not as visible as desired. Future development of the parcel to its west should provide a better sense of security for the lot users.

I-680 Corridor

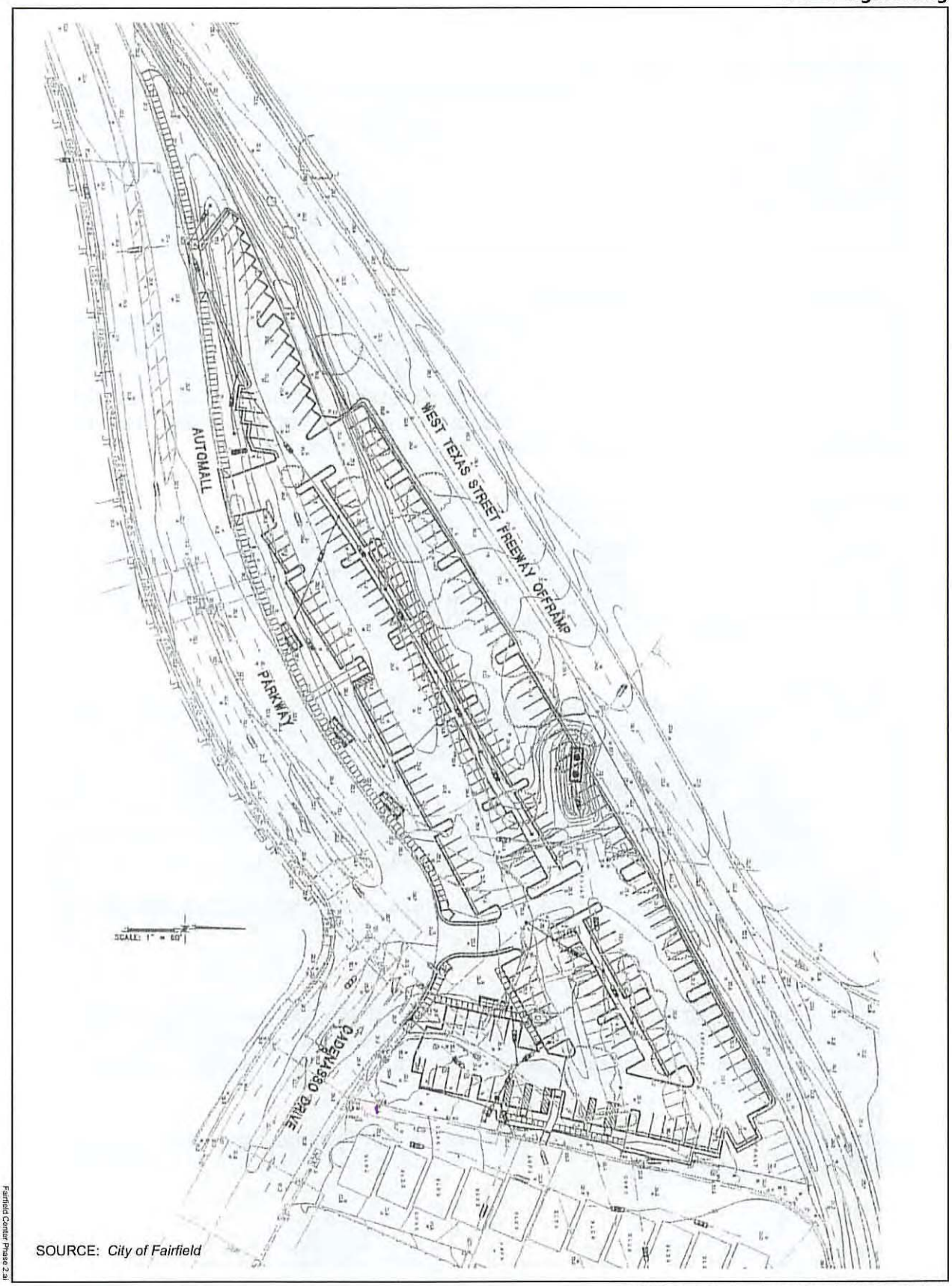
At present there are no park and ride lots or transit centers located along I-680. Some commuters, however, appear to use the Vista Point parking facilities near Lake Herman Road for parking. On a typical weekday less than ten cars appear to be park and ride oriented, with other users appearing to be Vista Point and rest area oriented users. The current parking lot provides about 45 spaces. No major residential areas are located near the interchange to draw park and ride use. Security appears to be an issue at this remote site. No intercity buses stop at or near the site.

About five cars currently park near the Gold Hill Road interchange in a graveled lot. No intercity bus service is provided to this lot.

I-780 Corridor

The only formal park and ride lot located along I-780 is the 15-space facility located in Benicia at East 2nd Street. The lot is not very visible and has relatively poor access. Approximately seven cars currently park at this lot on a typical weekday. There is no bus service at this lot.

Approximately nine park and ride cars are usually parked near the Columbus Parkway/Rose Drive intersection.



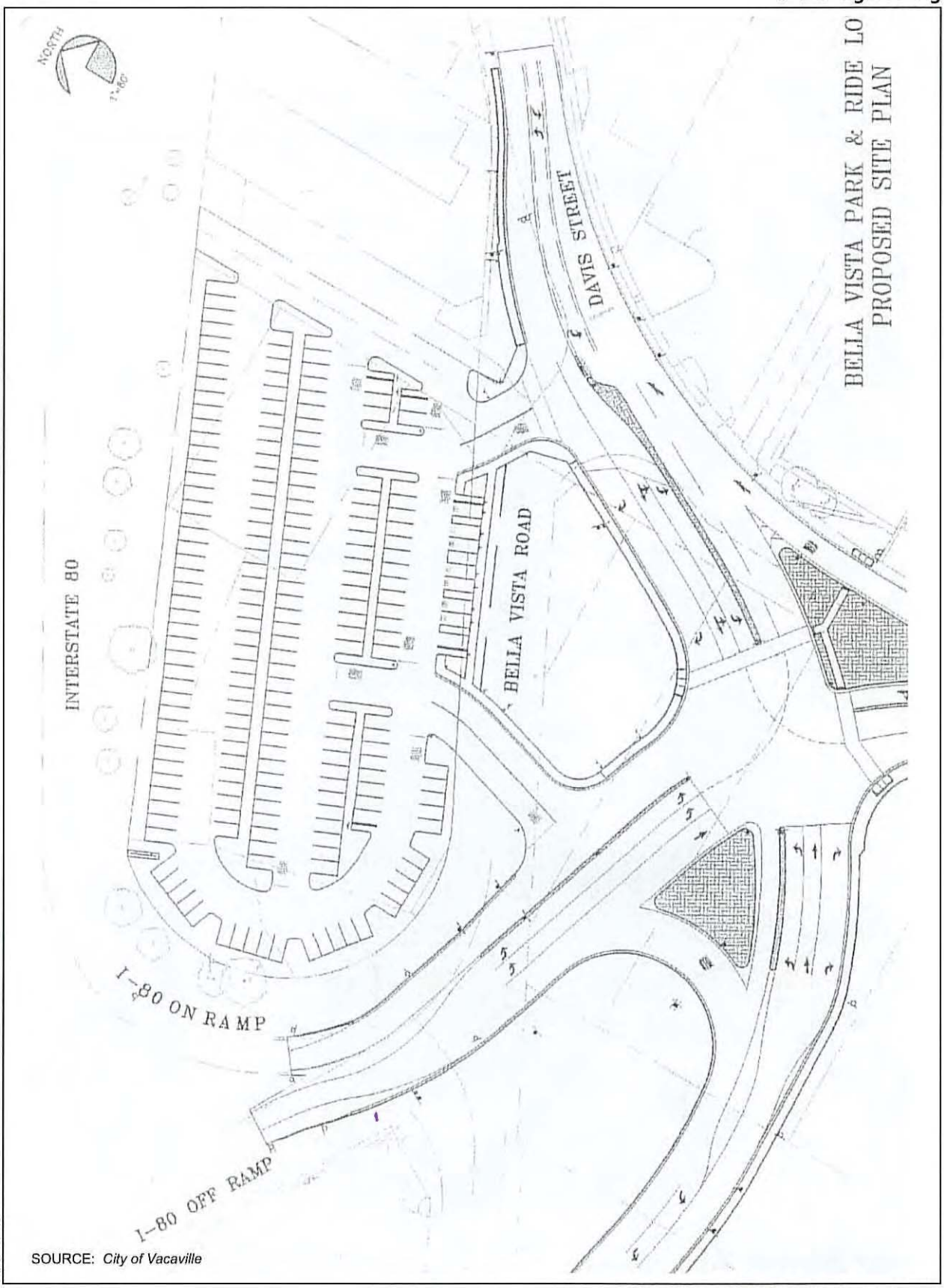
SOURCE: *City of Fairfield*

Fairfield Center Phase 2.ai

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-46

PHASE 2 OF THE FAIRFIELD TRANSPORTATION CENTER

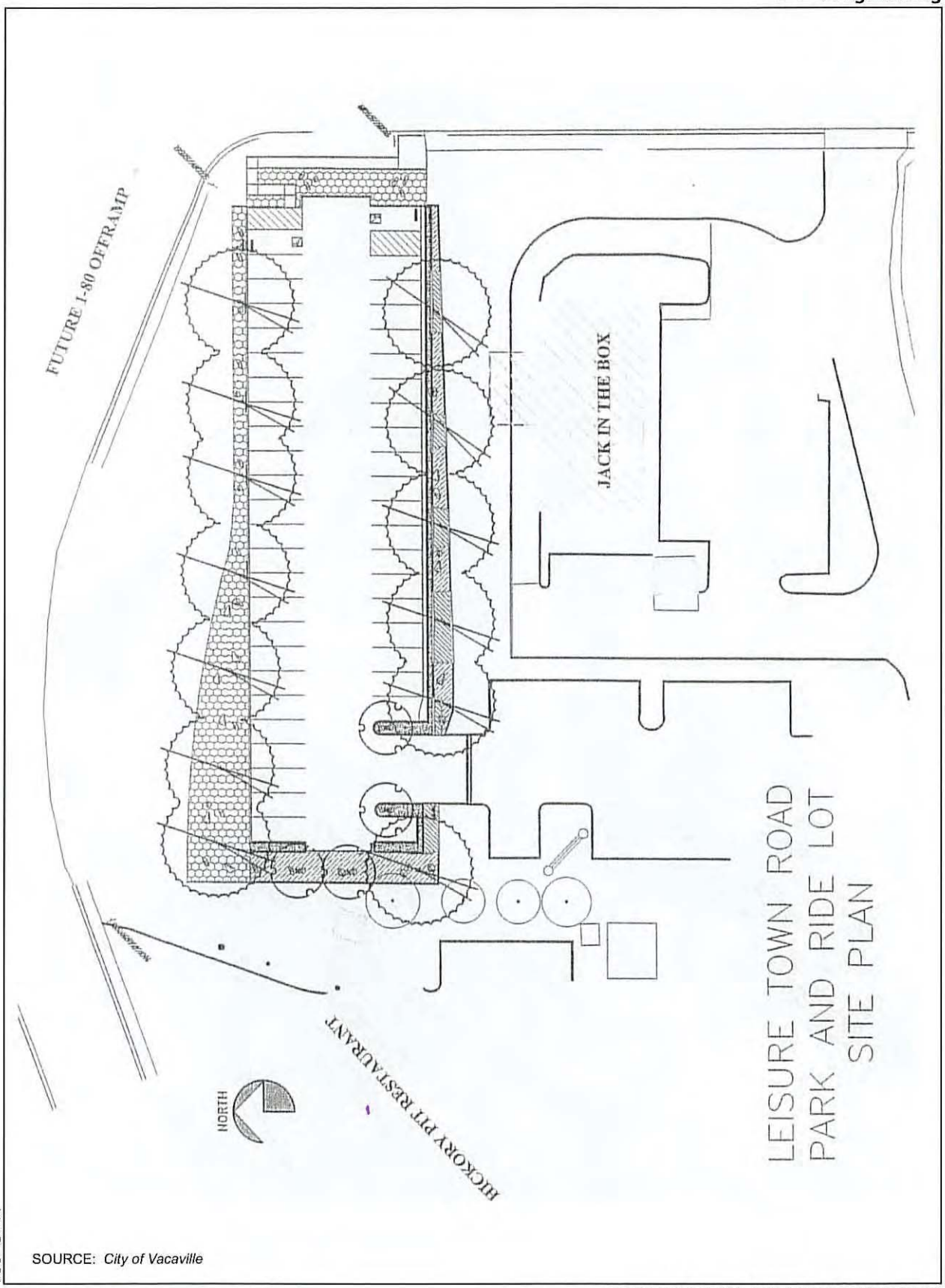


SOURCE: *City of Vacaville*

Bella Vista Pk-R.ai

Figure 2-47

BELLA VISTA PARK & RIDE PROPOSED SITE PLAN



SOURCE: *City of Vacaville*

Leisure Town PnR.ai

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 2-48

LEISURE TOWN ROAD PARK & RIDE LOT SITE PLAN

Park and Ride Use Profiles

Park and ride usage has declined in Solano County and elsewhere in the Bay Area since the recent economic boom era, but remains very active. Two sources of information provide some insight into current usage. These data resources are the November 2000 survey of park and ride users at the Curtola, York-Marin and Davis Street sites, and the post-opening survey of Fairfield Transportation Center users.

Mode of Travel

The mode of travel (transit or rideshare) varies significantly depending on location of the lot and the amount of transit services provided to that lot. At Curtola Parkway, 34 percent of the patrons use transit, 42 percent indicated they are casual carpoolers, 8 percent are regular carpoolers and 16 percent are vanpoolers. At York-Marin, 95 percent reported being bus patrons and 5 percent reported being vanpoolers. At Davis Street, 16 percent of the patrons reported are bus riders, 3 percent casual carpoolers, 14 percent regular carpoolers and 67 percent vanpoolers. At the Fairfield Transportation Center, 49 percent reported being bus riders, 20 percent being carpoolers and 31 percent being vanpoolers.

Origin Destination Patterns

Most park and ride patrons reside close to park and ride lots and a disproportionately high percentage were bound for San Francisco and the East Bay employment centers of Oakland and Berkeley. These communities have concentrated employment centers that are served by good pedestrian systems and transit service. It is also difficult and expensive to park cars at these worksites.

Of those who use the Curtola Parkway lot, 76 percent of patrons live in Vallejo, 6 percent in Benicia, and 4 percent in Fairfield. Seventy-seven percent were bound for work in San Francisco, 12 percent to Oakland and 5 percent to Berkeley. At the York-Marin lot, 77 percent of users are residents of Vallejo, 7 percent from Benicia and 7 percent from American Canyon. Patrons were bound for work as follows: 30 percent to San Francisco, 43 percent to Oakland and 20 percent to Berkeley.

Seventy-nine percent of the people who use the Davis Street lot live in Vacaville. Sacramento and Winters account for 6 percent of users. People were bound for work to the following employment locations: 25 percent to San Francisco, 19 percent to Sacramento, 13 percent to San Francisco International Airport (SFO), and 9 percent to Walnut Creek. The residential distribution of patrons at the Fairfield Transportation Center is as follows: Fairfield 52 percent, Suisun City 28 percent, and Vacaville 14 percent. Sixty percent of users were headed to San Francisco, 13 percent to Oakland, 7 percent to Richmond, 5 percent to Walnut Creek and 4 percent to Berkeley.

2.2.3 Existing Rail Services

Capitol Corridor rail service runs seven days a week between Emeryville and Sacramento. As of December 2003, there were twelve daily roundtrips. Solano County's only stop for the Capitol Corridor is in Suisun City, where 98,000 passengers boarded and alighted during FY02-03. This constitutes about five percent of intercity transit trips outside of Solano County. The ultimate objective for the Capitol Corridor is to have 16 daily roundtrips. AMTRAK service runs through Solano County, but does not have any stops there.

2.2.4 Market Demand

Background

The strongest travel markets for intercity express bus services typically are journey-to-work trips and to a lesser extent, journey to college/university trips. These trip purposes tend to be longest in length and thus benefit most from faster speeds of express bus services. These trip purposes also tend to be repetitive (every day), which is also conducive to transit and rideshare modes of travel. The presence of tolls, congestion and HOV facilities in the corridor tend to encourage transit and rideshare usage.

2.2.4.1 Existing Transit Ridership

Overall, the express bus services, the Capitol Corridor passenger rail service, and the Baylink ferry service are estimated to serve approximately 6,600 daily passenger trips on an average weekday. Capitol Corridor service carries about 300 daily riders from Solano's only rail station, located in Suisun City. The Baylink ferry service carries about 2,800 daily riders. Vallejo Transit serves about 2,680 trips to and from the county on Routes 80, 85, 90 and 91. Fairfield-Suisun Transit carries about 400 trips to/from the County on Routes 30 and 40 and Benicia Transit is estimated to carry 460 daily riders to/from Solano County on an average weekday. Table 23 gives a more detailed summary of these figures. The Capitol Corridor serves approximately five percent of intercity transit trips to points outside Solano County, and the Baylink ferry serves about 42 percent. The remaining 53 percent are served by intercity buses.

Table 2-20 Summary of Corridor Bus Usage

Operator	Route	Passengers per Weekday	Percent of Total
Vallejo	80	1,454	41%
	85	482	14%
	90	543	15%
	91	206	6%
FST	20	196	5%
	30	82	2%
	40	122	4%
Benicia	1	456	13%
Total Intercity Bus Transit		3,541	100%

Source: Table 4-5, *I-80/I-680/I-780 Transit Corridor Study* (WSA, December 2003).

In summary, on a typical weekday Vallejo Transit's intercity routes carry approximately 2,685 passengers. Route 80 from Vallejo to El Cerrito del Norte BART carries the most with 1,454 passengers, Route 85 carries 482 passengers, Route 90 carries 543 passengers and Route 91 carries 206 passengers.

Fairfield-Suisun intercity transit routes carry 400 daily passengers on a typical weekday. All of the 196 daily trips served by Route 20 are internal to the county and some of the 82 passengers carried by Route 30 are also internal county trips. Most of Route 40's 122 daily passengers are going to and from the Pleasant Hill BART Station. Thus, approximately 160 daily trips served by Fairfield-Suisun Transit are trips to points outside the county. Finally, Benicia Transit carries about 456 daily riders.

3 FUTURE CONDITIONS

3.1 Highway

To identify the long-term transportation needs of the I-80/I-680/I-780 freeway corridors in Solano County, future travel demand modeling forecasts were prepared using the Napa/Solano County travel demand model. The section describes the methodology used to develop the travel forecasts and projected future conditions in the study corridors.

3.1.1 Modeling Assumptions

The majority of the travel demand forecasting for the I-80/I-680/I-780 study corridor pivots off of year 2030 projections from the Napa/Solano County travel demand model. The set of baseline year 2030 demand forecasts used in the study assumes the implementation of a number of future travel improvements. Since the model uses an iterative assignment approach based on travel time calculations, it is necessary to assume a future set of baseline transportation improvements. This ensures the most accurate representation of future demand and travel patterns. The transportation improvements assumed in the study's year 2030 baseline forecasts include:

1. The Caltrans "Aux Lane" project, which widens I-80 to five lanes in each direction between I-680 and SR 12 East.
2. Additional widening of I-80, to five lanes from the West Texas Street on-ramp to SR 12 (East) in the westbound direction and from SR 12 (East) to the Abernathy off-ramp in the eastbound direction.
3. The Caltrans SR 12 West Truck Climbing Lane Project. This project adds a 2nd lane to westbound SR 12 from just past the SR 12 West/I-80 off-ramp to approximately 700 meters west of Red Top Road.
4. An HOV lane on I-80 in both directions between SR 12 West and Air Base Parkway.
5. Construction of a collector/distributor roadway system for eastbound traffic on I-80 from SR 12 (W) to Suisun Valley Road and braiding of off/on-ramps.
6. Construction of a collector/distributor roadway system for westbound traffic on I-80 and braiding of off/on-ramps from Suisun Valley Road to SR 12 (W).
7. Relocation and reconstruction of the truck scales within Segment 1.
8. A new Red Top Road/I-680 Interchange is also assumed to be constructed between the I-80/I-680 interchange and the Gold Hill Road/I-680 interchange.
9. The four-lane Jameson Canyon Project.
10. North Connector project. The SR 12/Red Top Road intersection is modeled as a signalized at-grade intersection. An eastbound left turn lane and one through lane in each direction has been added to SR 12 approaching Red Top Road to replace capacity lost by the signal. The North Connector has been modeled as a two-lane arterial between Red Top Road and the current western terminus of Business Park Drive. The eastern portion of the North Connector is modeled as a four-lane arterial.
11. The Benicia Bridge is assumed to be expanded to five northbound lanes and four southbound lanes. The I-680/I-780 interchange is assumed to be modified to

provide two lanes on each ramp, except for the ramp connecting southbound I-680 to westbound I-780 (one lane).

12. The Carquinez Bridge is assumed to be expanded to four lanes in each direction. No changes have been made to lane configurations north of the toll plaza.

A portion of the existing network outside Solano County has also been modified. The modifications reflect the MTC Regional Transportation Plan (RTP) for the year 2025. They include a westbound HOV lane on I-80 from the Carquinez Bridge to SR-4 in Hercules, and HOV lanes in each direction on I-680 from the Benicia Bridge to SR-4 in Concord. They also include the two widening projects for the bridges on the Carquinez Strait (Al Zampa and Benicia-Martinez bridges) that are currently underway.

3.1.2 Horizon Years

Future conditions were analyzed for the years 2010, 2020 and 2030 to determine future bottlenecks and points of traffic congestion in the study corridor. The California Department of Transportation (Caltrans) normally adopts a 20-year horizon in its planning studies, and the study's forecasts are consistent with that guideline.

3.1.3 Travel Demand Forecasts

3.1.3.1 Bottlenecks and Queues

Future bottlenecks, queues and delays throughout the study corridors were initially evaluated under the assumption that no improvements were pursued throughout the study corridors, other than the near term projects listed in Table 0-2. The results of this analysis are also included in Section 1-2, to establish the Purpose and Need for this study and its recommendations. This analysis uses the methodology described in Section 4.2.1 to evaluate the bottlenecks, queues and delays that would develop in the study corridors with the implementation of no further improvements. The constraining effects of upstream bottlenecks on downstream sections are factored into this analysis.

Figure 3-1, Figure 3-2 and Figure 3-3 illustrate forecast conditions in the study corridors for the horizon years 2010, 2020 and 2030 respectively. With no further improvements, westbound delays on I-80 in the morning peak hour will reach approximately 30 minutes through Vacaville and Fairfield, and approximately 12 minutes through Vallejo, by the year 2030. Similarly, with no improvement, eastbound delays during the evening peak hour will grow to approximately 20 minutes for vehicles on I-80 and I-680, by the year 2030.

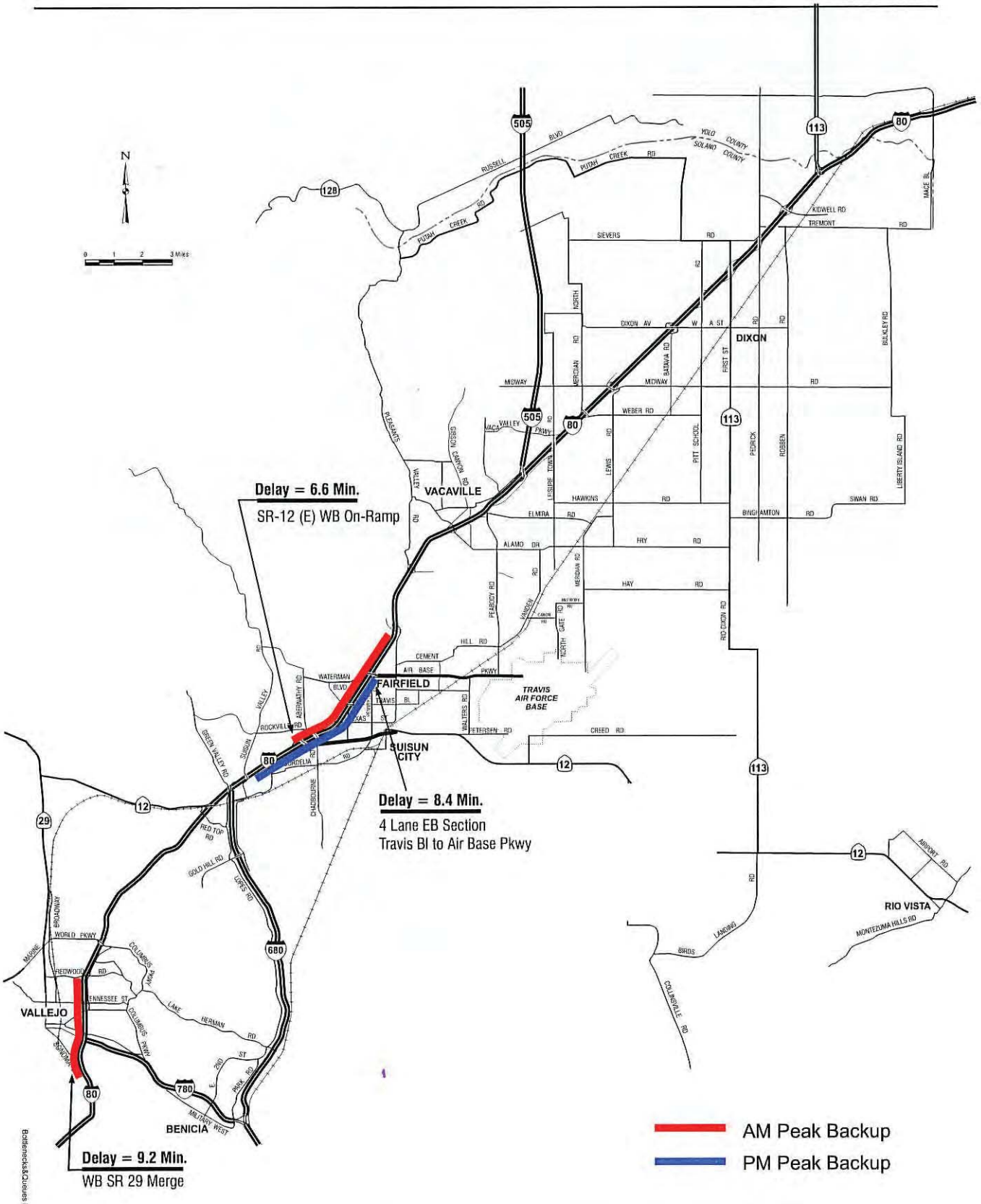
3.1.3.2 Volume-Capacity Ratio and Level of Service

To illustrate forecast growth in traffic through the study corridors, Figures 3-4 through 3-9 compare traffic volumes and capacities at critical locations for existing conditions, and the horizon years 2010, 2020 and 2030. The volumes presented in Figures 3-4 to 3-9 represent "unconstrained" traffic volume predictions, directly from the Napa/Solano County travel demand model, and do not account for the constraining effects of upstream bottlenecks.

The methodology used is similar to that presented in Section 2.1.4 for Existing Conditions. Service levels on each freeway section and ramp have been calculated for the "unconstrained" travel demand forecast by the Napa/Solano County model. The operating characteristics of the study freeway components in the year 2030 are described by the concept of Level of Service (LOS), which is a qualitative description of the freeway component's performance based on the volume-to-capacity (V/C) ratio. LOS analysis was conducted for each of the freeway segments and ramps along I-80, I-680 and I-780 for the year 2030 baseline condition.

As in the analysis of existing conditions, the assumed capacity for each of the freeway segments was 2,000 vehicles per lane per hour (vplph). On- and off-ramps are assumed to have a capacity of 1,600 vplph for diamond interchanges and 1,200 vplph for clover/loop interchanges. Two-lane ramps have a capacity of 3,000 vplph (equal to 1.5 times the capacity of one through lane). Figures 3-10 through 3-32 illustrate V/C ratios and LOS ratings for each of the freeway sections and ramps in 2030. These figures also show the unconstrained a.m. and p.m. peak hour traffic volumes. The geometry described in Section 3.1.1 above is assumed in this analysis.

Figures 3-10 through 3-32 do not account for the constraining effects of corridor bottleneck. In addition, they do not reflect poor service levels for areas under queue due to downstream bottlenecks. Section 6 presents a detailed analysis which accounts for the constraining effects of corridor bottlenecks, and identified service levels based on queues and travel speeds.

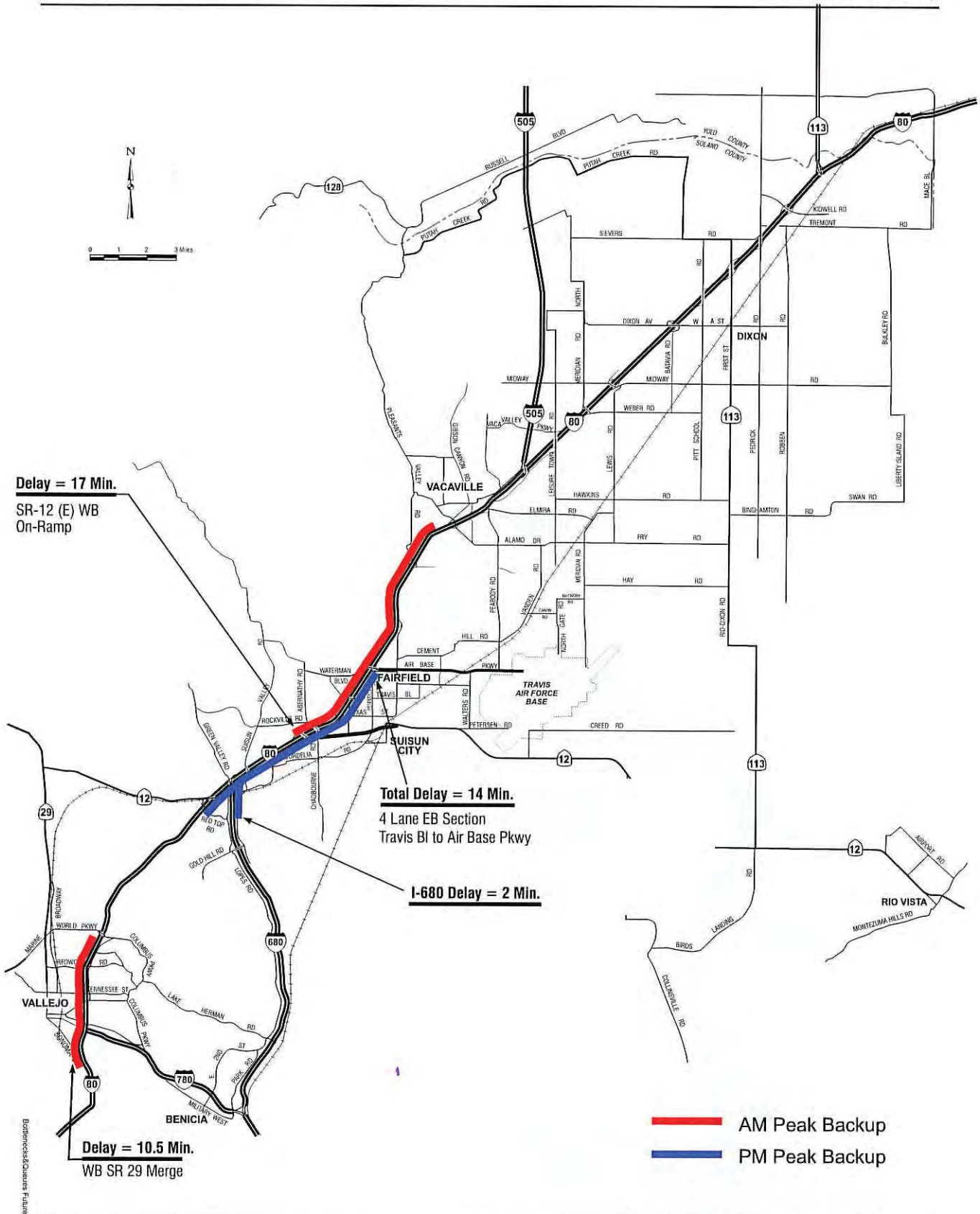


Bottlenecks&Queues Future.cdr

2-12-04

Figure 3-1

YEAR 2010 CONGESTION AND DELAY WITH FUNDED PROJECTS 1A THROUGH 1F

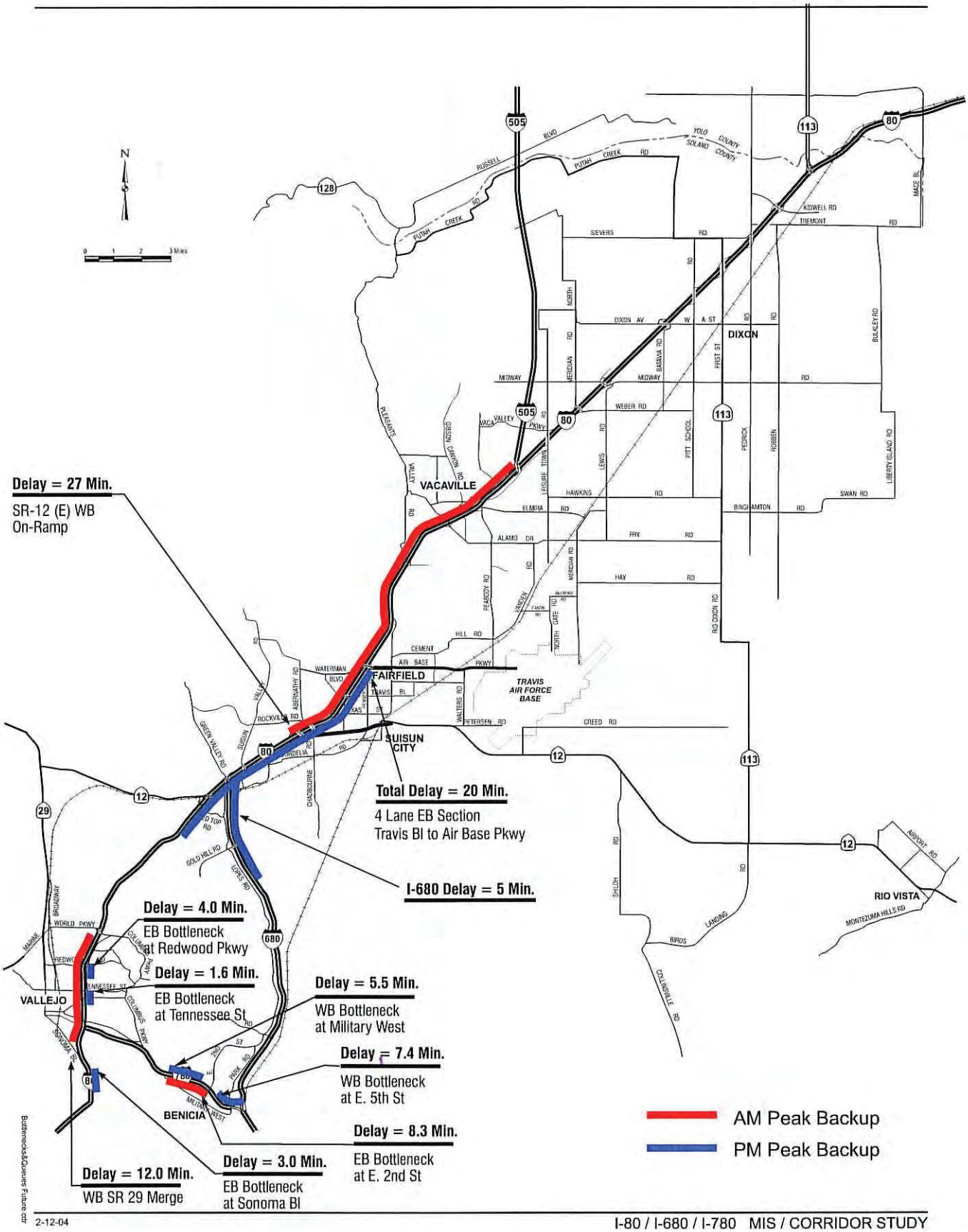


Bottlenecks&Queues Future.cdr 2-12-04

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-2

YEAR 2020 CONGESTION AND DELAY WITH FUNDED PROJECTS 1A THROUGH 1F



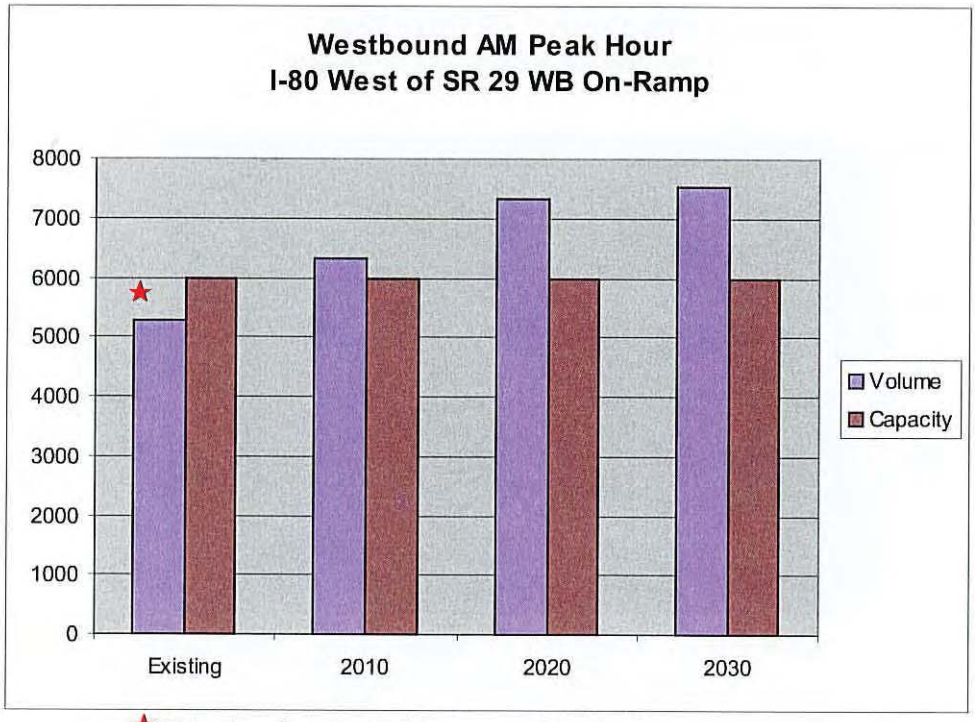
Bottlenecks&Queues Future.cdr

2-12-04

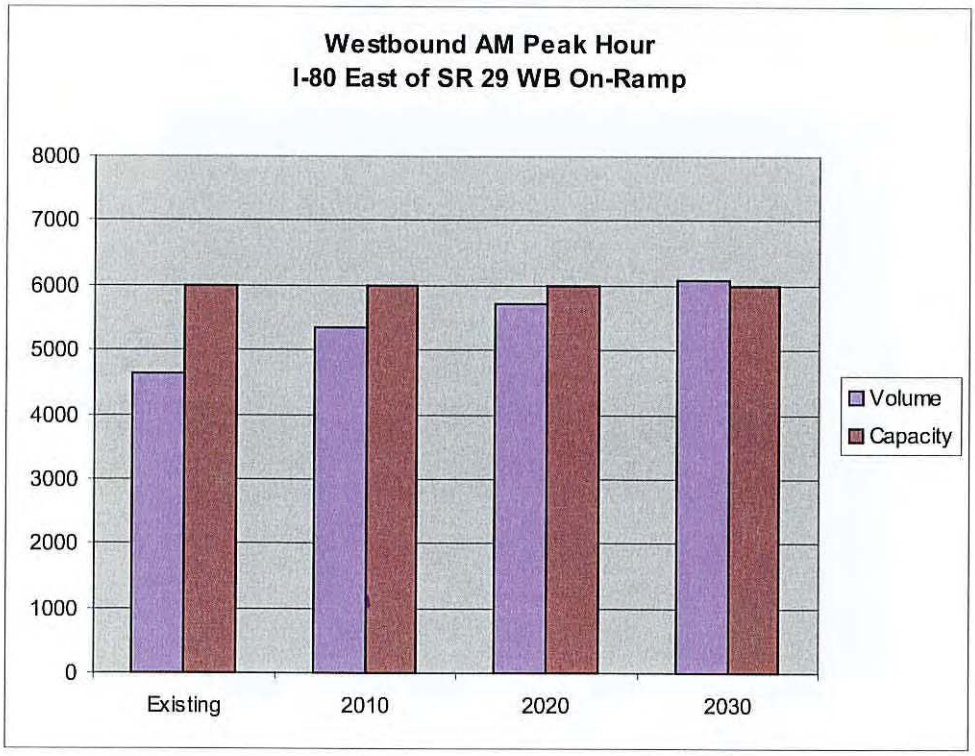
I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-3

YEAR 2030 CONGESTION AND DELAY WITH FUNDED PROJECTS 1A THROUGH 1F



★ Platooning of on-ramp traffic in excess of 6,000 vph.



Seg 2 V-C graph 1 Rev 3.cdr

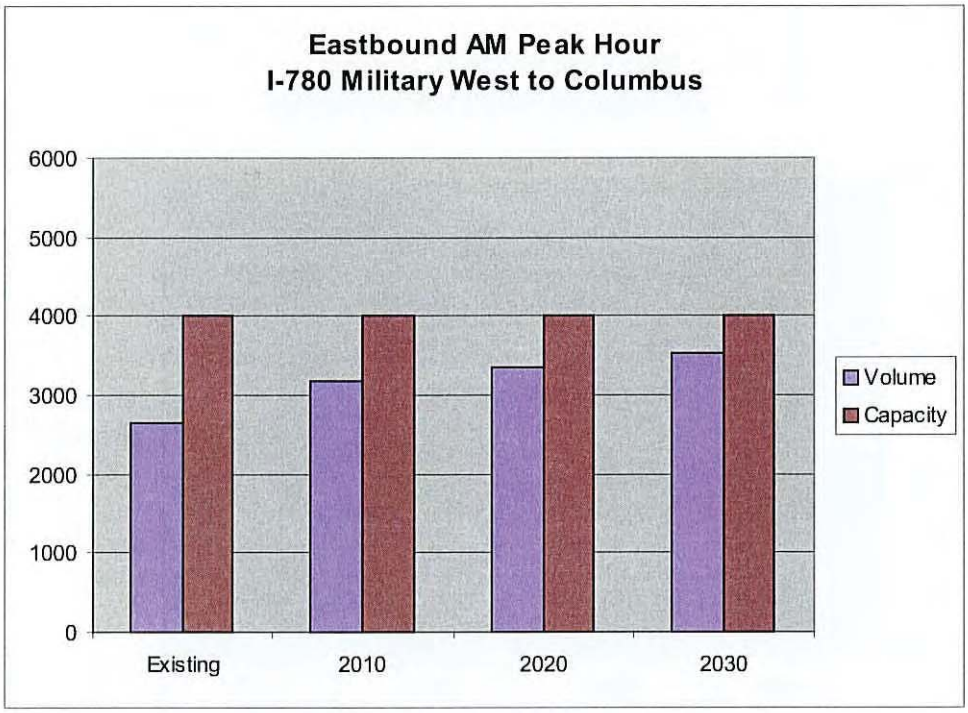
June 5, 2003
Rev 6-1-04

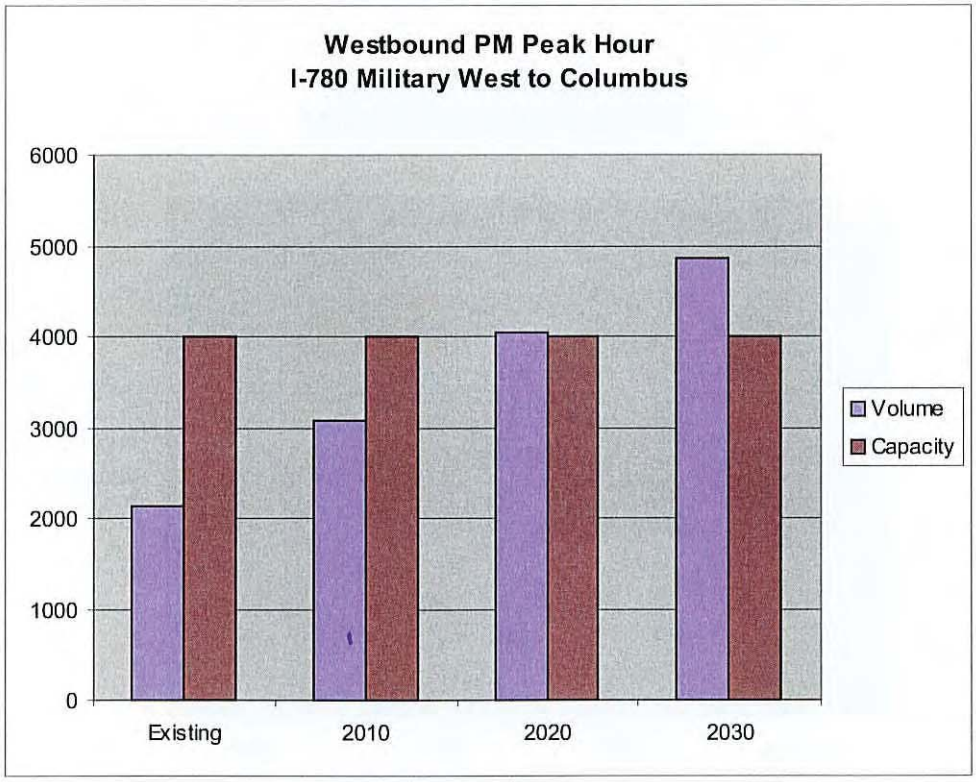
I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-4

I-80 TRAFFIC COMPARISON AT SR 29 ON-RAMP

Segment 2





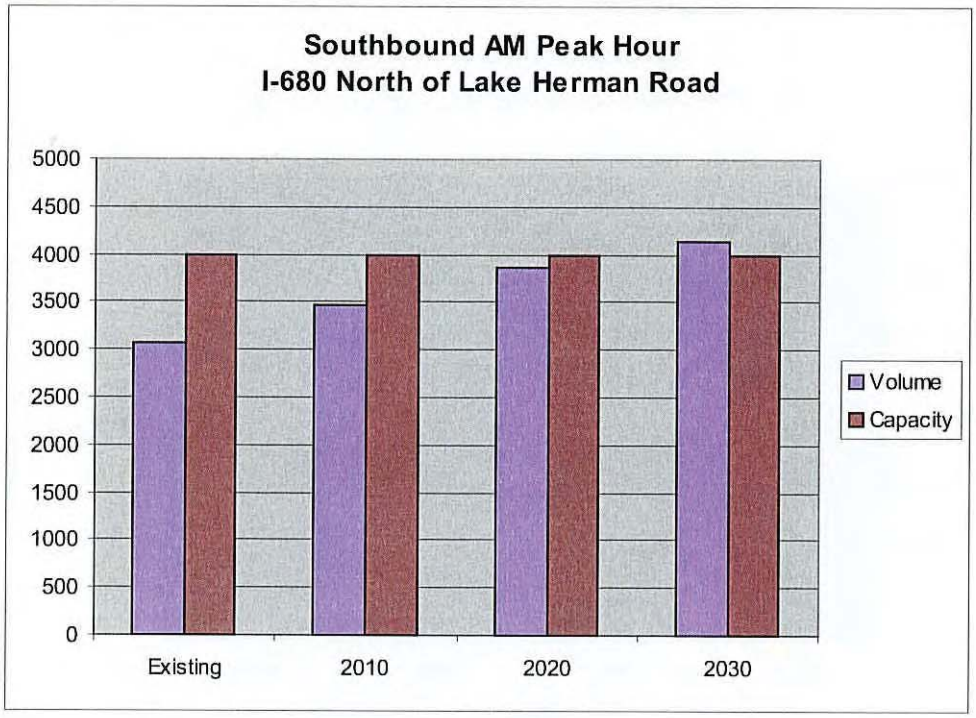
Seg 3 V-C graph 1 Rev 2.cdr

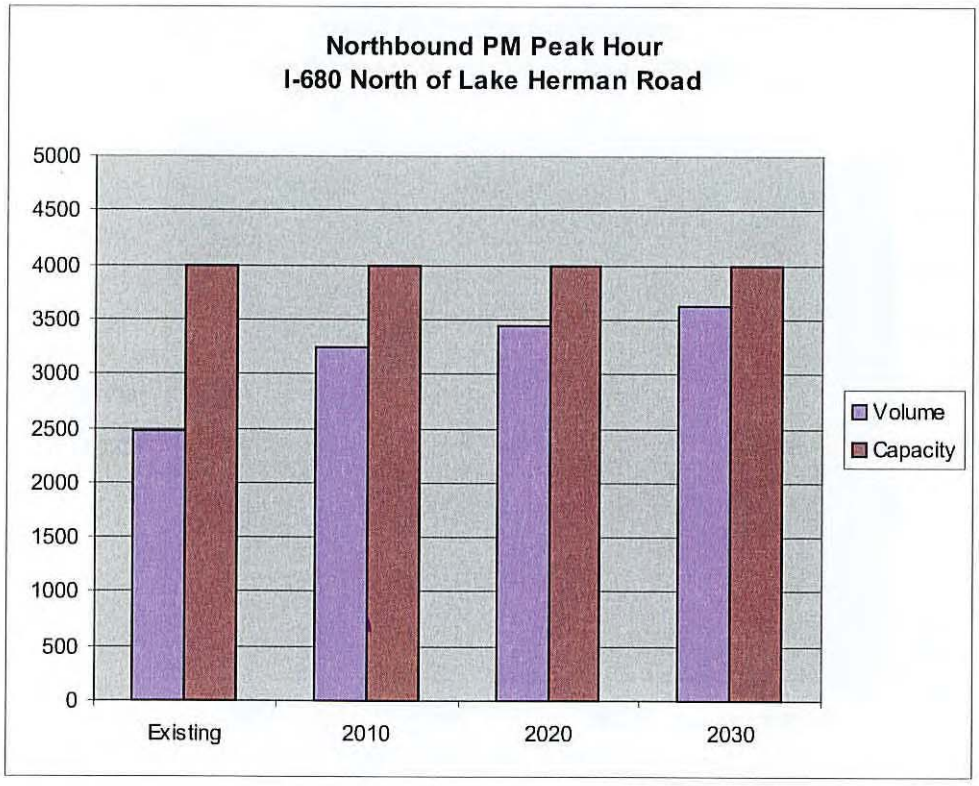
June 5, 2003
Rev 6-1-04

Figure 3-5

I-780 TRAFFIC COMPARISON MILITARY WEST TO COLUMBUS PKWY

Segment 3





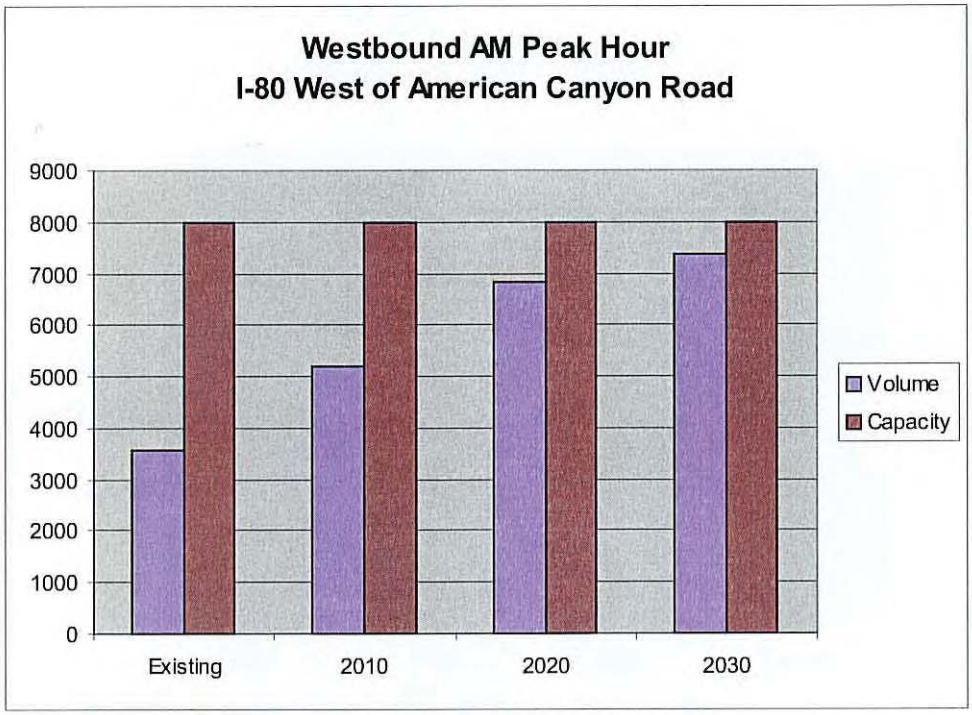
Seg 4 V-C graph 1 Rev 2.cdr

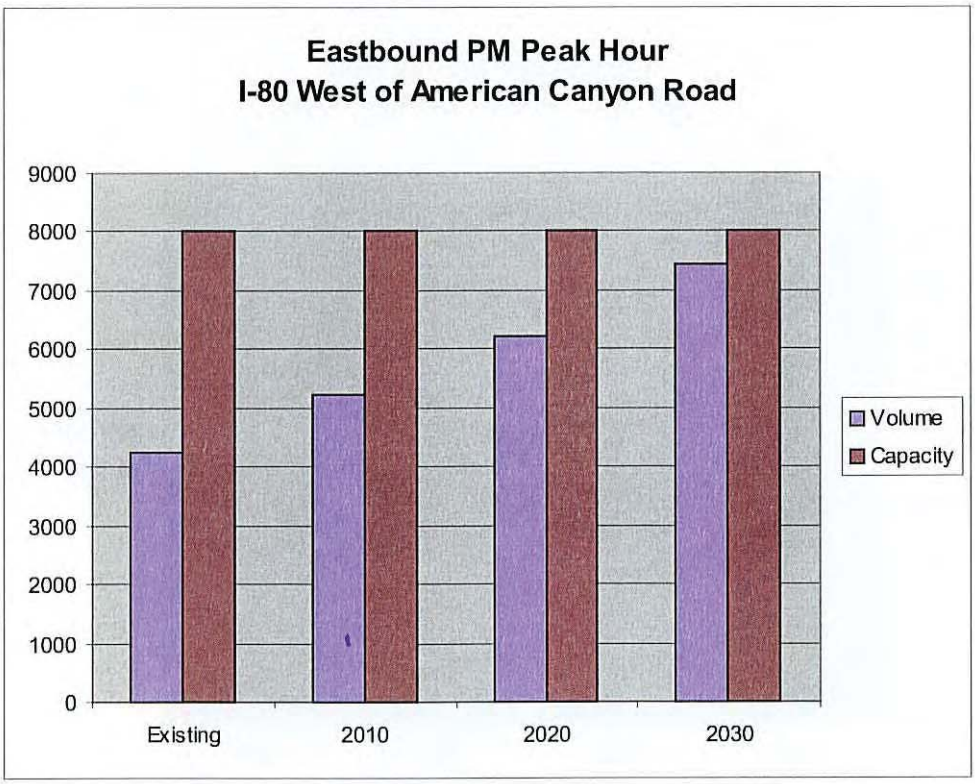
June 5, 2003
Rev 6-1-04

Figure 3-6

I-680 TRAFFIC COMPARISON NORTH OF LAKE HERMAN ROAD

Segment 4



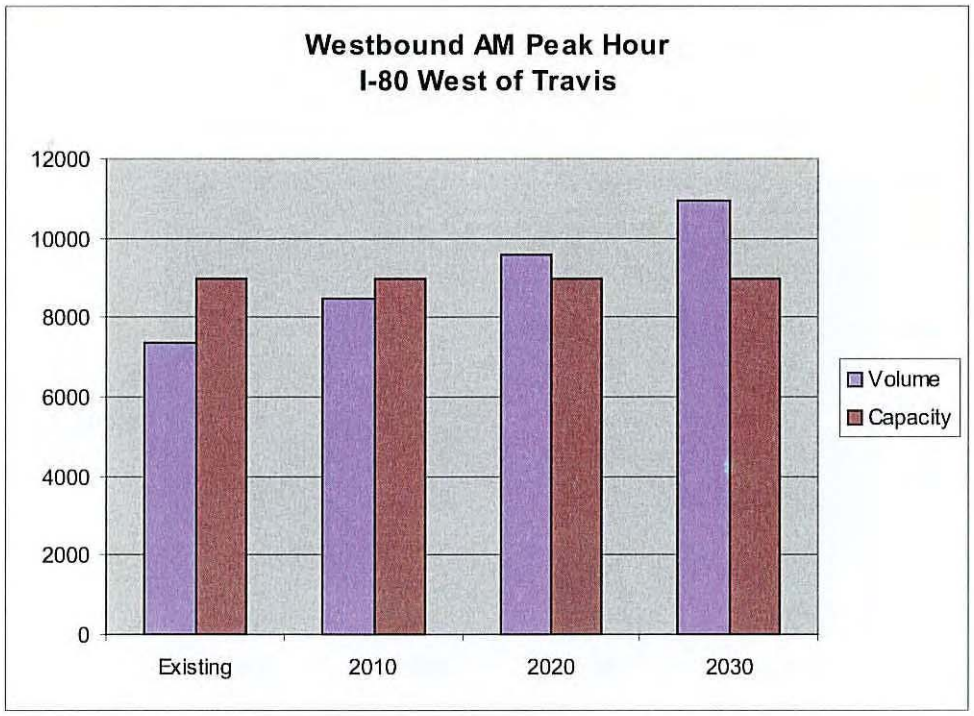


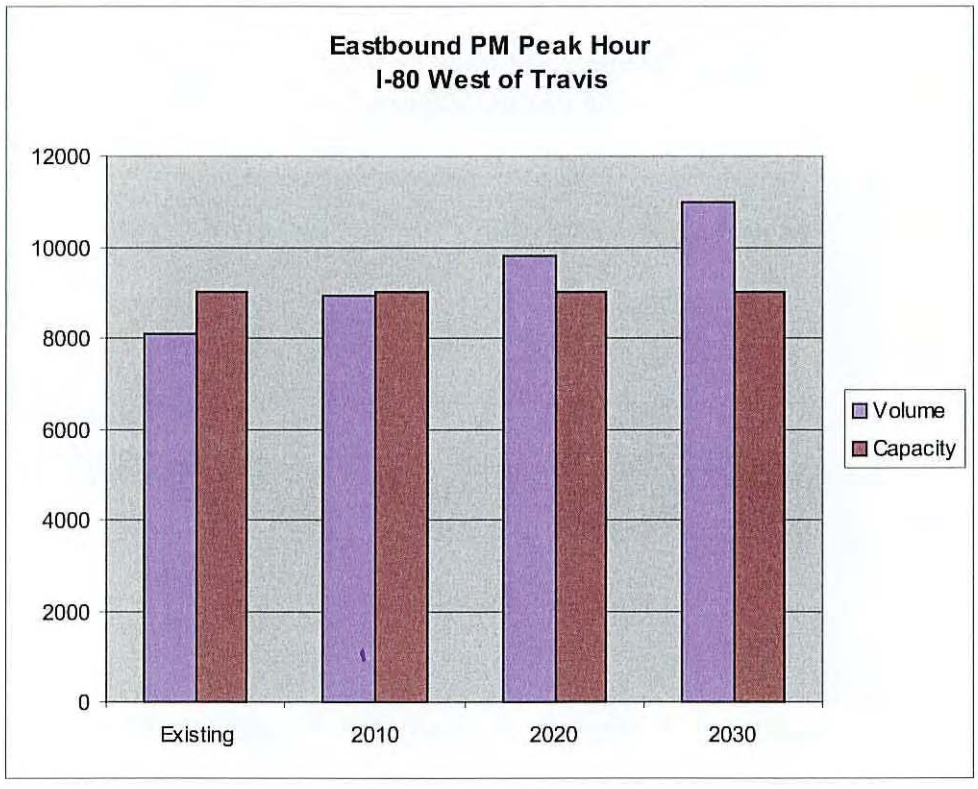
Seg 5 V-C graph 1 Rev 1.cdr

Figure 3-7

I-80 TRAFFIC COMPARISON WEST OF AMERICAN CANYON ROAD

Segment 5



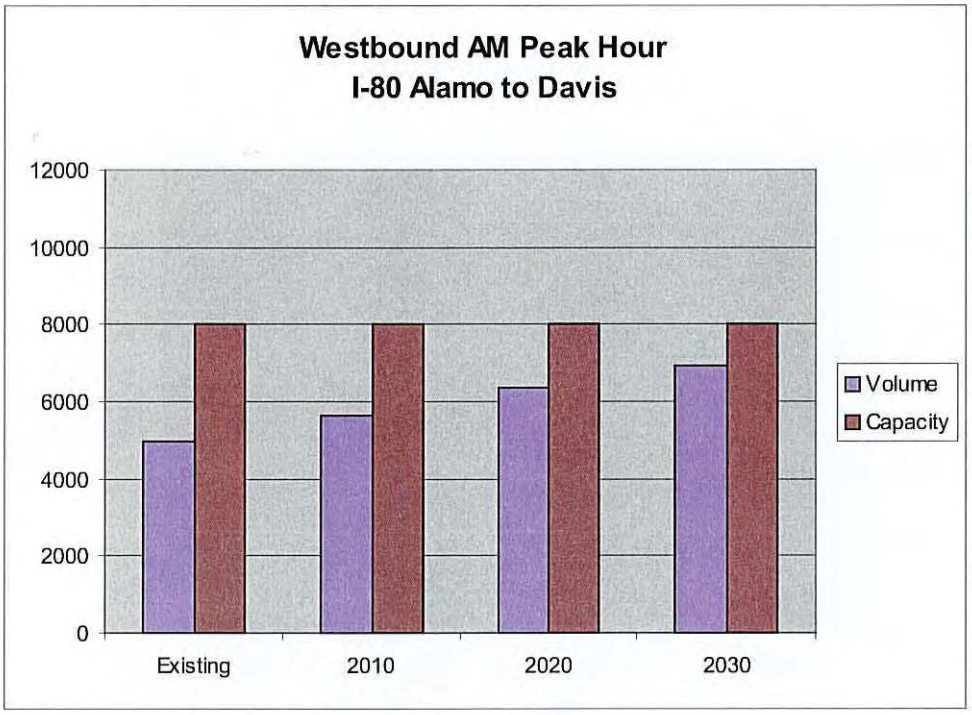


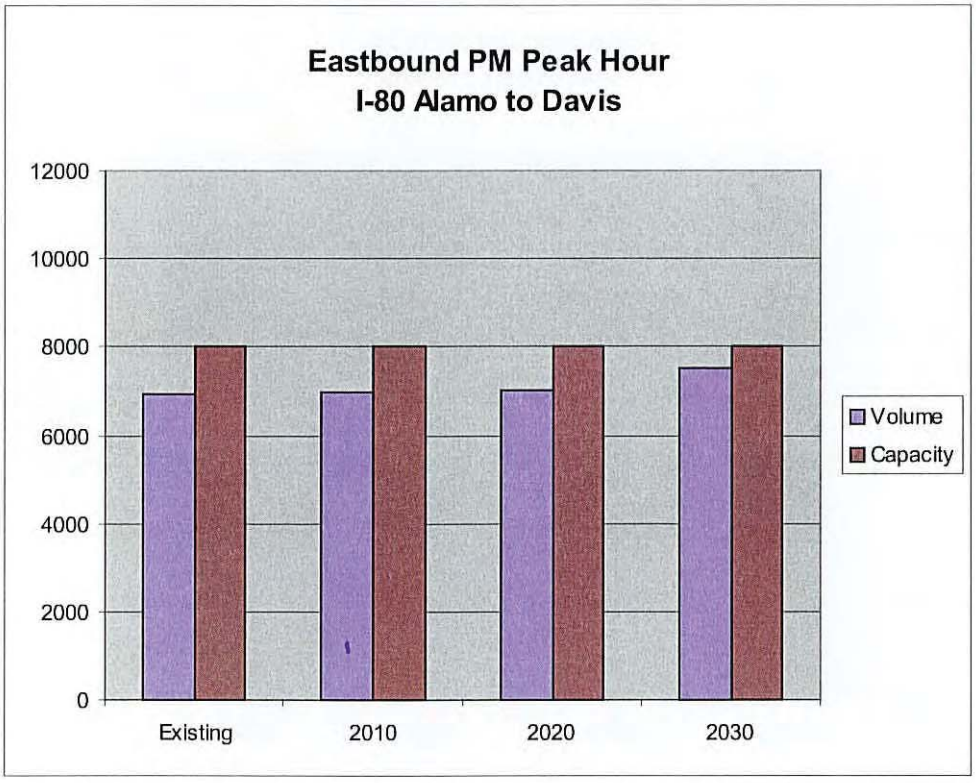
Seg 6 V-C graph 1.cdr

June 5, 2003
Rev 5-18-04

Figure 3-8

I-80 TRAFFIC COMPARISON WEST OF TRAVIS
Segment 6





Seg 6 V-C graph 4.cdr

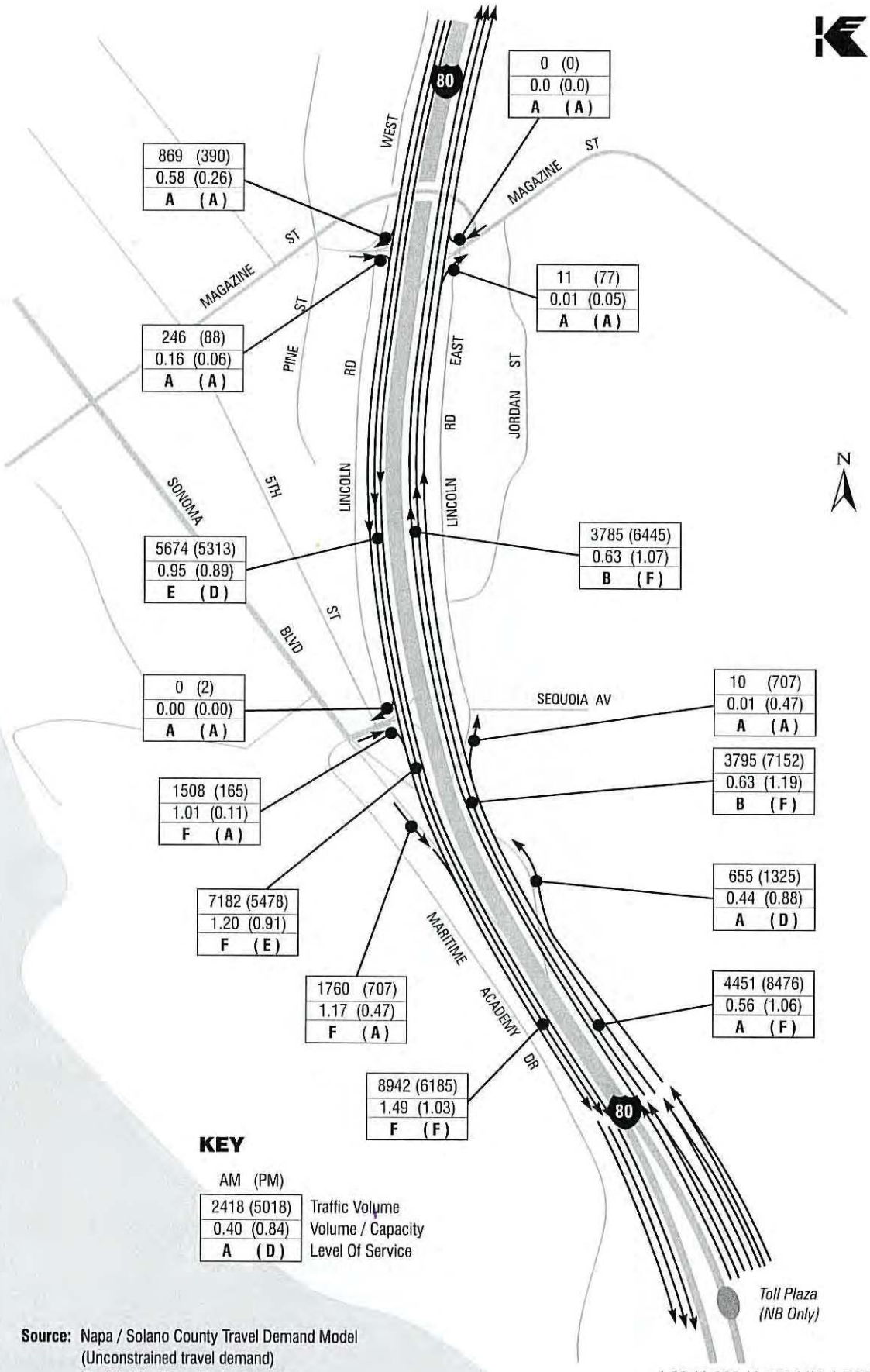
June 5, 2003
Rev 5-18-04

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-9

I-80 TRAFFIC COMPARISON ALAMO TO DAVIS

Segment 6



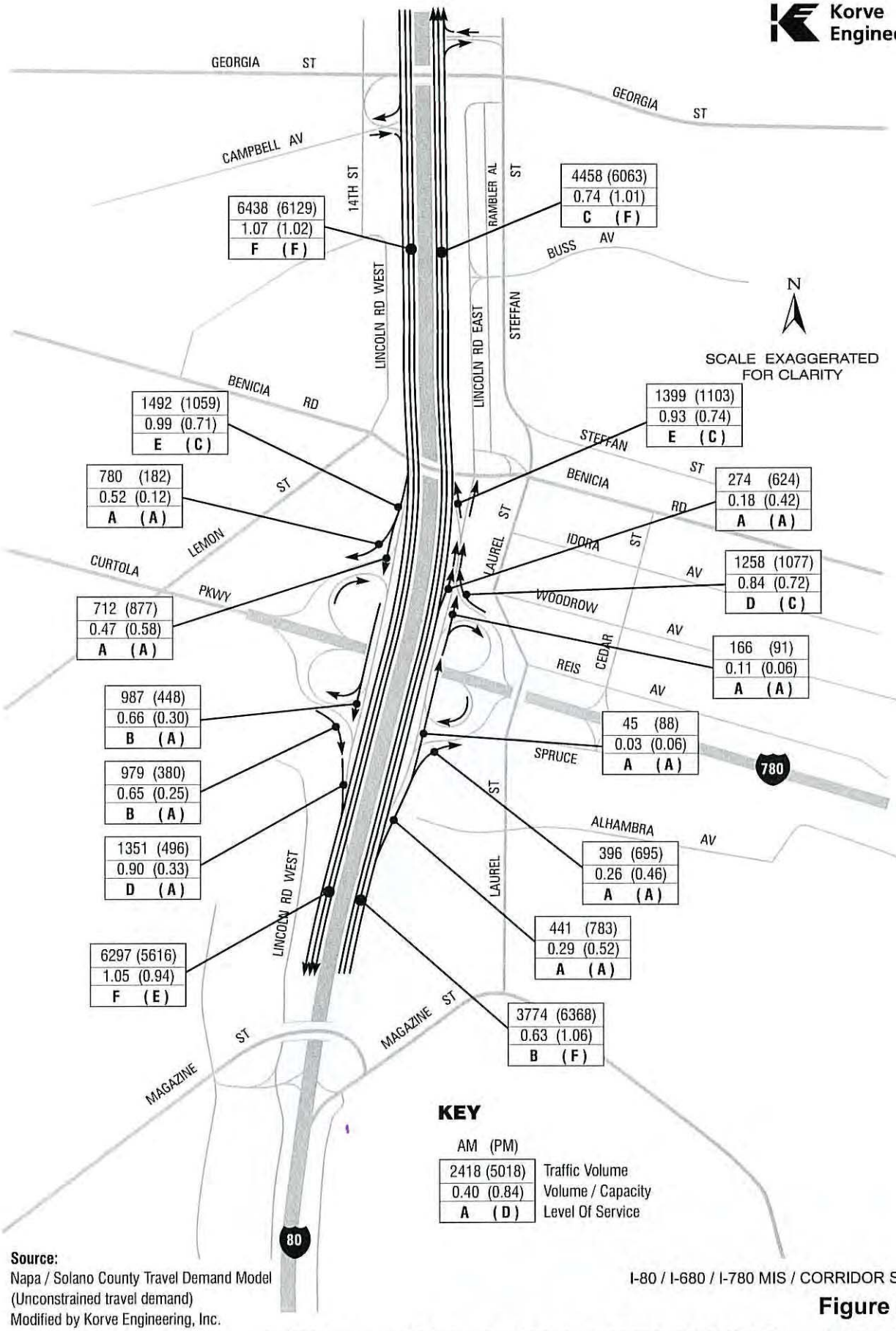
Source: Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

Seg 2-1 2030 Vols.cdr

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-10

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS
Segment 2



Source:
Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

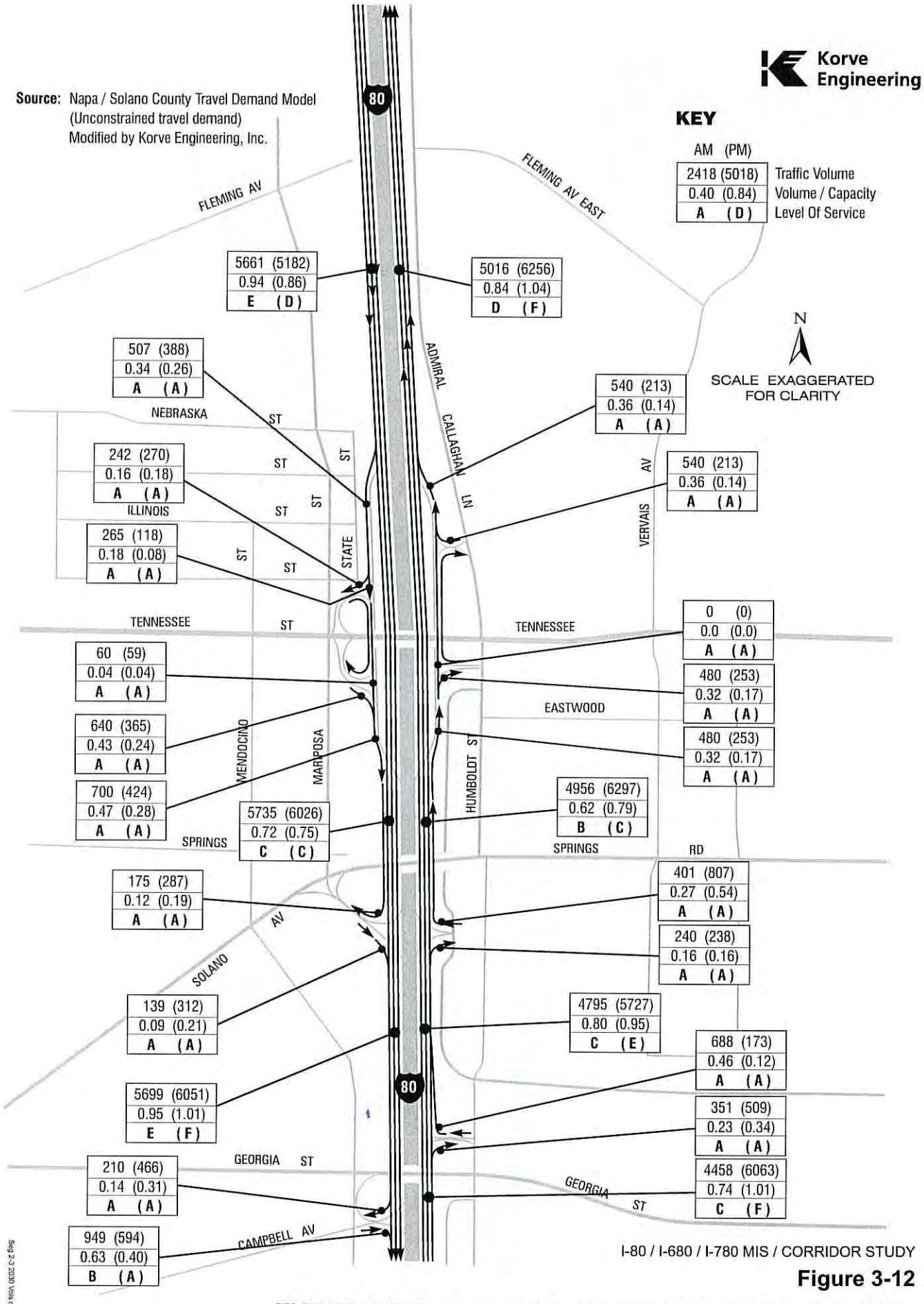
I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-11

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS

Segment 2
(cont'd)

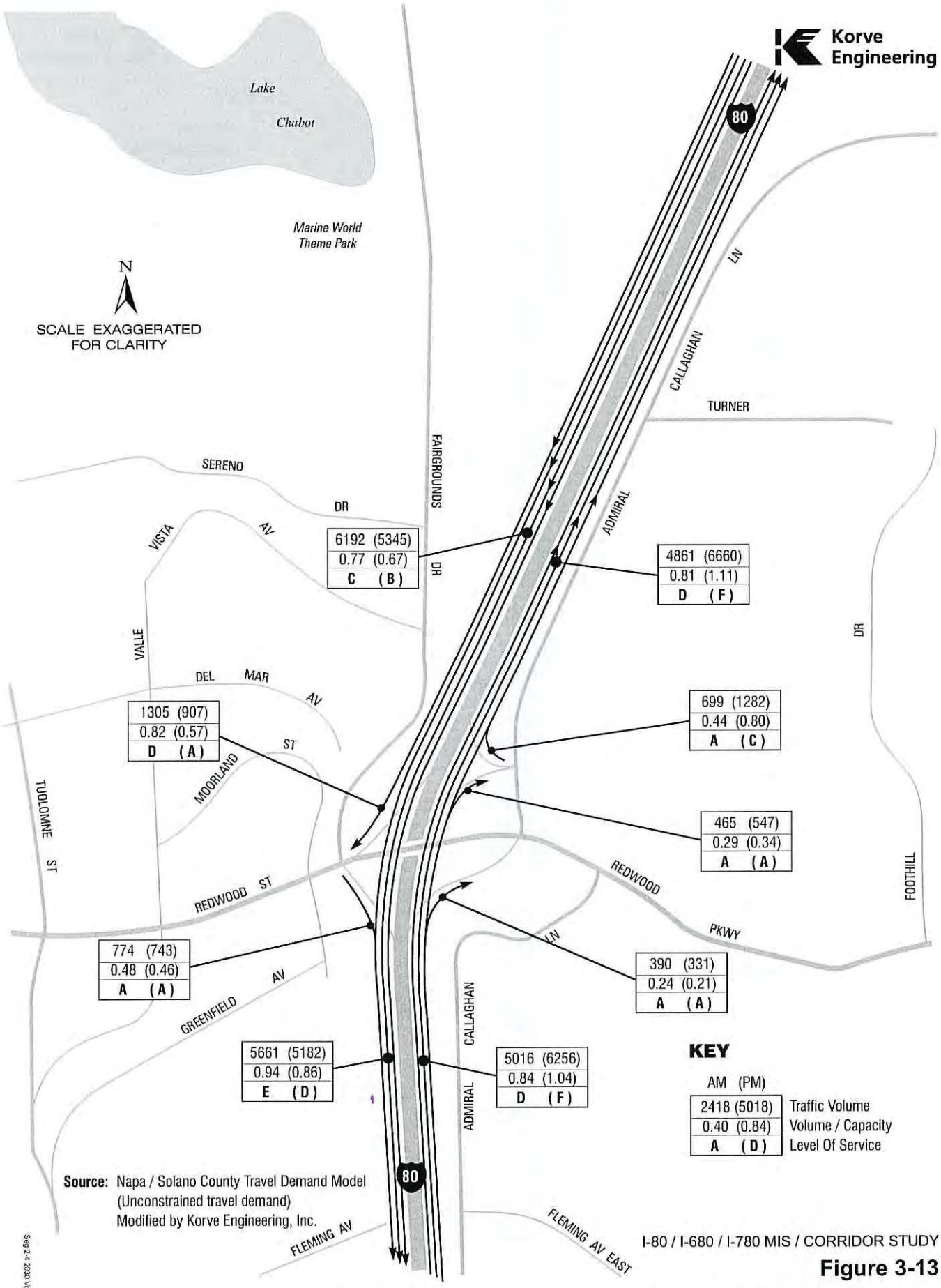
Seg 2: 2030 Volume



I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-12

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS
Segment 2
(cont'd)



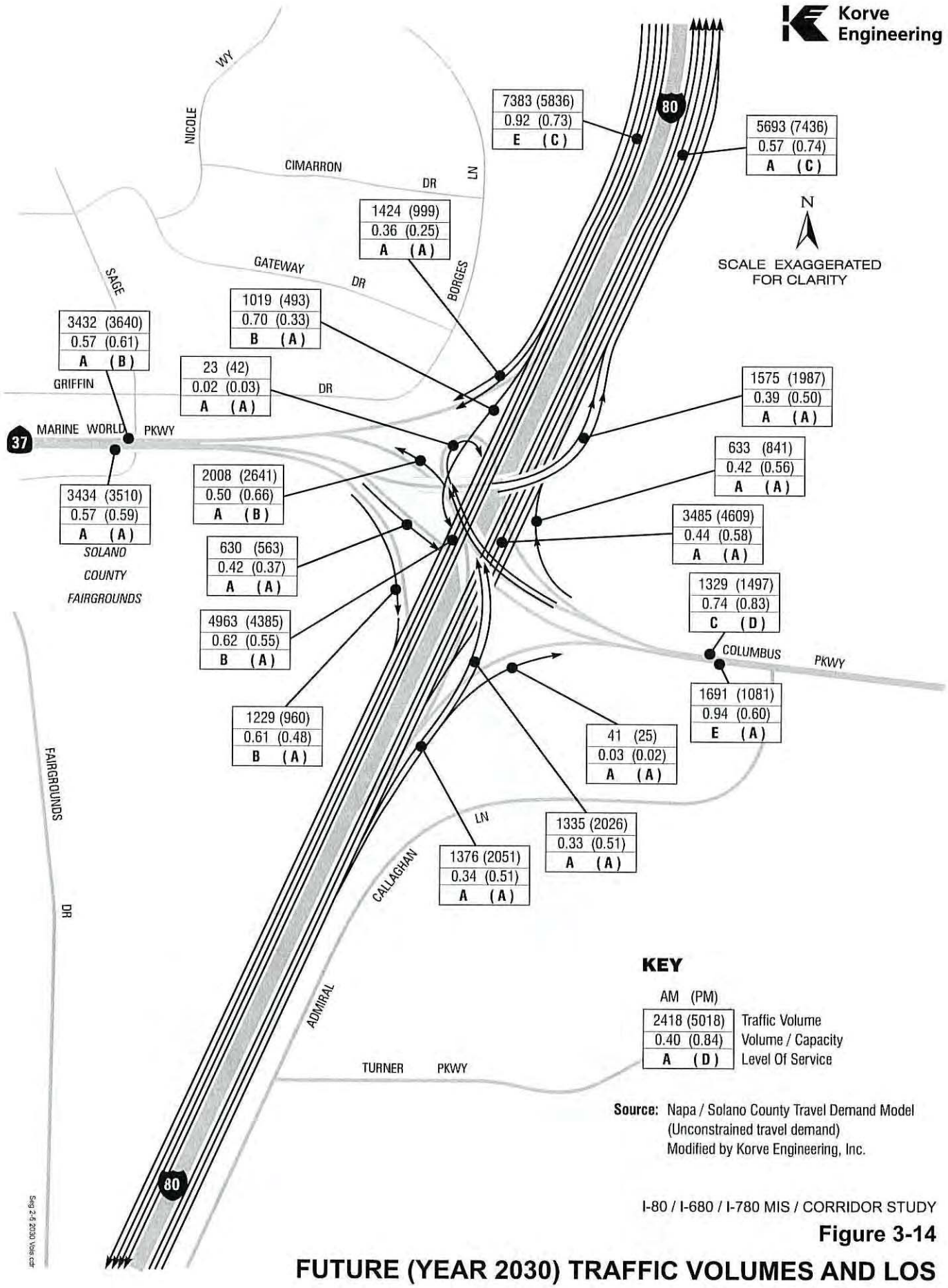
Source: Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

Seg 2-4 2030 Volts.cdr

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-13

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS
Segment 2
(cont'd)

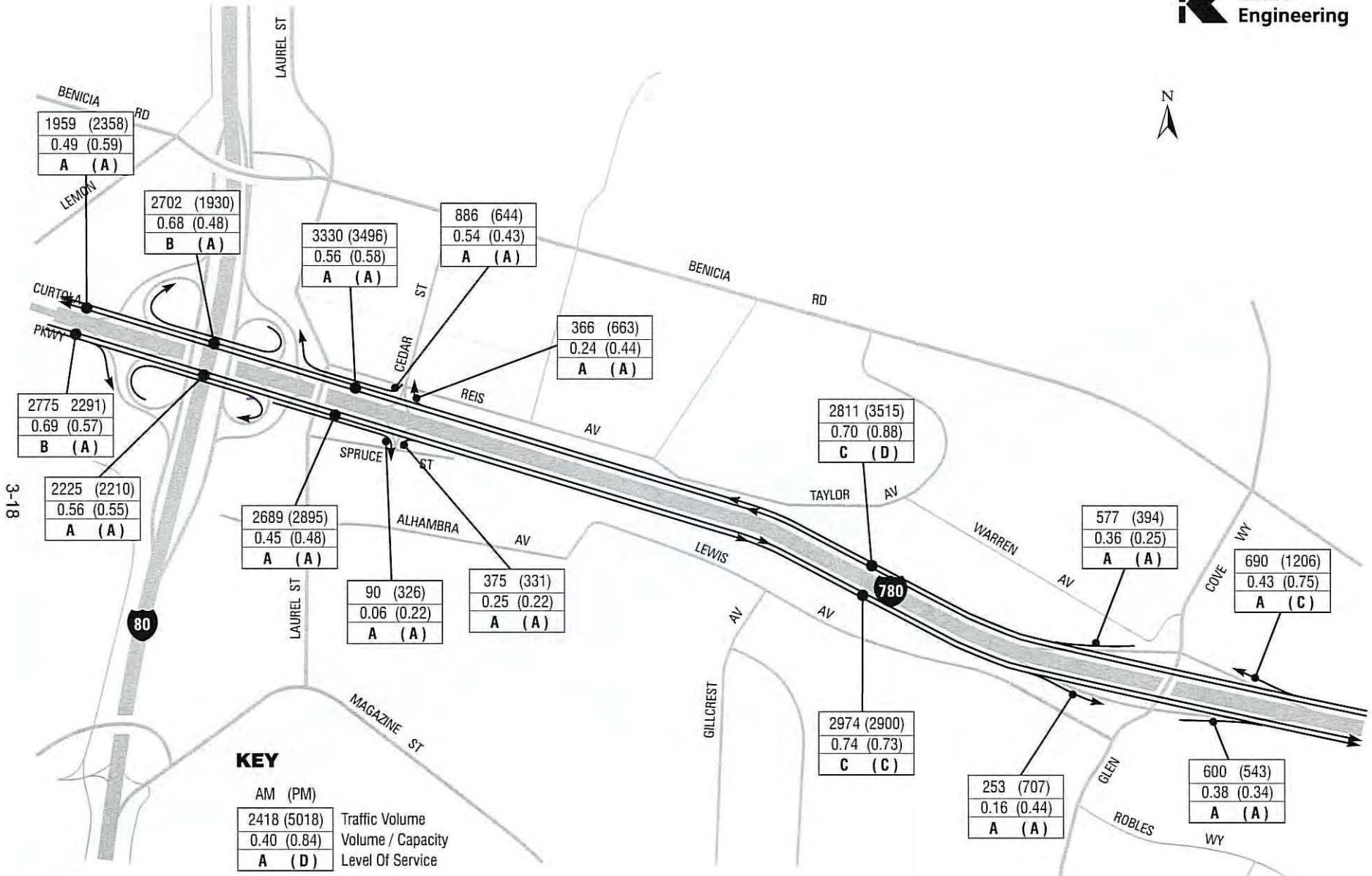


Source: Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-14

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS
Segment 2
(cont'd)



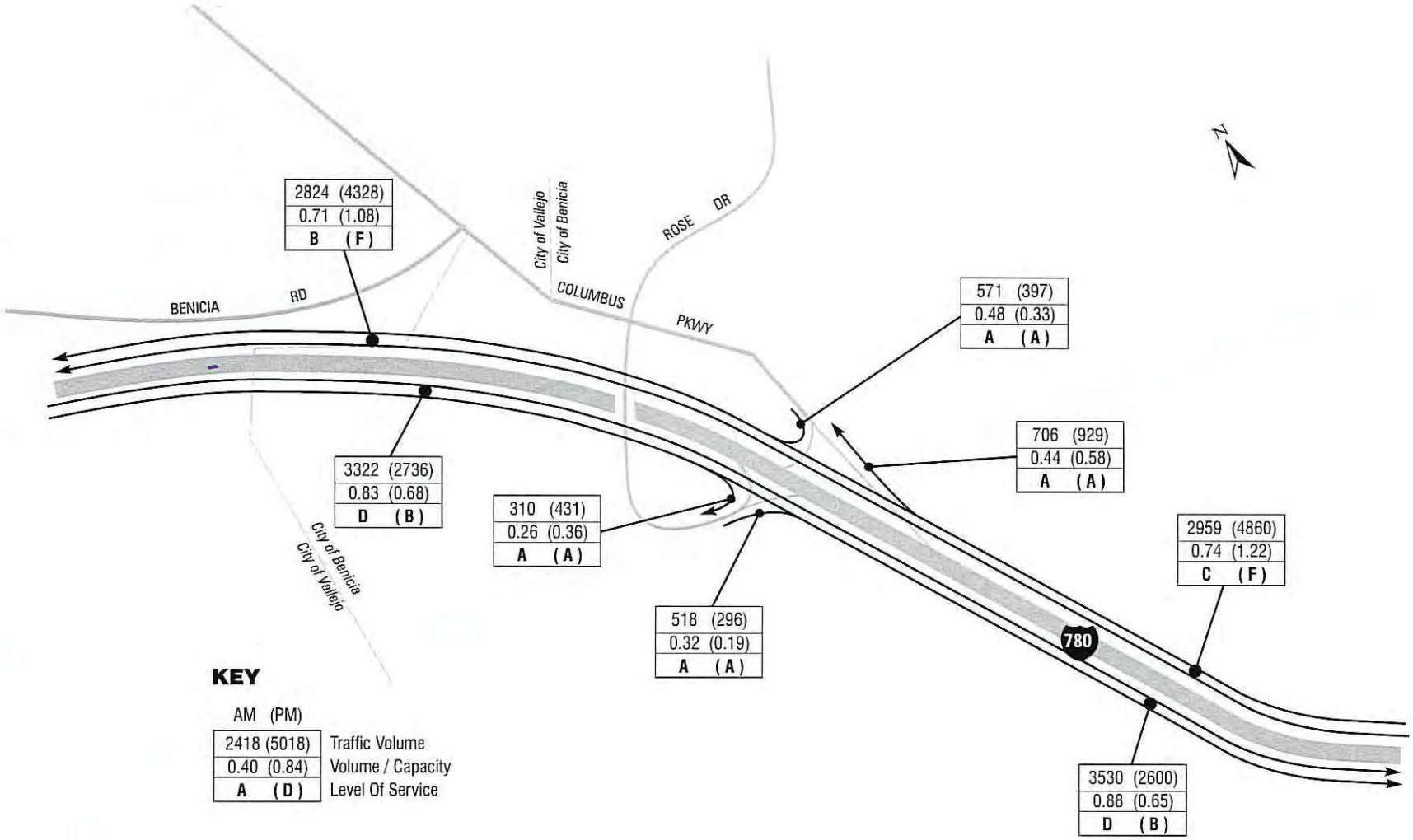
Source: Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

Seg 3-1 2030 Vols.cdr

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-15

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS
Segment 3



Source: Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

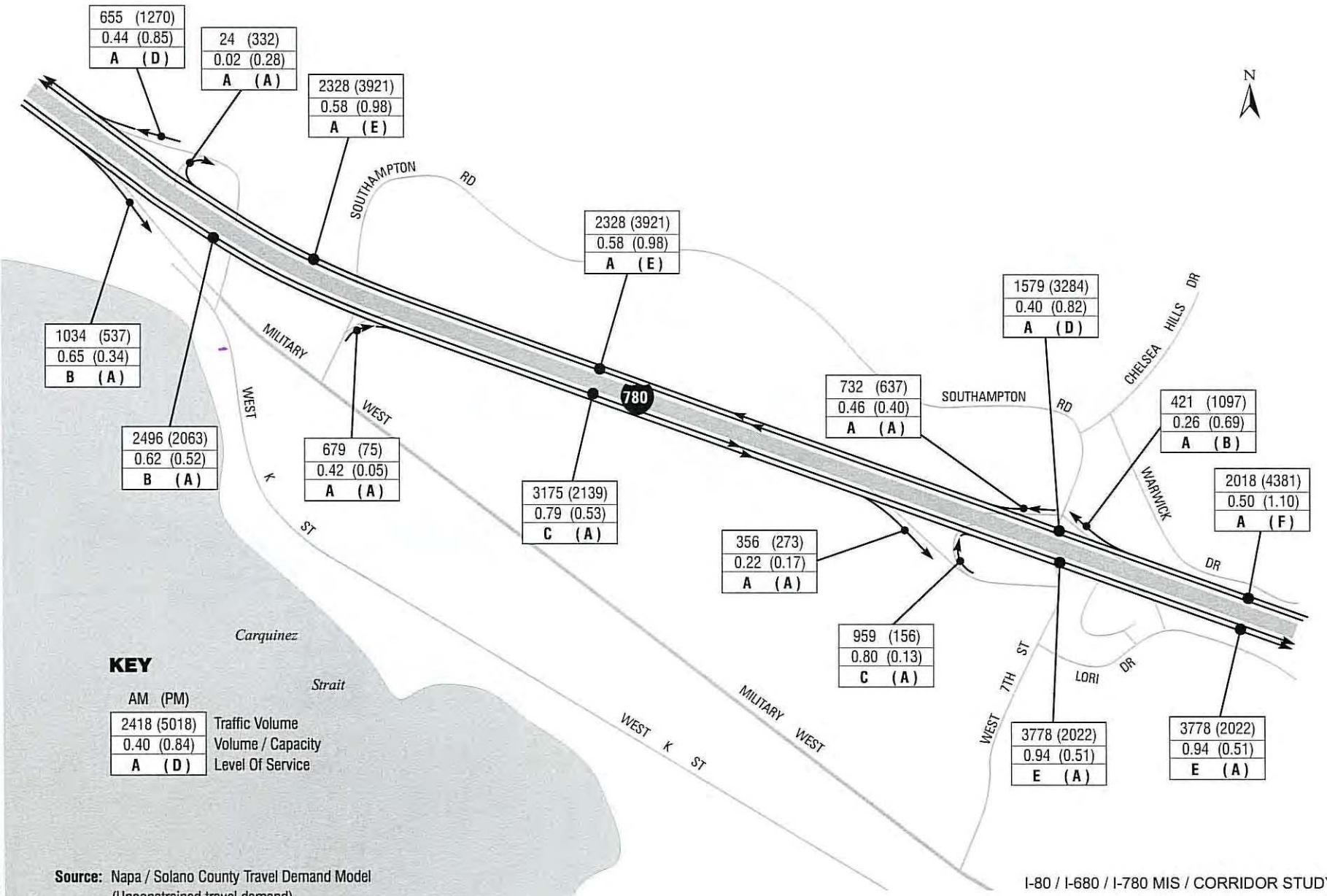
Seg 3-2 2030 Vols.cdr

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-16

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS
Segment 3

(cont'd)

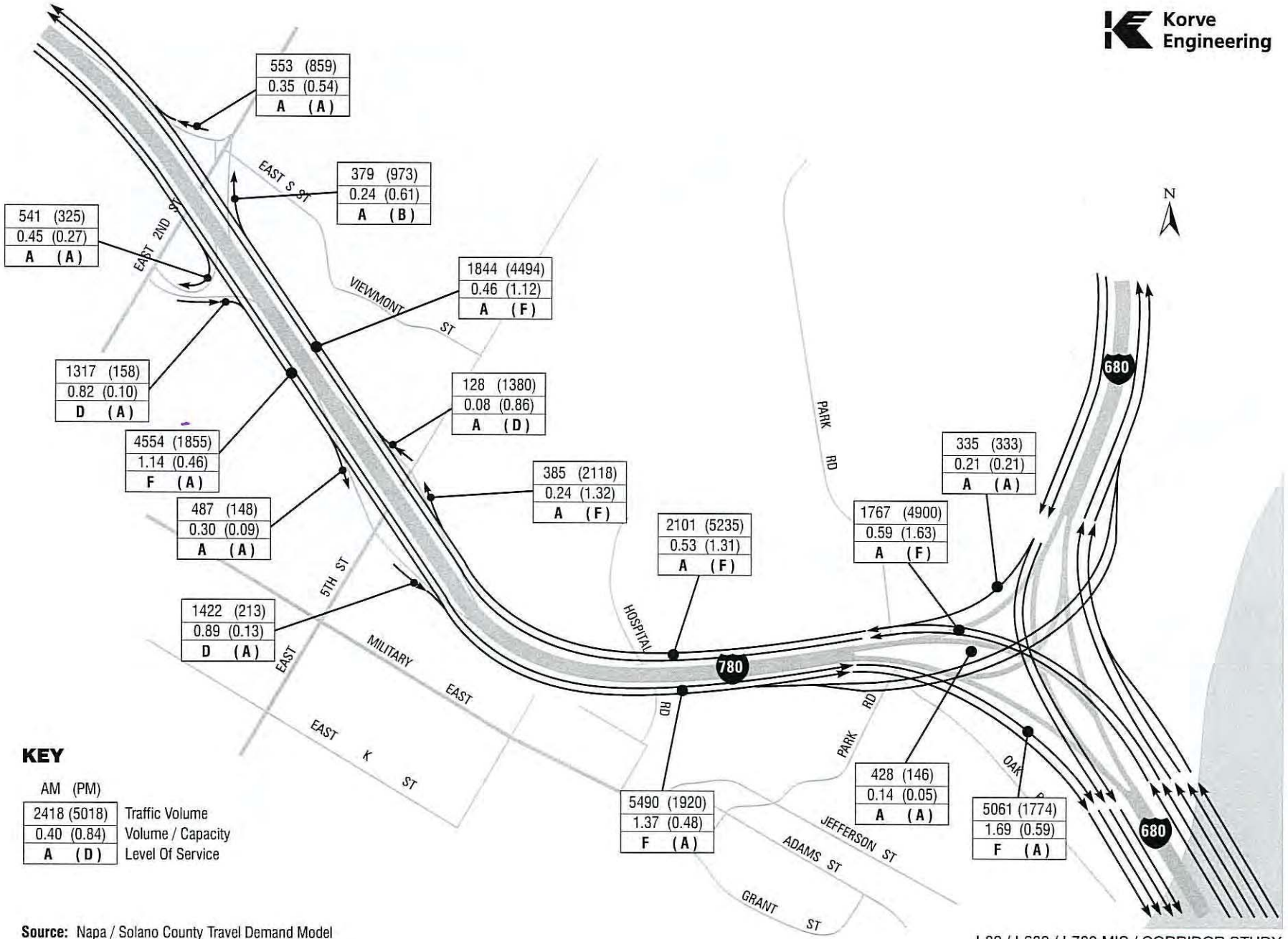


Source: Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

Seg 3-3 2030 Vols.cdr

Figure 3-17

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS
Segment 3
(cont'd)



Source: Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

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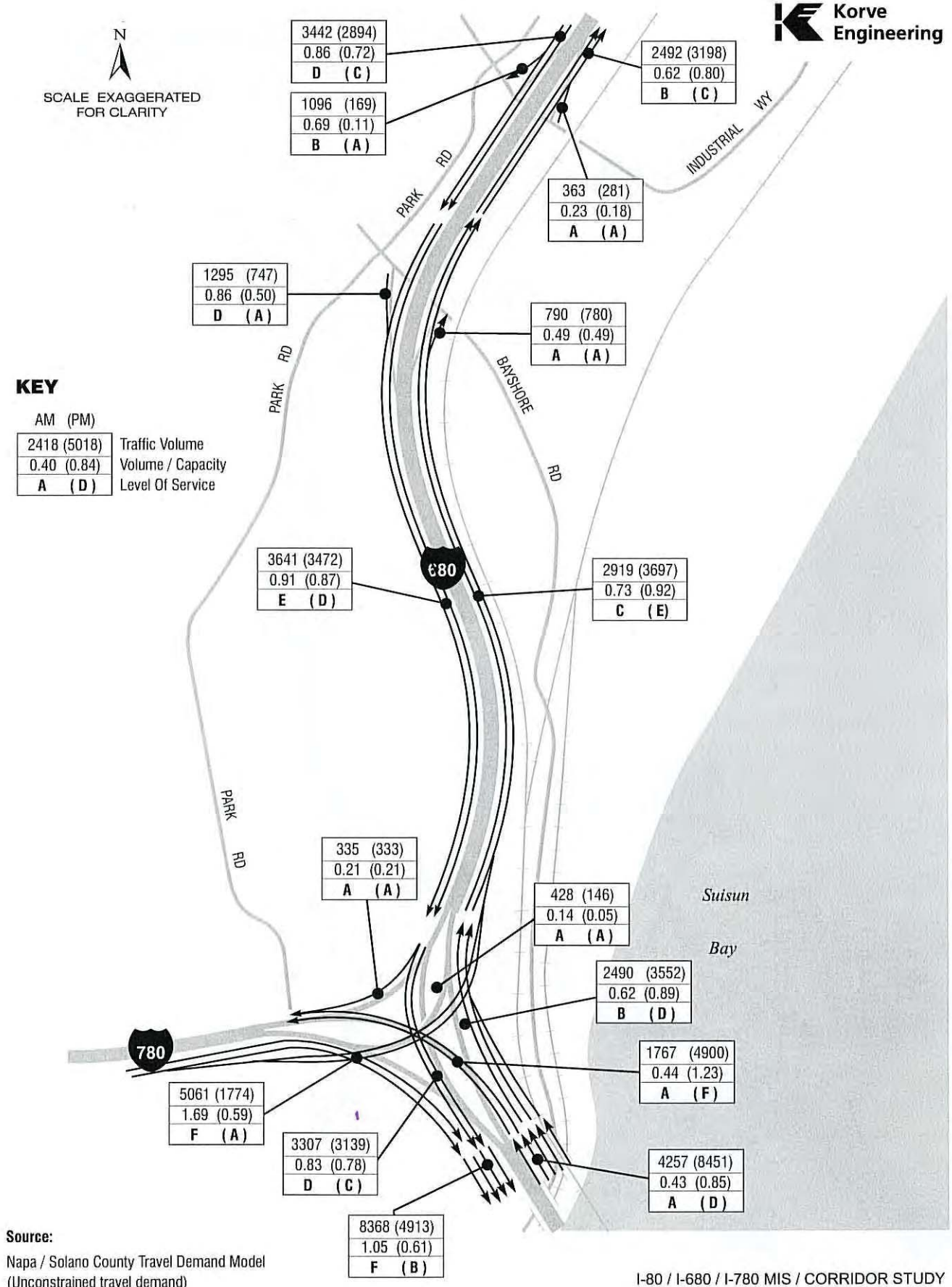
Figure 3-18

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS
Segment 3
(cont'd)

Seg 3-4 2030 Vols.cdr



Source:

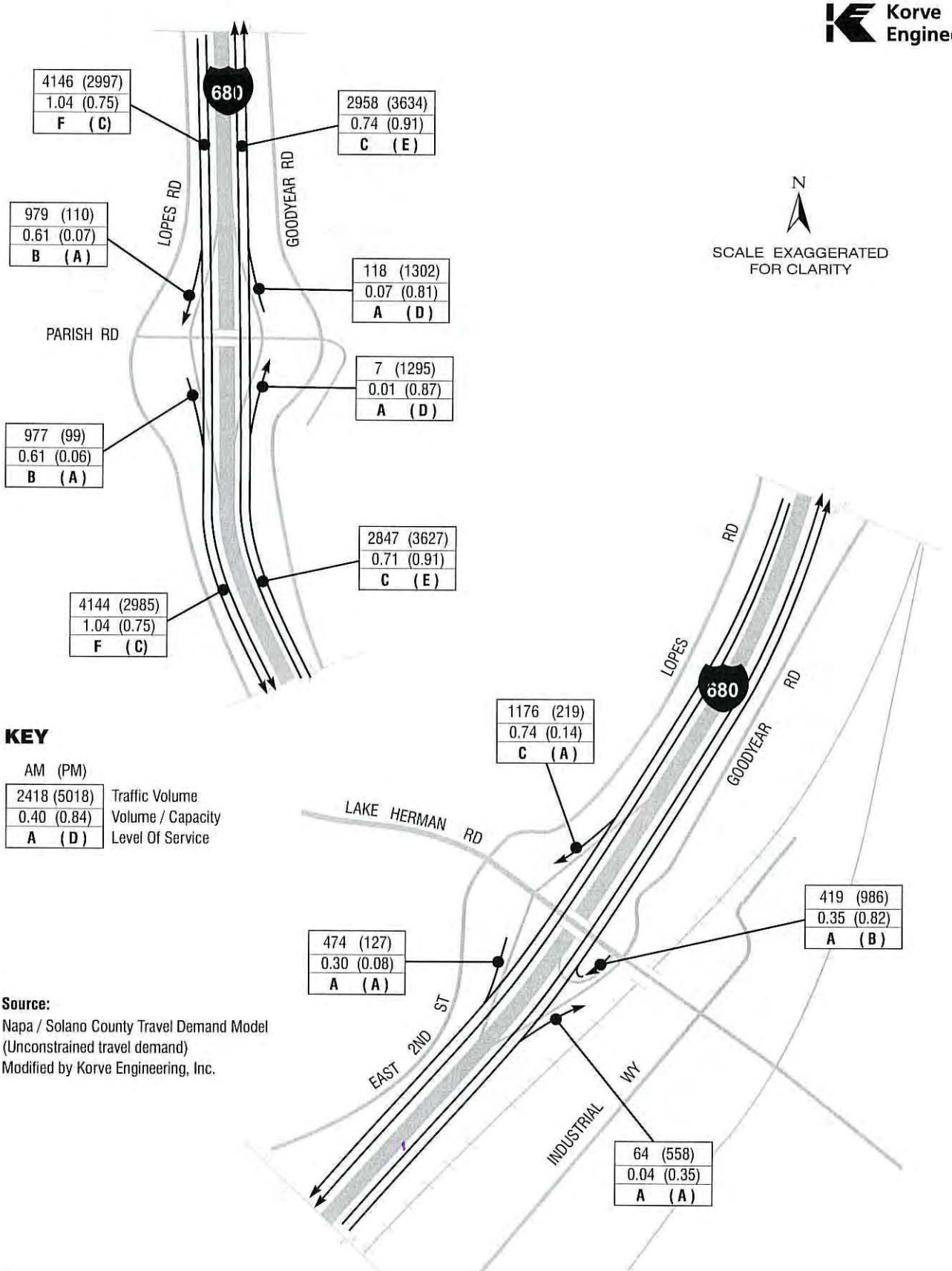
Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

Seg 4-I 2030 Vols.cdr

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-19

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS
Segment 4



KEY

AM (PM)	
2418 (5018)	Traffic Volume
0.40 (0.84)	Volume / Capacity
A (D)	Level Of Service

Source:
Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

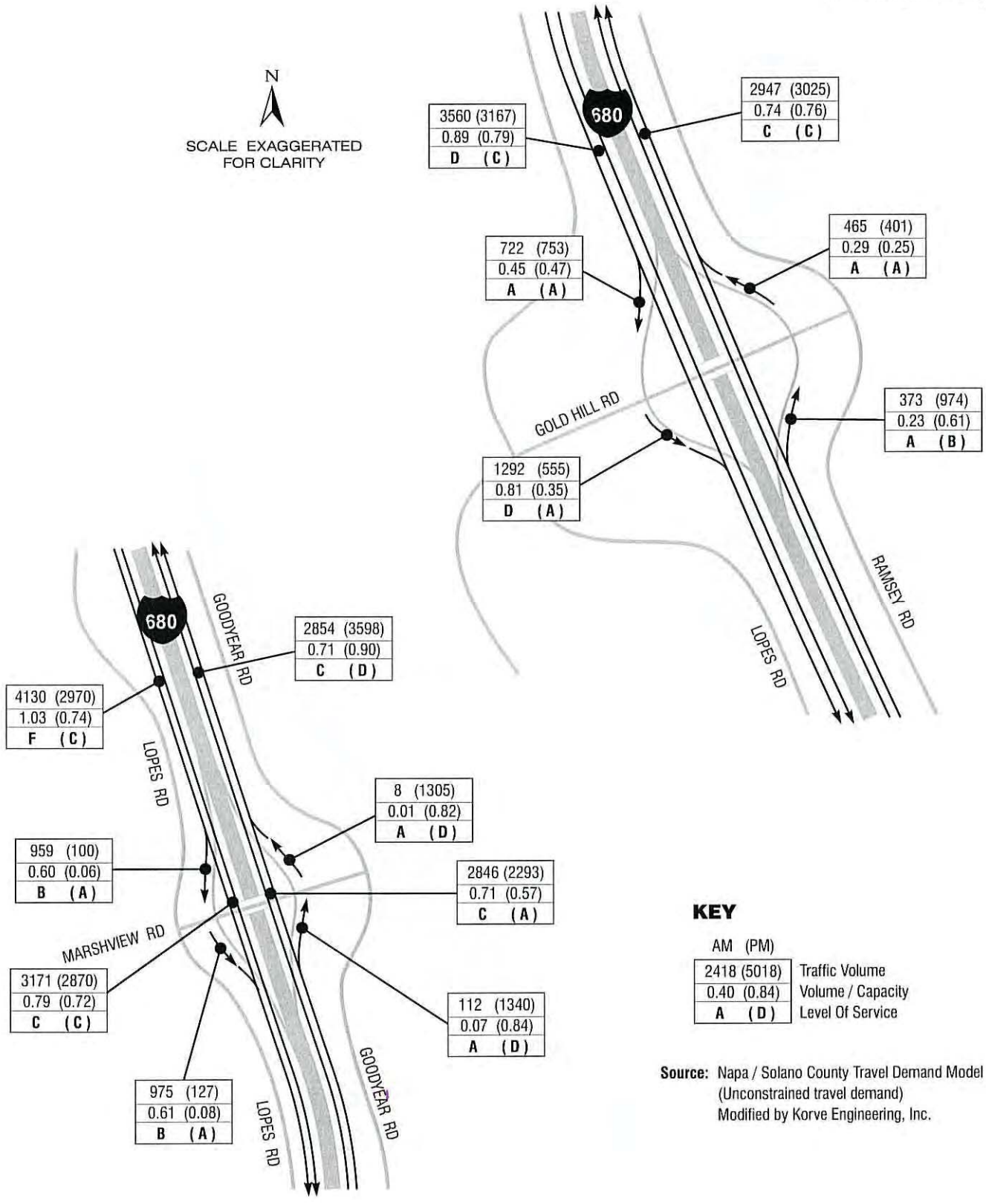
Seg 4-2 2030 Vols.cdr

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-20

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS

Segment 4
(cont'd)



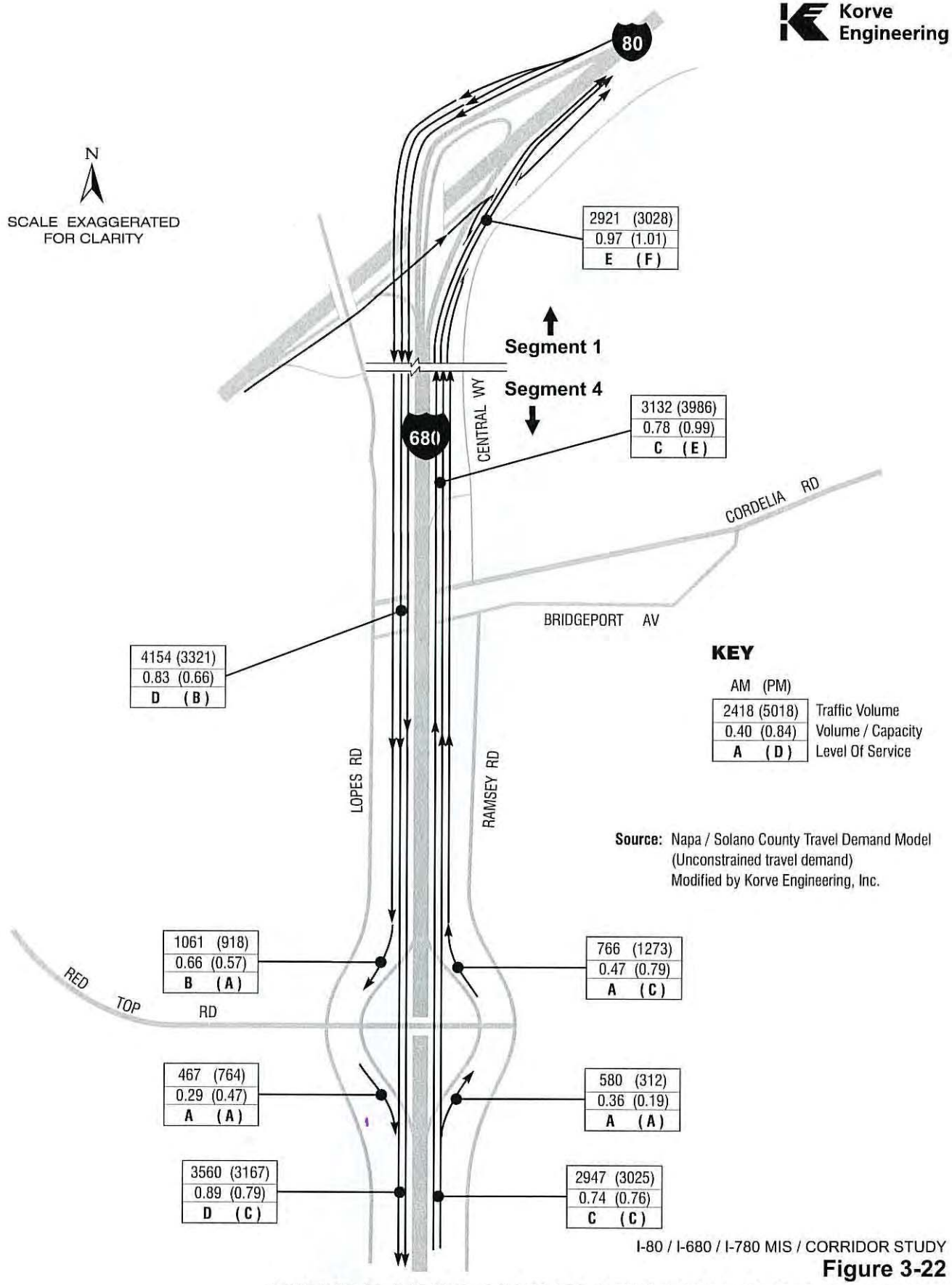
Source: Napa / Solano County Travel Demand Model (Unconstrained travel demand) Modified by Korve Engineering, Inc.

Seg 4-3 2030 Vols.cdr

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-21

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS
Segment 4
(cont'd)

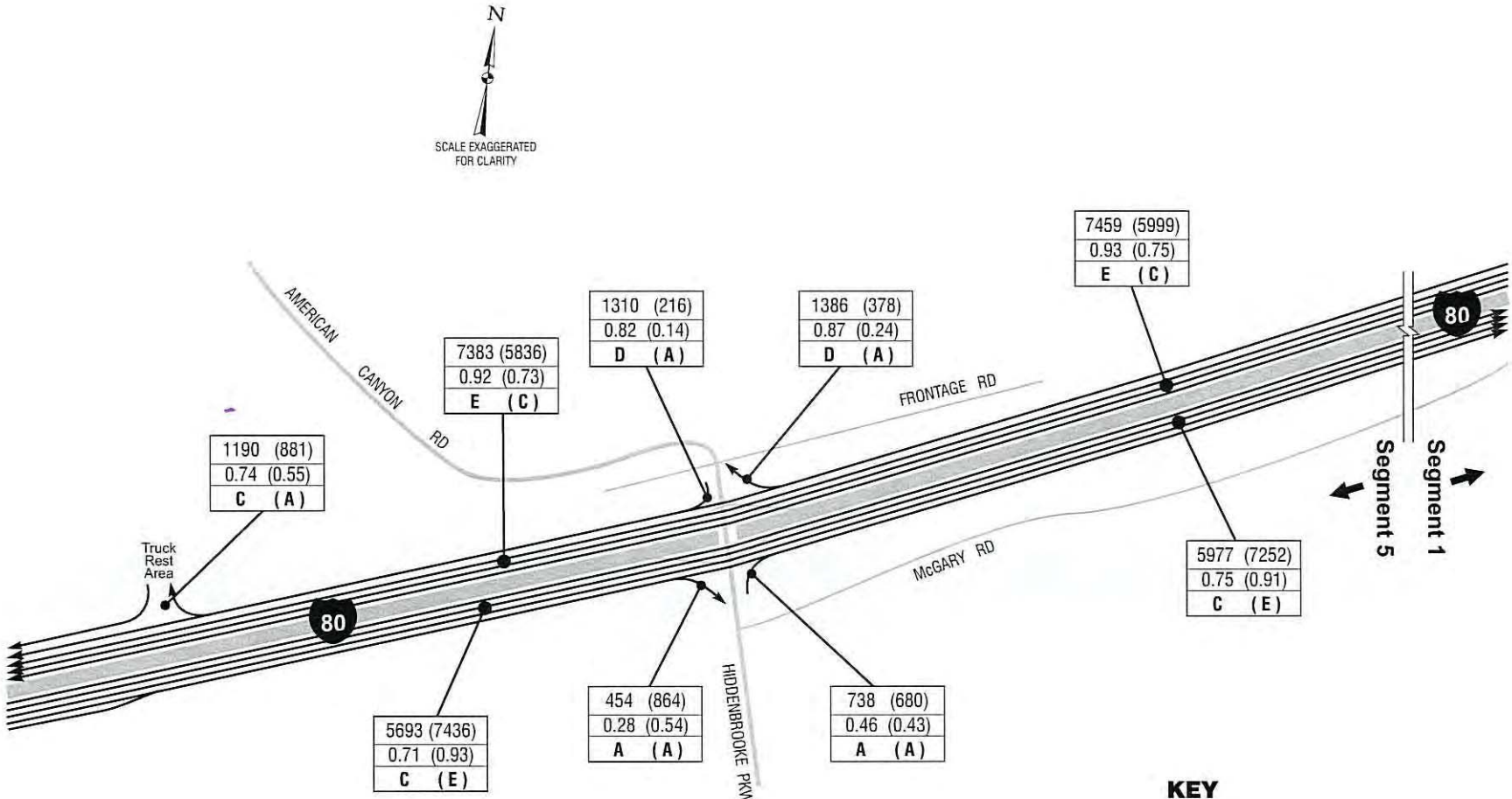


I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-22

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS
Segment 4
(cont'd)

Seg 4-4 2030 Volx.cdr



Source: Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

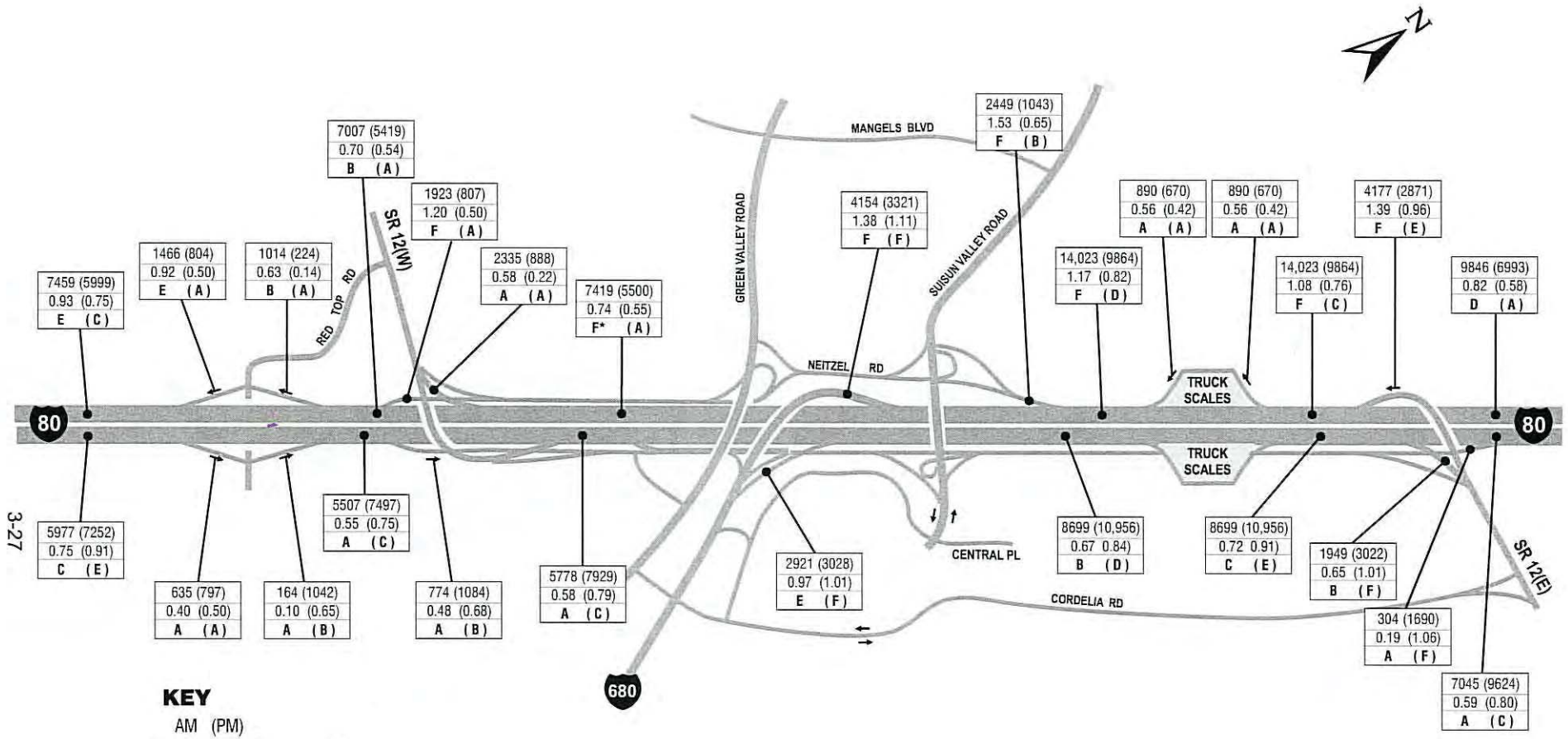
Seg 5 2030 Vols.cdr

Korve Engineering

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-23

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS
Segment 5



KEY

AM (PM)

2418 (5018)	Traffic Volume
0.40 (0.84)	Volume / Capacity
A (D)	Level Of Service

NOTE: AM Peak = 7-8 AM
PM Peak = 5-6 PM

*Area of Queue - LOS F

Source: Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

2030 Volumes Rev 2.cdr

Korve Engineering

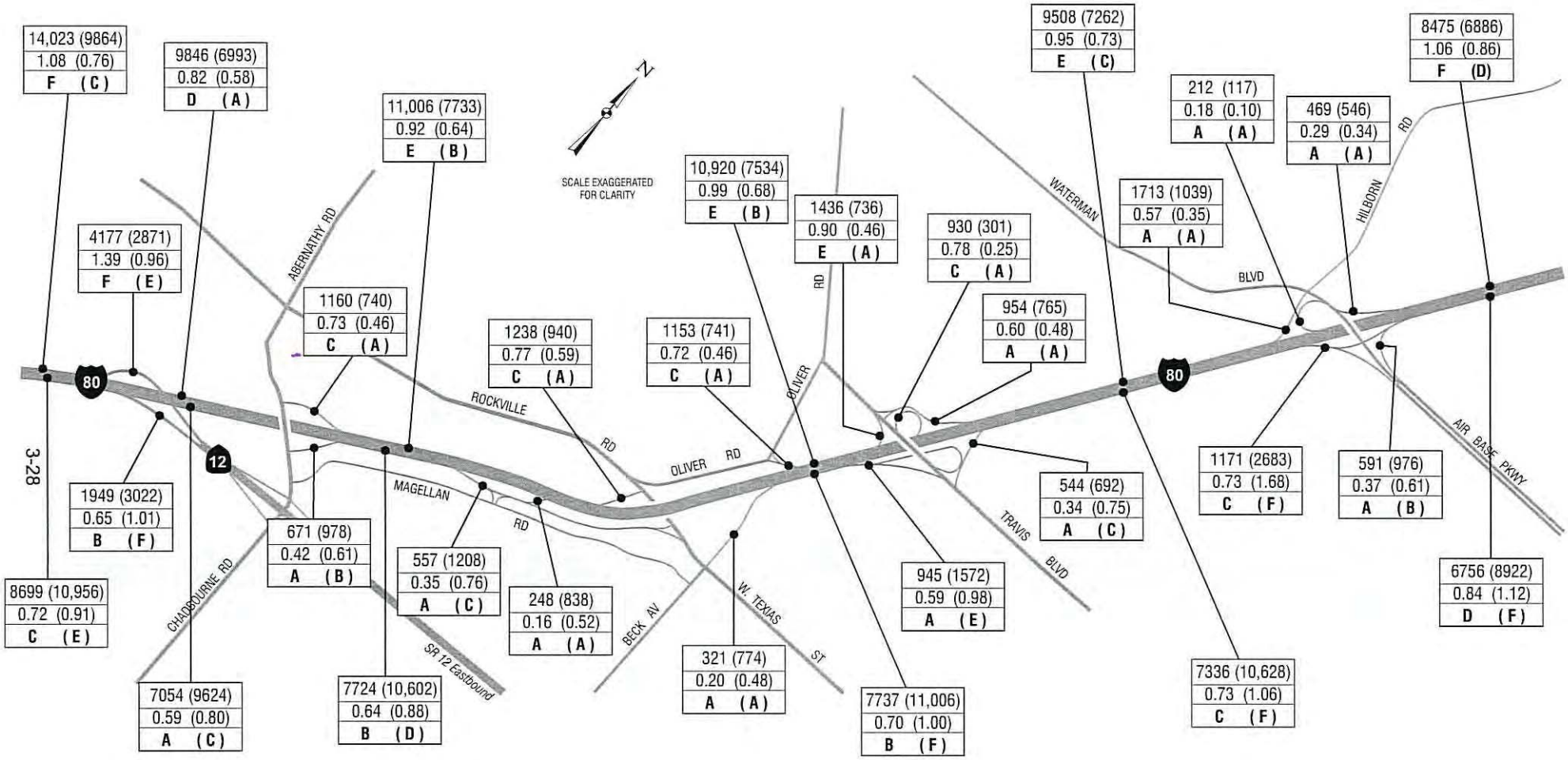
I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-24

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS

Segment 1

May 17, 2004



KEY

AM (PM)	
2418 (5018)	Traffic Volume
0.40 (0.84)	Volume / Capacity
A (D)	Level Of Service

Source: Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

6-1 Vols 2030.cdr

Korve Engineering

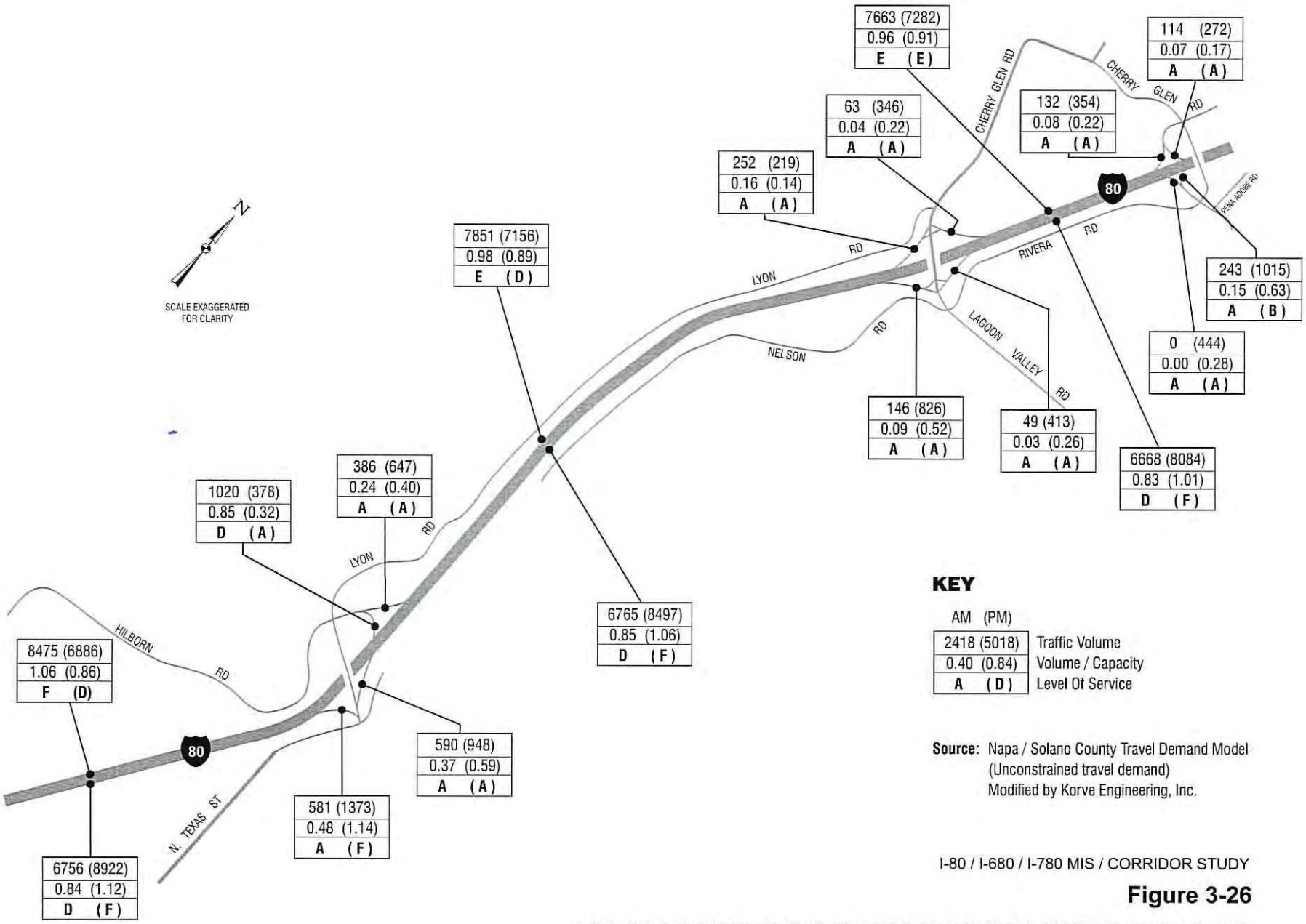
January 2004

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-25

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS

Segment 6



KEY

AM (PM)	
2418 (5018)	Traffic Volume
0.40 (0.84)	Volume / Capacity
A (D)	Level Of Service

Source: Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

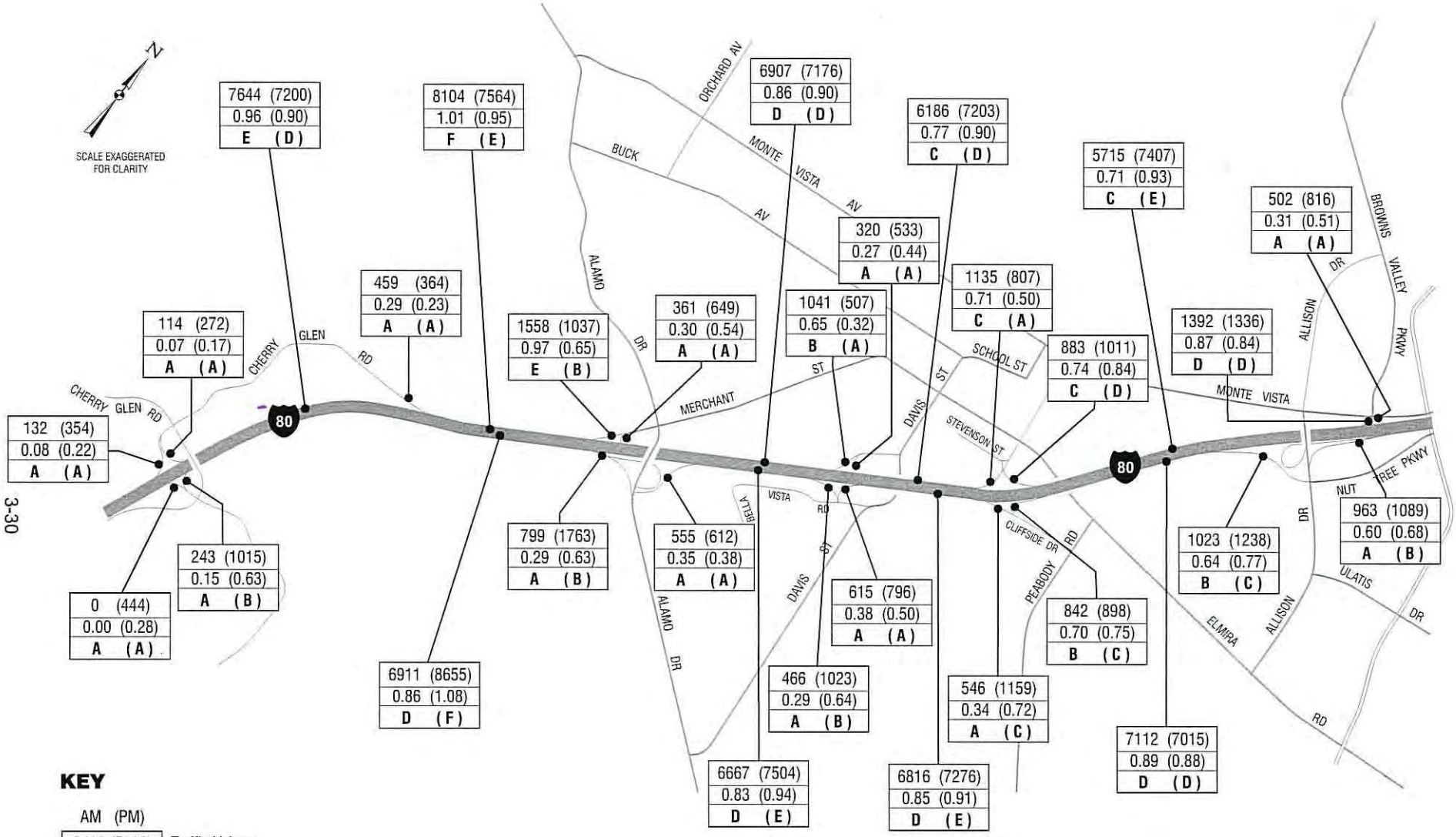
Figure 3-26

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS

Segment 6
(cont'd)

Korve Engineering

January 2004



KEY

AM (PM)	
2418 (5018)	Traffic Volume
0.40 (0.84)	Volume / Capacity
A (D)	Level Of Service

Source: Napa / Solano County Travel Demand Model (Unconstrained travel demand) Modified by Korve Engineering, Inc.

Korve Engineering

January 2004

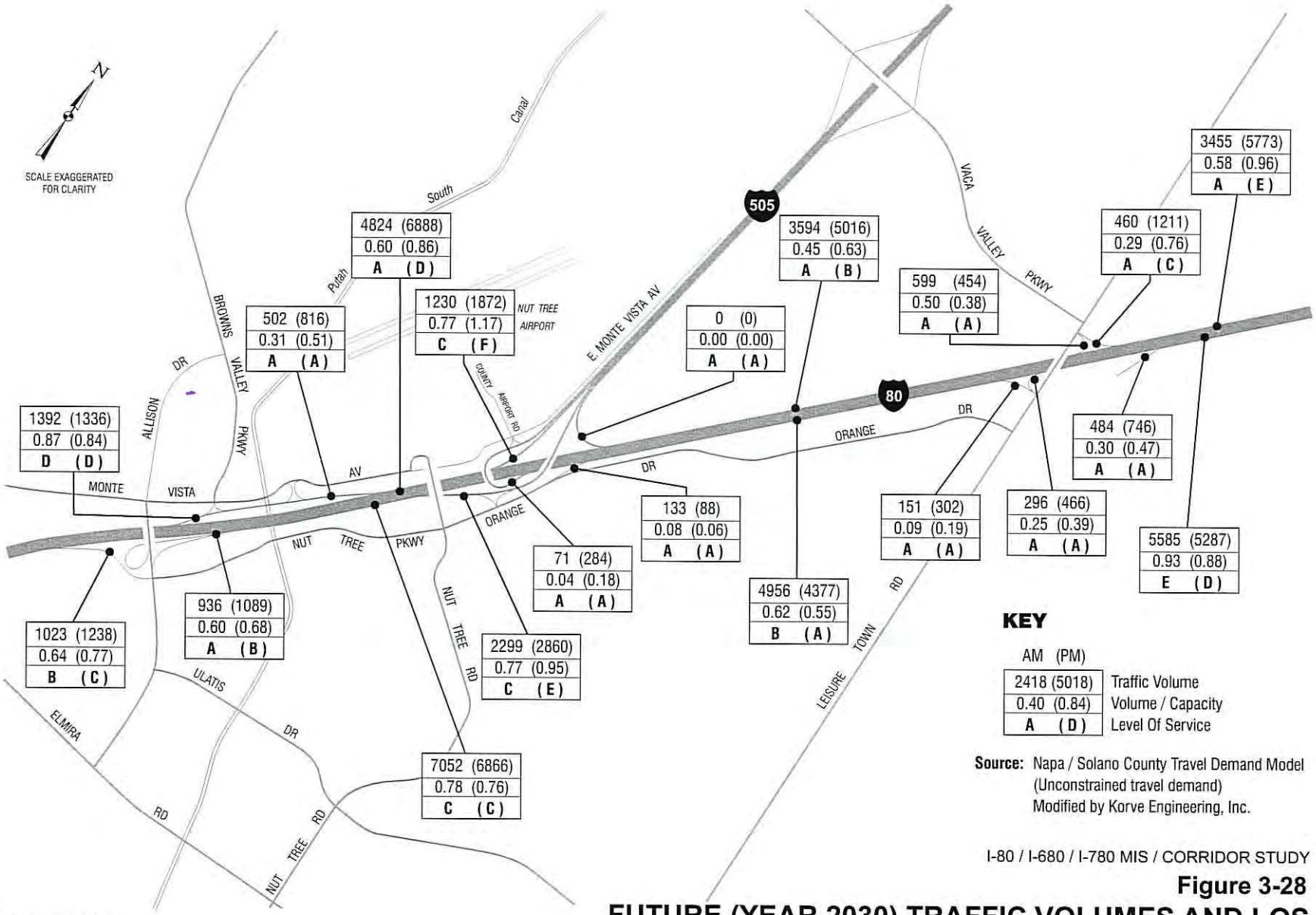
6-3 Vols 2030.cdr

Figure 3-27

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS

Segment 6

(cont'd)



Source: Napa / Solano County Travel Demand Model (Unconstrained travel demand) Modified by Korve Engineering, Inc.

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-28

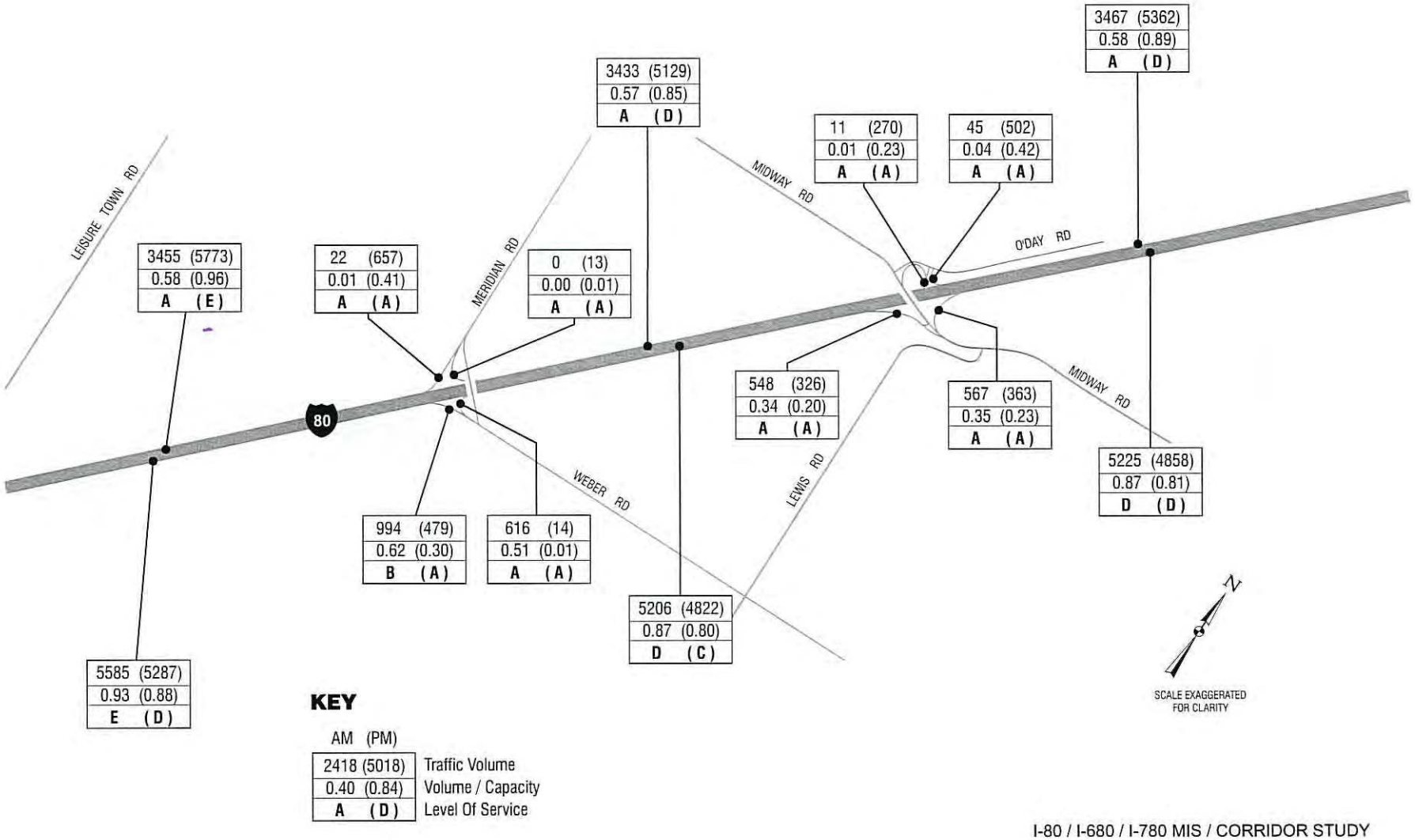
FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS

Segment 6
(cont'd)

Korve Engineering

January 2004

6-4 Vols 2030.cdr



I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-29

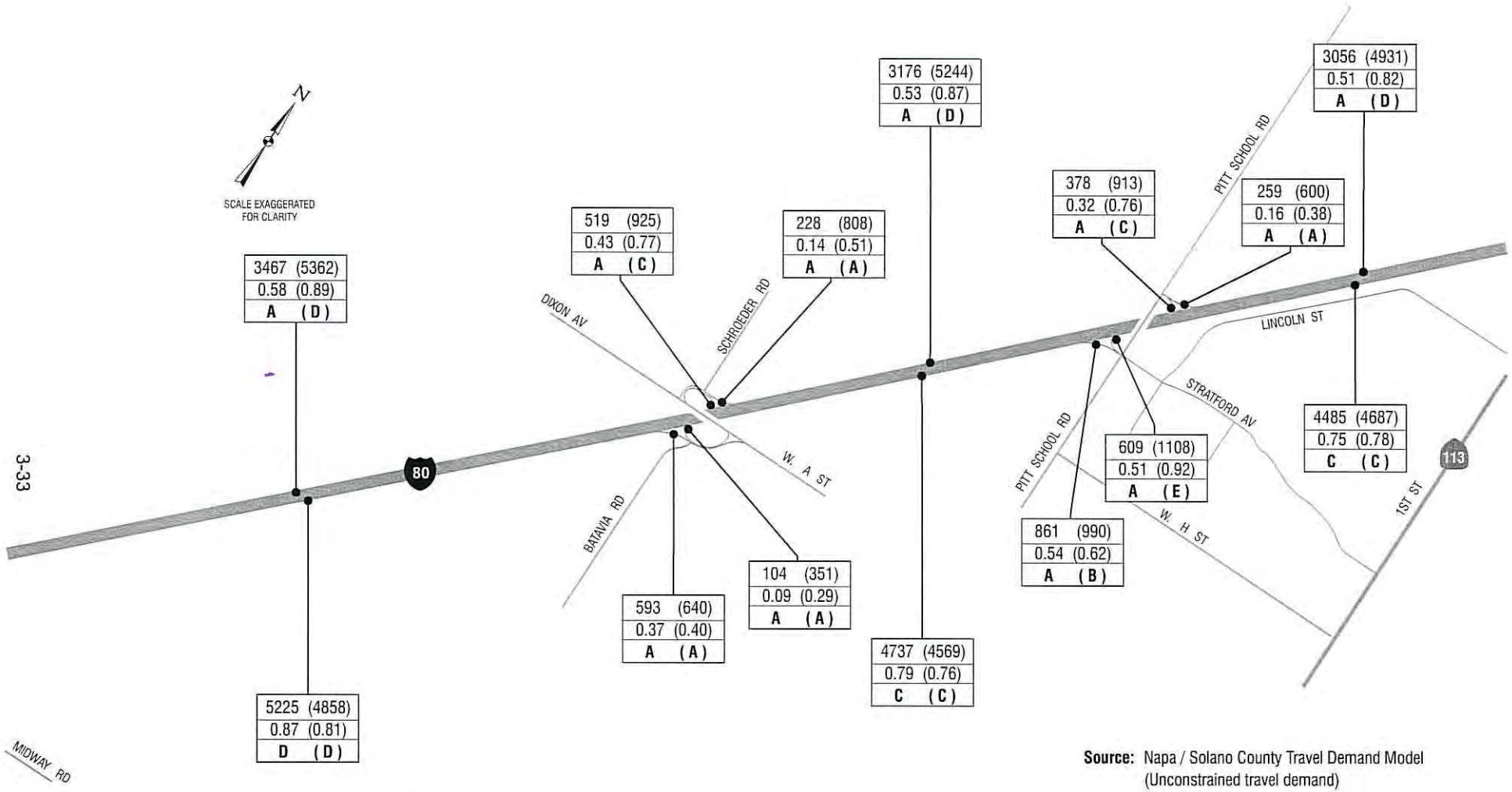
FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS
Segment 7

Source: Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

Korve Engineering

January 2004

7-1 Vols 2030.cdr



Source: Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

KEY

AM (PM)	
2418 (5018)	Traffic Volume
0.40 (0.84)	Volume / Capacity
A (D)	Level Of Service

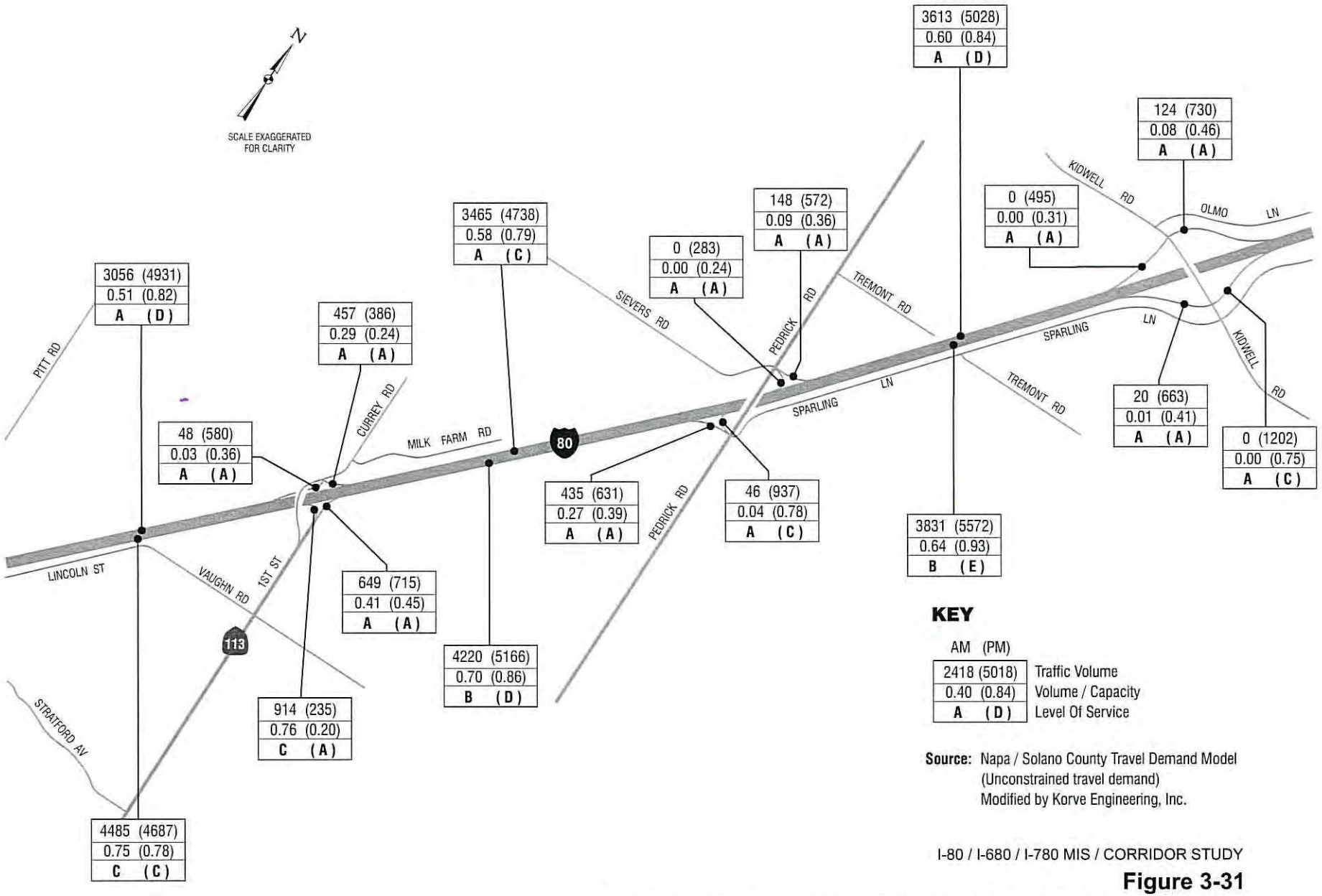
I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-30
FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS
Segment 7
(cont'd)

7.2 Vols 2030.cdr

Korve Engineering

January 2004



Source: Napa / Solano County Travel Demand Model (Unconstrained travel demand) Modified by Korve Engineering, Inc.

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-31

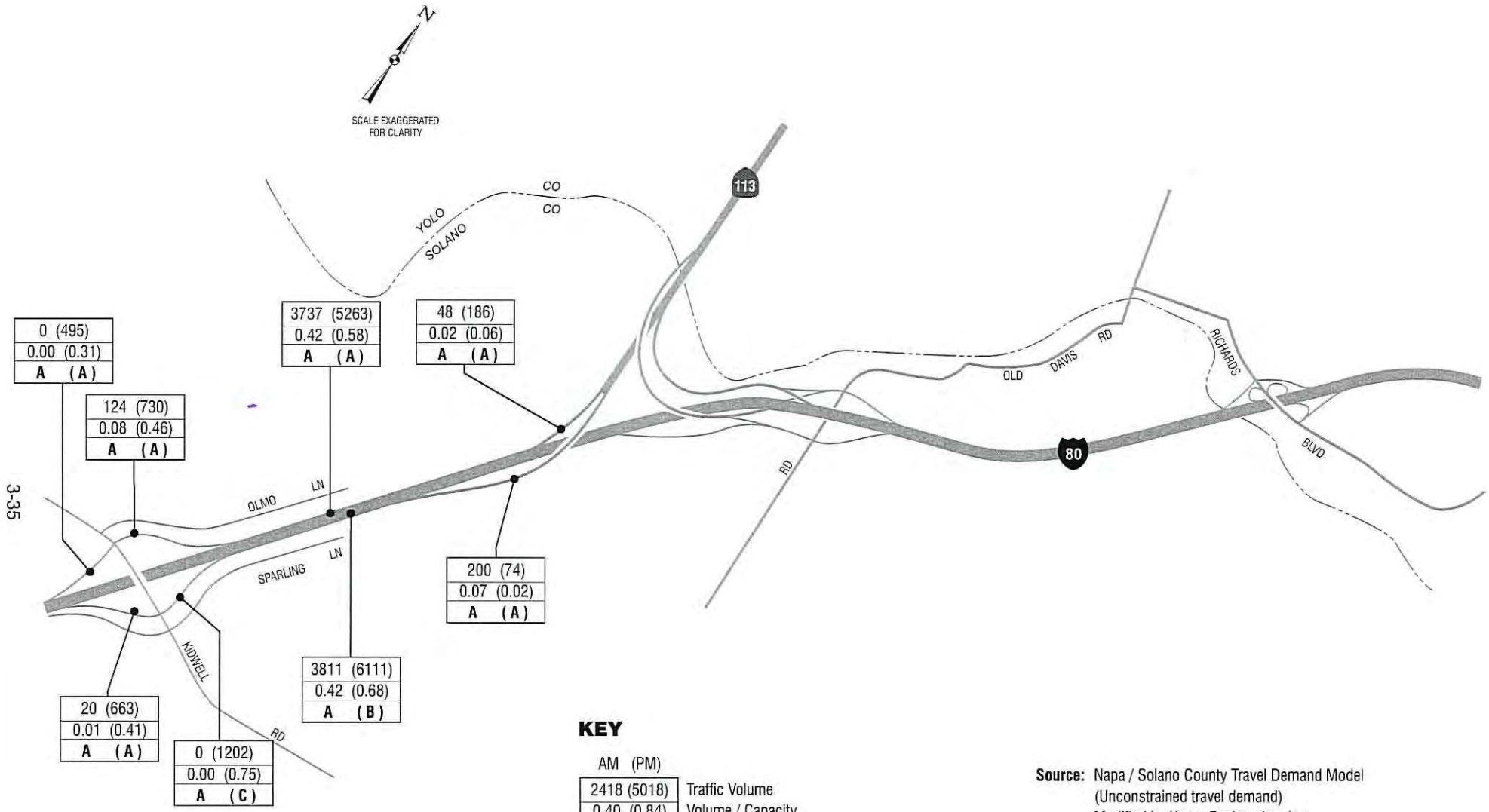
FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS

Segment 7

(cont'd)

Korve Engineering

May 2004



KEY

AM (PM)	
2418 (5018)	Traffic Volume
0.40 (0.84)	Volume / Capacity
A (D)	Level Of Service

Source: Napa / Solano County Travel Demand Model
(Unconstrained travel demand)
Modified by Korve Engineering, Inc.

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 3-32

FUTURE (YEAR 2030) TRAFFIC VOLUMES AND LOS

Segment 7
(cont'd)

7-4 Vols 2030.cdr

Korve Engineering

January 2004

3.2 Transit

Based on U.S. Census 2000 data and population/employment projections prepared by the Association of Bay Area Governments (ABAG), the demand for bus and park-and-ride facilities for future conditions was evaluated. Information in this section is based largely on the December 2003 *I-80/I-680/I-780 Transit Corridor Study*, prepared by Wilbur Smith & Associates.

3.2.1 Projected Growth in Bus Travel

3.2.1.1 Projected Growth of Intercity Commuters

Current population and employment projections prepared by ABAG for Solano County forecast that commute travel to and from the County will continue to increase. As described in Section 2.2.4, U.S. Census data documents that in the year 2000 Solano County had 170,208 residents employed in the workforce. Fifty-eight percent worked within the County and 42 percent commuted to other counties for work.

Based on previous ABAG forecasts for the year 2020 (ABAG Projections 2000), MTC published the *Commute Forecasts for the San Francisco Bay Area 1990-2020* in October 2000. MTC projects that in the year 2020 Solano County will have 262,000 residents working and 198,200 jobs in the County. With 39,800 workers coming from other counties, approximately 109,000 residents would need to commute out of the County to work. Therefore, there will be growth in the number of residents who commute out of the County for work from 2000 to 2020 even though employment in the County is expected to increase. Table 3-1 compares the year 2000 Census data to MTC forecasts for Solano County in the year 2020.

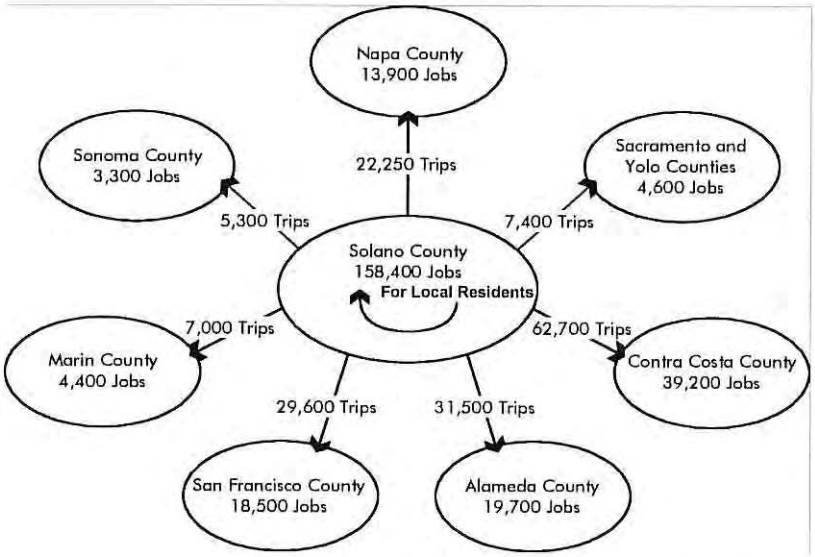
Table 3-1 Current Census Data and Projected Growth in Solano County Employment

Solano County	2000 Census	2020 (MTC Forecast)	Percent Increase
Resident workers [a]	170,208	262,000	**54%**
Jobs in the county [b]	120,885	198,200	**64%**
Workers from other counties [c]	21,654	39,800	**84%**
Workers commute out of Solano County to work [a - (b - c)]	**70,977**	**103,600**	**46%**

Source: 2000 Census – U.S. Census Bureau
2020 Projection – *Commute Forecasts for the San Francisco Bay Area 1990-2020,* Metropolitan Transportation Commission, October 2000

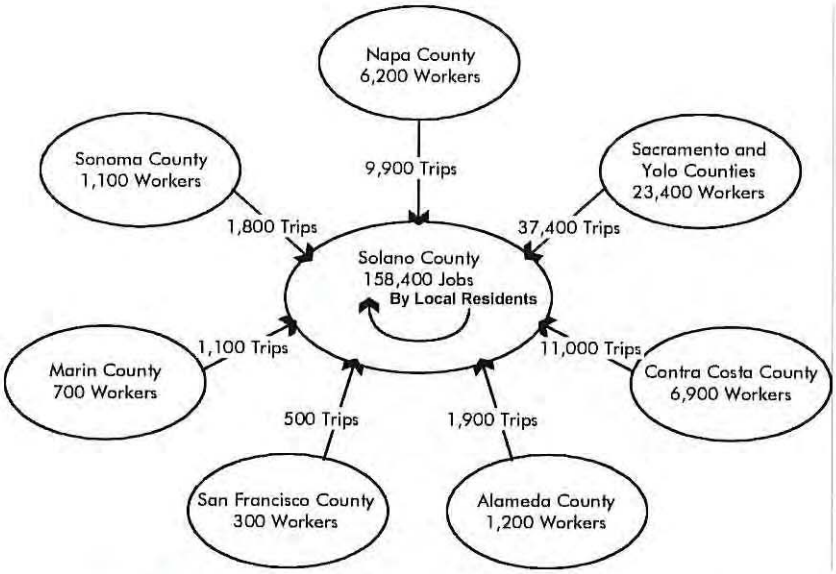
To understand the cross-county commute pattern, Figure 3-33 below documents the year 2020 distribution of jobs for Solano County residents, and Figure 3-34 illustrates where outside workers commuting into Solano County will reside. These two figures also provide estimates of the number of daily commute trips associated with these commuters. These estimates assume that only 80 percent of workers commute to their jobsites on a given day and that each commuter makes two trips (to work and from work).

Figure 3-33 Projected Year 2020 Employment Distribution for Solano County Residents



Source: "Commute Forecasts for the SF Bay Area 1990-2020: Data Summary," MTC, October 2000. Edited by Korve Engineering, Inc. April, 2004

Figure 3-34 Projected Year 2020 Residential Distribution for Solano County Workers



Source: "Commute Forecasts for the SF Bay Area 1990-2020: Data Summary," MTC, October 2000. Edited by Korve Engineering, Inc. April, 2004

In 2020, the largest commute destination, outside of Solano County, is projected to be Contra Costa County (14.6%). Alameda County is projected to be the second largest commute destination (7.4%) and San Francisco is the third largest (6.9%). Napa County is projected to be the jobsite for 5.2% of Solano residents. Marin and Sonoma Counties together account for 2.9% of jobs.

According to Figure 3-34, most Solano County workers are projected to be county residents. The largest number of workers outside the county commutes in from Sacramento and Yolo Counties combined (11.8%). The other two counties with a significant number of workers traveling to Solano County are Contra Costa County (3.5%) and Napa County (3.1%).

Figure 3-2 compares the projected change of residential distribution of Solano County Workers from 2000 to 2020. The percentage of Solano County workers living in Sacramento and Yolo counties are expected to increase in 2020 while the percentage of those living in Contra Costa is expected to fall. Additionally, the percentage of Solano County workers living in Solano County is projected to fall from 82% to 80%.

Table 3-2 Residential Distribution of Solano County Workers, 2000 and 2020

County	2000 Census	2020 (MTC Forecast)
Alameda	2%	1%
Contra Costa	5%	3%
Marin	1%	0%
Napa	3%	3%
Sacramento and Yolo	5%	12%
San Francisco	0%	0%
Solano	82%	80%
Sonoma	1%	1%

* Percentages do not add up to 100% due to rounding

Source: 2000 Census – U.S. Census Bureau
2020 Projection – *Commute Forecasts for the San Francisco Bay Area 1990-2020,* Metropolitan Transportation Commission, October 2000

3.2.2 Park-and-Ride Facility Demand

The demand for park-and-ride facilities will depend on the number of long distance commuters residing within convenient access of the individual park-and-ride sites, and the relative attractiveness of express bus and rideshare commuting versus driving in general traffic. Initial estimates of park-and-ride demand were developed using the Solano County Traffic Model, 2000 Journey-to-Work Census Data, the MTC Travel Model and ground counts of usage at several current facilities in the corridor. One of the major weaknesses of the resources used to estimate demand is the understatement of Solano commute demand to jobs in Yolo and Sacramento Counties.

The catchment area or market-shed area for each park-and-ride site was defined in terms of the Solano County Model's Traffic Analysis Zones (TAZ). In general, the catchment areas extend about three miles upstream from the park-and-ride lot and one mile downstream (relative to the direction of commute travel). The definition of these park-and-ride catchment areas is based on national experience that indicates the distance most patrons are willing to drive to a lot and also the fact that few motorists like to travel out of direction to reach a park-and-ride lot. These TAZ from the Solano Model were translated into MTC's larger regional TAZ system. The MTC model provided estimates of 2000 and 2025 commute trips from Solano park-and-ride catchment areas to four primary commute destinations:

1. Downtown San Francisco;
2. I-80 Corridor in Contra Costa County and Northern Alameda County;
3. I-680 Corridor in Contra Costa County south to Bishop Ranch; and
4. I-80 East Corridor to Yolo and Sacramento Counties.

The reason for using the MTC model as well as the Napa/Solano County model was that the Napa/Solano Model provides forecasts only for the one hour a.m. peak traffic period on Solano County roadways. Park-and-ride site access demands extend to more than just a one hour period and the longer commute distance park-and-ride peak demand period typically occurs earlier in the morning than the local traffic peak. The MTC model's three hour peak period forecasts therefore better reflect regional park-and-ride demand than the one hour Solano Model. Because the Solano Model has a more detailed TAZ structure and land use inputs, the Solano Model's TAZ system was used to disaggregate MTC's forecast in order to provide greater detail. MTC work trip forecasts were prorated back to the Solano Model's TAZs based on the number of dwelling units in each Solano TAZ.

Capture rates were then developed for each park-and-ride catchment shed to each of the four commute destinations. The capture rates were calibrated based on several ground counts of park-and-ride usage, compared to the total 2000 market of commute trips.

The proportion of patrons traveling to jobs in Yolo and Sacramento Counties was adjusted from the travel model forecasts using the year 2000 park-and-ride survey data and also using the year 2000 Journey-to-Work data from the Census.

Table 3-3 describes estimated current and future demand for spaces at each facility. Table 3-4 describes estimated current and future origin-destination patterns of park-and-ride demand for the I-80/I-680/I-780 Corridor.

Table 3-3 Park-And-Ride Demand Forecast At Existing and Potential Facilities

City	Site	Spaces	Current Demand	Estimated Demand	
				2000	2025
Dixon					
	I-80 & North First Street	0	0	5	40
	I-80 & Pitt School Road	100	7	8	64
	I-80 & West A Street	0	0	1	10
	Sub-total	100	7	14	114
Vacaville					
	I-80 & Leisure Town Road	46	10	25	78
	I-80 & Davis/Bella Vista	250	190	200	444
	I-80 & Cliffside	129	5	0	0
	Sub-total	425	205	225	522
Fairfield					
	I-80 & North Texas Street	0	0	166	406
	I-80 & West Texas Street (FTC)	400	450	561	916
	I-80 & Green Valley Road	61	35	46	0
	I-80 & Red Top Road	50	30	30	209
	I-680 & Gold Hill Road	0	5	22	202
	Sub-total	511	520	825	1,733
Vallejo					
	I-80 & Hiddenbrooke Parkway	20	15	19	35
	I-80 & Turner Road	0	0	203	371
	I-80 & Curtola Parkway	500	600	757	1,158
	I-80 & Magazine Street	19	19	20	80
	Sub-total	539	634	999	1,644
Benicia					
	I-680 & Vista Point/Intermodal	0	10	12	16
	I-780 & West Military/Southampton	0	0	83	120
	I-780 & Columbus Parkway	0	9	20	35
	East 2nd Street	19	18		-[1]
	Sub-total	19	38	115	171
GRAND TOTAL		**1,594**	**1,403**	**2,178**	**4,184**

1. Demand estimate included in West Military/Southampton estimate.
Source: Wilbur Smith Associates, January 2004

Table 3-4 Park-And-Ride Origin-Destination Forecast

City/Year	to SF	to East Bay	to I-680	to Sac	Total
Dixon					
2000	1	1	1	11	14
2025	4	10	7	93	114
Vacaville					
2000	126	25	47	27	225
2025	194	73	124	131	522
Fairfield					
2000	495	212	70	48	825
2025	1,047	327	198	161	1,733
Vallejo					
2000	757	202	36	4	999
2025	1,024	528	84	8	1,644
Benicia					
2000	32	26	45	12	115
2025	21	57	80	13	171
TOTAL					
2000	1,411	466	199	102	2,178
2025	2,290	995	493	406	4,184

Source: Wilbur Smith Associates, January 2004

Dixon Sites - Three express bus/rideshare I-80 corridor park-and-ride sites were assessed in the Dixon segment of the corridor. As shown in Table 3-3, the 2000 demand levels are estimated to be relatively low but would increase as express bus connections to Davis and Sacramento are improved in years ahead. Table 3-3 suggests that the current Pitt School Road Park-and-ride site should continue to be the center of express bus connections for Dixon. Neither the North First Street nor the West A Street site appears to have high levels of demand and therefore small to medium size lots should suffice at each location. An argument could be made to defer the West A Street site to the Long Term and to encourage this demand to use the Pitt School Road site. The North First Street and West A Street sites could be developed in conjunction with private sector development around these interchanges, rather than as stand alone projects. These facilities could also be integrated into future upgrade improvements to the I-80 interchanges in Dixon.

Vacaville Sites - Two sites along I-80 were assessed in the Vacaville segment of the study corridor. The recently completed Leisure Town Road and the planned Bella Vista Park-and-ride projects are projected to be stretched to their maximum capacities by 2025. No demands are projected for the Cliffside Road Park-and-ride site due to its lack of visibility, security concerns and lack of regional bus service.

Fairfield Sites - Five park-and-ride sites were assessed in the Fairfield segment of the study area as shown in Table 3-3. All five sites are anticipated to attract substantial demand, except for the one at Green Valley Road, which is slated for closure as part of the interchange upgrade project. As it will be difficult to accommodate the projected park-and-ride demand for the Fairfield Transportation Center at this site, further development of the site, or a nearby companion facility might be necessary. The I-80/Abernathy Road interchange appears to be an attractive location to accommodate the overflow park-and-ride demand.

Vallejo Sites - Three sites were assessed along the Vallejo segment of I-80 as shown in Table 3-3. The 2000 estimate for Curtola reflects bleeding of park-and-ride demands to Turner and to an I-780 facility, if one could be developed. Without the bleeding off of demand farther north at Turner Road and to the east at I-780, the demand for parking at Curtola would be much higher.

Benicia Sites - Three site vicinities were assessed along I-680 and I-780 in Benicia as shown in Table 3-3. The Fairfield area Gold Hill Park-and-ride site along I-680 was found to siphon most of the southbound park-and-ride demand away from the Benicia Intermodal site. The Gold Hill site is closer to residential catchment areas and therefore would be more effective at capturing southbound park-and-ride demand. The bulk of the commute demand from Benicia's environs to I-680 Contra Costa County job sites is significantly out of direction of travel (more than two miles) from the Benicia Intermodal site and therefore unlikely to use this site. The estimate for intercity rail park-and-ride for this site is 83 roundtrips in 2000 and 213 roundtrips in 2025. Adjusting for vehicle occupancies would translate into about 80 spaces for 2000 and 200 spaces for 2025.

The high demand estimates for park-and-ride sites located along the I-780 corridor possibly could not be fully met due to the absence of large well-located sites for park-and-ride lots. Development of a park-and-ride lot at the I-780/Rose Drive interchange (northwest quadrant) and perhaps partnering with the Calvary Church for a park-and-ride lot at Southampton and West Military appear to be the most promising opportunities.

Section 6 describes how the individual park and ride projects are integrated into the study's project prioritization process. In general, park and ride lots are prioritized in order of need, and in a manner which complements the highway improvement plan (e.g. construction of park and ride lots in concert with the construction of HOV facilities).

4 EVALUATION CRITERIA

The purpose of this section is to define the evaluation criteria developed and used to evaluate alternative improvement measures. The methodology used to phase and prioritize the alternatives is described in Section 5. As discussed earlier in the report, the purpose and objective of the I-80/I-680/I-780 Major Investment and Corridor Study is to evaluate the existing and future transportation networks within the study corridors, and to develop a long range prioritization list of multi-modal improvements necessary to serve existing and future transportation needs.

4.1 Evaluation Methodology Overview

Based on input from local agencies, the STA, Caltrans and the study's Project Development Team (PDT), a list of evaluation criteria was developed. These criteria were then used to evaluate the alternatives relative to one another, so that the improvement recommendations developed could be ranked and prioritized. The following nine performance measures were developed and applied for the alternative improvement recommendations.

1. Traffic Operations including Link Volume/Capacity Ratio, Levels of Service, Bottlenecks, Queuing and Vehicle Delay;
2. Safety;
3. High Occupancy Vehicles (HOV) Lane Performance;
4. Preliminary Right-of-Way (ROW) Requirements;
5. Preliminary Environmental Constraints;
6. Order of Magnitude Costs;
7. Complement Transit Plan;
8. Compliance with Engineering Standards; and
9. User Benefit.

These criteria provide a relative indication of mobility, traffic operational characteristics, impacts, benefits and costs for each alternative.

4.2 Description of Criteria

The nine evaluation criteria are described in detail in this section.

4.2.1 Traffic Operations

The ability of each alternative to accommodate existing and future traffic levels was evaluated. Two levels of traffic operations analysis were conducted. First, as a baseline analysis to assist in the initial development of alternative improvement measures, volume to capacity ratios and levels of service on critical links were calculated using the "unconstrained" forecasts of the Solano County Travel Demand Model. This analysis was conducted for the years 2010, 2020 and 2030.

In addition to the unconstrained evaluation of baseline traffic conditions, a more detailed

evaluation of "constrained" conditions throughout the study corridors was conducted. The constrained analysis identified the following performance characteristics for each alternative:

- Freeway bottleneck sections;
- Length of queue upstream of each bottleneck;
- Vehicle delay associated with each bottleneck;
- HOV time savings, wherever applicable; and
- Queuing on ramps and freeway-to-freeway connectors.

This analysis was first conducted for the years 2010, 2020 and 2030 assuming the implementation of no improvement measures. The analysis was then refined through the development, evaluation and prioritization of mainline improvement measures to iteratively predict delays, queues and bottlenecks in different time horizons under different geometric scenarios as the improvement measures are implemented in their identified order of priority.

4.2.1.1 Bottlenecks

The constrained traffic operations analysis takes into account the constraining effects of existing and future bottlenecks through the study corridors. Where capacity constraints are found to exist, downstream travel demand is adjusted downwards accordingly. Figure 4-1 presents an example of this type of constrained bottleneck analysis. In Figure 4-1, demand on a hypothetical section, in this case 8,900 vehicles per hour, exceeds capacity (8,000 vehicles per hour) by 900 vehicles per hour. In the constrained analysis, these 900 vehicles are stored at the bottleneck location and subtracted proportionately from downstream sections. For each bottleneck, the number of stored vehicles, delay and queue lengths are calculated.

4.2.1.2 Delay

For each identified bottleneck, the amount of vehicular delay is calculated using the following formula:

Total Bottleneck Delay = (Stored Vehicles x 60)/Capacity

4.2.1.3 Queues

The length of vehicular queues upstream of the identified bottlenecks has been calculated based on the ratio of speeds and volume/capacity ratios (V/C) on upstream sections. Figure 4-2 presents the relationship of V/C ratio to travel speeds on typical California freeways.

A typical California freeway lane has a maximum capacity of approximately 2,000 vehicles per hour. The amount of traffic served on a segment of freeway is dependent on travel speeds and travel demands. When demands exceed capacity, queues form, speeds slow and the operation of the freeway section is constrained. When demands are less than capacity, a freeway section operates in an unconstrained manner. The top

half of the curve presented in Figure 4-2 illustrates an unconstrained operation, while the bottom half illustrates a constrained operation, where demands exceed capacity.

In an unconstrained condition when a segment's V/C is smaller than 0.2 (point A on Figure 4-2), vehicles can travel at the 60 mph speed limit assumed in this instance. When an unconstrained section's V/C increases to 0.8 (point B), the average speed reduces to approximately 55 mph. When a freeway reaches its maximum capacity (V/C = 1, point C), the average speed reduces further to approximately 40 mph. With the presence of a downstream bottleneck, vehicle speeds are limited and queues are formed. In these areas of queue, speeds decrease, as does the section's throughput. At point D on Figure 4-2, for example, average vehicle speeds are reduced to 14 mph. Due to the slow travel speeds and stop-and-go traffic, only 1,200 vehicles per hour can travel through this segment instead of the 2,000 that the lane will ideally accommodate when demand is less than capacity. As demand begins to exceed capacity, speeds slow and fewer vehicles can travel through the section, resulting in backups, or queues. Thus, while the unconstrained demand in the section can exceed capacity (i.e. v/c greater than 1.0), from an operational perspective, a section's throughput can never actually exceed its capacity.

Table 4-1 illustrates the relationship between section speeds (as determined by V/C ratio) and throughput.

Table 4-1 Speed, V/C and Throughput Relationship

Speed (mph)	V/C	Vehicles Per Hour	Reference Point on Figure 4-1
UNCONSTRAINED – AREAS WITHOUT QUEUE			
59	0.2	400	A
58	0.4	800	
57	0.6	1,200	
55	0.8	1,600	B
54	0.9	1,800	
39-44	1	2,000	C
CONSTRAINED – AREAS IN QUEUE			
25	(Demand >1.0) Actual = 0.9	1,800	
19	(Demand > 1.0) Actual = 0.8	1,600	
11	(Demand > 1.0) Actual = 0.6	1,200	D
5	(Demand > 1.0) Actual = 0.4	800	
2.5	(Demand > 1.0) Actual = 0.2	400	

For each section (distance between consecutive ramps) of freeway, upstream of an identified bottleneck, the volume to capacity ratio is calculated. Using Figure 4-2, the speed on that section is then identified. Based on the speed achieved in the section of upstream bottleneck, the amount of vehicular delay experienced in the section is calculated. The amount of delay utilized in a given section is calculated through the following equation:

Delay (minute/mile) = (60/Section Speed) – (60/Freeflow Speed)

The delay experienced in each section upstream of the bottleneck is calculated. The point where all of the delay has been utilized represents the back of the queue in question, or the total length of the queue from the bottleneck.

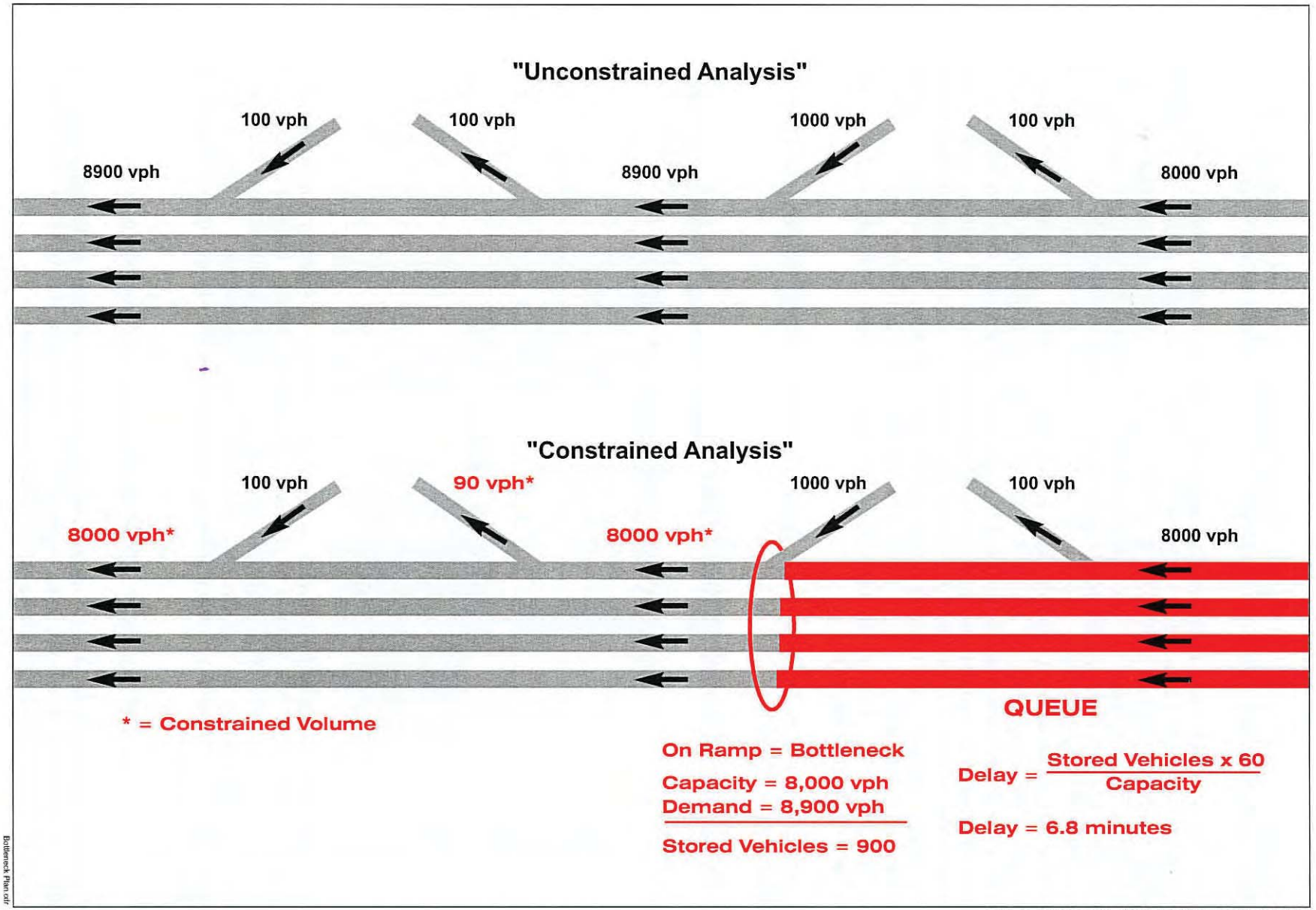


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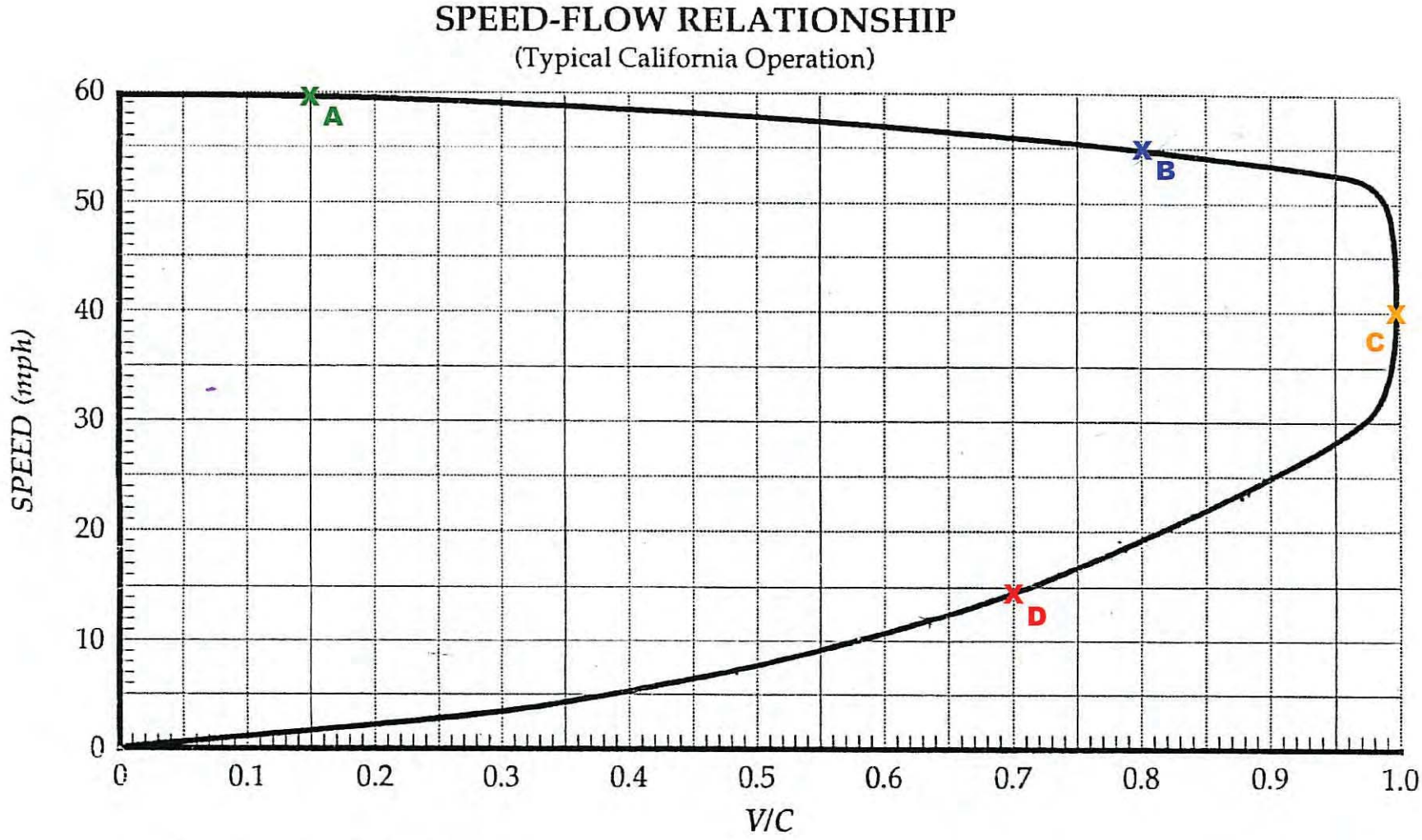
Figure 4-1

EXAMPLE OF BOTTLENECK CONSTRAINT

4 Lane Freeway Section



Source: Caltrans District 4, Office of Highway Operations

I-80 / I-680 / I-780 MIS / CORRIDOR STUDY

Figure 4-2

SPEED-FLOW RELATIONSHIP

Speed Flow.cdr

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4.2.2 Safety

Each alternative's impact on vehicular safety was qualitatively identified. The degree to which each alternative would resolve an existing safety issue or problem was identified. If an improvement was specifically designed to remedy existing substandard geometry, it was identified as having a safety improvement. If an improvement, designed to industry engineering design standards, was developed to increase mainline capacity, or remedy an existing traffic operational problem, it was identified as having no effect on safety. No alternatives are proposed that would present a safety problem or concern.

4.2.3 HOV Lane Performance

The operational performance and effectiveness of HOV lanes was evaluated for those alternatives which include the development of an HOV lane. The two primary measures of HOV lane performance evaluated were HOV lane usage (i.e. number of HOVs) and travel time savings.

4.2.3.1 Travel Forecast Model

As described in Section 3, the travel demand forecasts used for the evaluation of HOV lanes are based on year 2030 traffic projections from the Napa/Solano County travel model. The Napa/Solano County travel model does not separately account for HOV vehicles. Therefore, the model was modified, specifically for this study, to provide separate projections for vehicles with one occupant, two occupants, or three or more occupants, as well as trucks.

4.2.3.2 Road Network Coding

The model road network was modified to include separate coding of HOV lanes. Freeway HOV lanes were coded the same as freeways, but a code was added to identify whether they are restricted to 2-person or 3+-person carpools. Additional network segments were added to connect the HOV lanes to the mixed-flow lanes. These connectors were coded between freeway interchanges, to account for the distance that was required to merge into or out of HOV lanes. This coding procedure also ensured that the model would not allow vehicles to use the HOV lane to travel between adjacent freeway interchanges.

4.2.3.3 HOV Demand

Two sources were used to estimate the initial HOV demand. The first source was the regional travel model maintained by the Metropolitan Transportation Commission (MTC). The second source is vehicle occupancy counts conducted in the year 2001 for the Solano County Comprehensive Transportation Plan. These counts are summarized in Section 2. The MTC travel model includes separate vehicle trip estimates for single occupant vehicles, 2-person vehicles, 3+-person vehicles and trucks.

The MTC a.m. peak period projections for the year 2025 were obtained from the forecasts conducted for the most recent Regional Transportation Plan. These trips were

compressed to the nine Bay Area counties plus major gateways to the Bay Area (such as I-80 at the Yolo County line). Percentages of vehicle trips were calculated for each of the four vehicle types and for each county-to-county or gateway-to-county combination. The following regional default values were used for any combination where projections were not available:

Single occupant:	87%
2-person carpool:	10%
3+-person carpool:	3%
Trucks:	<1%

The vehicle split factors were then applied to the Solano County model year 2030 a.m. peak hour trip forecasts. The reverse-direction factors were applied to the Solano County model year 2030 p.m. peak hour trips. For example, the MTC a.m. vehicle split factors for trips from Solano County to San Francisco County were applied to the Solano County model a.m. trips from Solano County to San Francisco County and the Solano County model p.m. trips from San Francisco County to Solano County.

The resulting trips were assigned to the road network and the vehicle occupancy splits were compared to the counts conducted in 2001. Additional adjustments were necessary to bring the vehicle occupancy splits derived from MTC closer to the observed counts. Three iterations of adjustments were used on key corridors within Solano County. Table 4-2 shows the resulting HOV percentages at selected points on the study corridor.

Table 4-2 HOV Percentages in the Study Corridor

Peak Hour	Direction	Traffic Counts (2001)			Revised Solano County Model (2030)		
		2 Person	3+ Person	Total	2 Person	3+ Person	Total
I-80 at Meridian Rd.							
AM	EB	15	2	17	17	4	21
	WB	12	3	15	15	3	18
PM	EB	20	3	23	19	3	22
	WB	20	5	25	21	4	25
I-80 at Suisun Valley							
AM	EB	16	4	20	15	4	19
	WB	17	3	20	14	4	18
PM	EB	18	6	24	19	4	23
	WB	14	7	21	22	5	27
I-80 at Magazine Street							
AM	EB	16	5	21	20	5	25
	WB	15	4	19	17	5	22
PM	EB	22	6	28	24	6	30
	WB	20	5	25	25	6	31
SR 12 at Red Top Rd.							
AM	EB	11	1	12	11	2	13
	WB	16	5	21	16	3	19
PM	EB	19	6	25	21	3	24
	WB	23	5	28	21	3	24
SR 29 at Magazine Street							
AM	NB	20	4	24	17	5	22
	SB	21	9	30	18	5	23
PM	NB	25	9	34	25	5	30
	SB	25	3	28	21	6	27

Source: MTC Regional Travel Model; STA vehicle occupancy counts collected by FPA (2001).

4.2.3.4 HOV Assignment

The version of the software used for the Solano County travel model (TRANPLAN) does not fully support the assignment of multiple vehicle types using different road segments such as HOV lanes. For this study, the traffic assignment process from the model was converted to a different software (TP+). By setting parameters to be the same as the Solano County model, the TP+ assignment could closely match the 2030 forecasts produced by the original Solano County model.

The assignment procedure was then modified to allow for the full analysis of HOV lanes. The single occupant and truck vehicles were prohibited from using designated HOV lanes and connectors. In addition, the assumed lane capacities were adjusted from the Solano County model assumption of 75 percent of full capacity to 100 percent of capacity in order to allow maximum use of the HOV lanes. With these modifications, the travel model did not fully replicate the original Solano County model results, but provided more information on potential HOV lane usage.

By comparing the year 2030 forecasts from a roadway network model without proposed HOV projects to the one with proposed projects, the effectiveness of these projects was evaluated in terms of the likely magnitude of usage, and the travel time savings for both vehicles and total persons.

4.2.4 Preliminary Right-of-Way Requirements

Right-of-way requirements and estimates of right-of-way costs were prepared at a preliminary level for each alternative. Alternatives which require a relatively high amount of right of way, or a relatively high amount of sensitive right of way, are identified as having a "high" relative cost/"low" relative benefit under this evaluation criterion. For the purposes of this analysis, the acquisition of unencumbered right of way is treated as being less impactful than encumbered right of way (i.e. taking a home or business is treated as a greater impact than the taking of an empty field). Alternatives which require relatively small amounts of right of way are identified as having a "low" relative cost/"high" relative benefit.

It should also be noted that land use impacts are also evaluated in detail as part of the Environmental Constraint analysis presented in Section 4.2.5 below.

4.2.5 Preliminary Environmental Constraints

Widening of freeways or construction of new facilities may have effects on the adjacent environment. The degree of environmental constraints may cause some alternatives to be fatally flawed or require extensive mitigation. The environmental screening analysis provides a discussion of planning considerations including land use, general plan and zoning designations and applicable policies, and a brief overview of potential environmental constraints associated with each of the alternatives. Specifically, the alternatives are relatively evaluated for the following areas of environmental concern:

- Land Use Displacement;
- Biological Resources;

- Visual Resources;
- Construction Noise; and
- Air Quality.

Information has been compiled based on field reconnaissance, review of existing planning and environmental documents obtained from local jurisdictions, and consultation with planning and public works staff from Benicia, Dixon, Fairfield, Vacaville and Solano County.

4.2.6 Order of Magnitude Costs

4.2.6.1 Introduction

The purpose of cost estimating during the Major Investment Study phase is to determine the order-of-magnitude capital costs for proposed improvements and to compare costs between alternatives. This is essential for determining the fiscal requirements for a project, performing cost-effectiveness analyses and for project financial planning.

Capital cost estimates have been prepared using Caltrans' standard Preliminary Engineering Estimate format which estimates roadway, structure and right-of-way costs. The estimate accounts for major items which are easily identified through field observations and review of as-built drawings. Costs for right-of-way and land use takes are estimated separately. All costs are expressed in current year dollars, and unit costs have been developed using recent data from similar projects.

Quantities have been determined for major construction bid items, since typically the largest 20 percent of the bid items determine 80 percent of project cost. After quantities are prepared for the major bid items, the remaining construction items are estimated by applying percentages for minor work construction based on observed historical percentages of the major work.

4.2.6.2 Assumptions and Basis of Estimates

The following assumptions have been used to prepare the construction cost estimates:

- Except where noted, all highway improvements comply with Caltrans standards and local interchange improvement projects comply with jurisdiction requirements.
- A Traffic Management Plan is necessary for each project.
- Culvert extensions are included as part of project drainage and are within the LS value.
- Relocation or protection of underground utilities is identified by the vicinity of the area outside the Caltrans right-of-way and, if necessary, is included with a LS value.
- Right-of-way estimates are based on the approximate area required for the proposed improvements. All structure/land use costs are based on the latest available information regarding real estate values in the area affected.

Table 4-3 summarizes the basic roadway improvement assumptions, all of which are consistent with Caltrans standard plans.

Table 4-3 Roadway Element Summary

Roadway Elements	Dimensions
Lane Width (typical for freeway and local roads)	3.6 m (12-feet)
Inside*/Outside Shoulder Width (for freeway)	3.0 m (10-feet)
Outside Shoulder Width (for ramps)	2.4 m (8-feet)
Inside Shoulder Width (for ramps)	1.2 m (4-feet)
Bridge or Creek Crossing Width	Lane Widths + Shoulders + Railings
Local Roads' Shoulder	2.4 m (8-feet)
Side Slope	2:1 maximum

* Only as applicable. Exemptions are sometimes made due to spatial constraints.
Source: *Standard Plans*, Caltrans, July 1999

4.2.6.3 Unit Costs

Unit prices have been compiled from previous engineers' estimates, completed projects, standard estimating manuals and an application of standard estimating practices. The unit costs include contractor or supplier mark-ups for overhead, risk and insurance, profit, mobilization/demobilization, traffic control and cost allocations for utility relocation, as appropriate. The following is a description of these items, which historically represent 75-85 percent of the total project costs for the types of improvements under consideration:

- Clearing & grubbing – includes removal and disposal of materials (such as trees, rocks, etc.).
- Roadway excavation – includes excavation, placement of embankment, and compaction and hauling costs.
- Imported borrow – includes soils trucked to the site, placed in embankment and compacted.
- Edge drains – unit cost includes trench excavation, installation of edge drain and backfill. This cost is used for ramp or freeway improvements.
- Pavement section – includes placement and compaction of asphalt concrete surface, aggregate base and sub-base coarse on roadway, shoulders and multipurpose paths.
- Drainage facilities – unit cost includes trench excavation, installation of culverts or special drainage features. Unit cost varies by culvert size.
- Storm drains – unit cost includes trench excavation, installation of culverts and backfill.
- Pumping plants – required when tunnel structure is proposed.
- Project drainage – included for any special feature, such as a new creek crossing that requires special attention. The cost of the new crossing is included as part of structural costs.
- Retaining walls/sound walls – retaining/sound wall costs include structural excavation, foundation, wall and railings. All retaining walls are assumed to have an average height of 3m.
- Barriers and guard rails - cost of installing three-beam guard rail including posts and rail according to Caltrans HDM requirements.
- Temporary railings - cost of installing temporary railing when required.

- Erosion control – unit cost includes straw or seeding of disturbed ground to limits of grading.
- Curb & gutter – includes all necessary appurtenances, material and labor required to construct curb and gutter, such as aggregate, Portland cement concrete, form work, etc.
- AC dike – includes all necessary appurtenances, material and labor required to construct AC dike, such as aggregate, Portland cement concrete, form work, etc. This item is installed where new ramps are proposed.
- Bridge demolition – includes all material, labor and equipment cost to demolish existing bridges. Temporary structures are included under a separate cost under the structural cost section.
- Lighting allowance – usually included if the project is located near commercial or residential areas where pedestrian traffic is expected.
- Overhead sign structure – typical for all new construction of ramps or auxiliary lanes in order to direct traffic appropriately.
- Traffic Delineation – cost of temporary traffic control during construction.
- Signing & striping – unit cost includes centerline, lane and edge lines, post(s) and panel(s) for one or two post installations.
- Temporary traffic control - providing temporary facilities and controls, which includes traffic control, temporary utility facilities and protection and maintenance of existing utilities. Traffic control includes flaggers and construction area signs required for traffic control during construction of the roadway. It also includes placing, removing, storing, maintaining, moving to new locations, replacing and disposing of the components of the traffic control system. Construction area signs required for the direction of public traffic through and around the work will also be furnished.
- Traffic signal – traffic signal costs include signal heads, mast arms, poles, induction loops, interconnection and controllers. Traffic signals are estimated on a case-by-case basis.
- Traffic management plan – cost for handling traffic during construction. Includes cost of planning and meeting with local and state agencies.
- Structural cost (bridges or creek crossings) – bridge costs include structural excavation, foundation, abutments, piers, decks and railings.
- Right-of-way acquisition – right-of-way costs include the capital costs for securing and providing all the property rights required for implementation of the project. These include acquisition of property in fee or easement, damages to remnant parcels and relocation costs. Services to secure the right-of-way and contingency factors for right-of-way are included as a multiplier to the right-of-way costs.

Right-of-way is measured by area (square meter) at a parcel-by-parcel level, based on the proposed right-of-way and easement lines indicated on the conceptual plans for the project. Rates for right-of-way are derived from the best available local data, such as sales and comparable acquisitions. The source of this information is local real estate title companies, real estate professionals, and local appraisers. In addition to right-of-way cost estimates, relocation costs are also determined for occupied parcels.

Table 4-4 summarizes the unit cost for each of the items described above.

Table 4-4 Unit Costs of Construction Elements

Line item:	Unit	Unit Cost
Clearing and Grubbing	ha	$10,000.00
Roadway Excavation: ▪ 1 Lane Freeway (with shoulder) ▪ Additional Lane Freeway (no shoulder) ▪ 1 Lane Ramp (with shoulders) ▪ Additional Lane Ramp (no shoulder) ▪ 2 Lane Local Road ▪ Additional Lane (Local Road)	m	 $80.00 $45.00 $80.00 $40.00 $70.00 $30.00
Imported Borrow	m^3	$30.00
Edge Drains	m	$180.00
Pavement Sections: ▪ 1 Lane Freeway (with shoulder) ▪ Additional Lane Freeway (no shoulder) ▪ 1 Lane Ramp (with shoulders) ▪ Additional Lane Ramp (no shoulder) ▪ 2 Lane Local Road ▪ Additional Lane (Local Road)	m	 $345.00 $180.00 $400.00 $220.00 $330.00 $165.00
Drainage Facilities	LS	Varies
Storm Drains	m	$200.00
Pumping Plants	LS	Varies
Project Drainage	LS	Varies
Retaining Wall/Sound Wall	m	$2,400.00
Barriers & Guardrails	m	$120.00
Temporary Railing	m	$30.00
Erosion Control	m	$60.00
Curb and Gutter	m	$260.00
AC Dike	m	$15.00
Bridge Demolition	m^2	$1000.00
Lighting Allowance	LS	varies
Overhead Sign Structure	EA	$50,000.00
Traffic Delineation	m	$15.00
Signing and Striping: ▪ 1 Lane Freeway (with shoulder) ▪ Additional Lane Freeway (no shoulder) ▪ 1 Lane Ramp (with shoulders) ▪ Additional Lane Ramp (no shoulder) ▪ 2 Lane Local Road ▪ Additional Lane (Local Road)	m	 $10 $5 $10 $5 $10 $5
Temporary Traffic Control	LS	varies
Traffic Signal	EA	$150,000.00
Traffic Management Plan	LS	varies
Structural Bridge: ▪ Over-crossing Structure ▪ Viaduct Structure & HOV Connector ▪ Creek Crossing ▪ Tunnel Structure	m^2	 $1,600.00-$2,400.00 $3,000.00 $1,400.00-$1,600.00 $4,500.00
Right-of Way (general for Solano County)	m^2	$65-$216.00

Source: 2002 Caltrans Contract Cost Data, recalculated by Korve Engineering

4.2.6.4 Contingencies

The project contingency allowance includes items and conditions which cannot be assessed at the time of the cost estimate due to the level of completeness of the design. Contingency allowances are needed to account for items not covered in the conceptual design phase. The contingency reflects the degree of risk associated with the level of design detail available and the characteristics of the specific design element. Contingency allowances are applied to roadway cost subtotals, structural subtotals and right-of-way subtotals.

Roadway Design Contingency

A roadway design contingency of 35 percent is applied to the subtotal cost for roadways. This is added to the cost of minor items, roadway mobilization and supplemental work covered under the Caltrans Standard Estimating format.

Structural Design Contingency

The Structural Design Contingency for bridges is 25 percent.

Right-of-Way Cost Contingency

A contingency factor is also applied to right-of-way costs to ensure that sufficient funds are identified to secure the necessary right-of-way. The following three items are added to the base right-of-way estimate to arrive at a final cost figure.

- A Damage Allowance to provide for compensation for damages which might occur in the event that a relatively small area of land acquisition is necessary, but the impact to the remainder of the parcel is felt to be high by the property owner. The Damage Allowance is 20 percent of the partial parcel cost.
- A Negotiation Allowance is applied to reflect the cost of right-of-way as consecutive parcels enter into negotiation. If a high acquisition price is successfully negotiated by a property owner early on, subsequent property owners may use that value to increase their compensation. The Damage Allowance is 20 percent of the partial parcel cost.
- A Condemnation Allowance provides for professional condemnation proceedings for right-of-way acquisition. The allowance is 20 percent for each parcel.

The total right-of-way allowance described above is 60 percent, which is applied to the estimated cost of the project right-of-way. The following items are also applied to the cost of right-of-way. These elements in combination result in a 40 percent add-on.

- Right-of-way engineering;
- Right-of-way agent staff time; and
- Right-of-way appraisal.

The total right-of-way allowance results in a multiplier of 2. This multiplier is applied to small, partial takes. For large, complete takes the multiplier is reduced to 1.5.

4.2.6.5 Project Development Costs

Project development costs include those costs that agencies must fund to complete the design and approval process and manage project work. Project development costs are divided into two categories. The first category is for funds set aside for unknown risks. These include environmental mitigation, construction change orders and project reserves.

Environmental Mitigation Allowance
The Environmental Mitigation Allowance is the cost for new roadway projects associated with the costs of environmental documentation and public review. An estimated mitigation is made for each alternative based on an assessment of the known environmental impact.

Construction Change Order
The Construction Change Order Contingency includes funds for unknown risks that will occur during construction. These risks include delays by the owner, weather delays, hazardous material discoveries and archeological discoveries. The construction change order contingency is 6 percent of the construction cost.

Project Reserve
Project reserves include funds for unforeseen site conditions, buried obstructions, hazardous material discoveries and archeological discoveries. The project reserve is 7 percent of the construction cost.

The second category of project development costs is for design engineering, construction management, agency costs, environmental documentation and project management. The allowances for these activities are shown in Table 4-5.

Table 4-5 Engineering and Project Management Costs

Design Engineering	10%
Construction Management	8%
Agency Costs	3%
Environmental Documentation	3%
Project Management	3%
Subtotal Project Development Costs	**27%**

Source: 2002 Caltrans Contract Cost Data, recalculated by Korve Engineering

4.2.6.6 Construction Change Order Contingency

As noted above, the design contingency percentage decreases as the project design detail increases. The capital cost estimate for a contract package can then be compared to contractors' bids. However a construction contingency will also be needed for change orders during construction. A Construction Change Order Contingency of 6 percent is applied to the project cost estimate at the final design stage to account for cost items outside of the normal bid package. The Change Order Contingency is included as part of the cost multiplier applied to the Construction Subtotal.

4.2.7 Complement Transit Plan

Alternatives which complement transit plans within the study corridor are rated as having a "high" relative benefit under this evaluation criterion. Alternatives which offer the greatest complement to the movement of transit through the study corridors include park and ride and HOV lane improvements.

4.2.8 Compliance with Standards

Preliminary designs and cost estimates have been prepared for each of the alternatives. In the great majority of instances, the proposed alternatives were designed in compliance with the latest standards of the Caltrans *Highway Design Manual, Fifth Edition.* However, due to site constraints, some design standards could not be met for some projects. The required design exceptions in these cases are discussed and identified under this evaluation criterion. Alternatives which require design exceptions are identified as having "low" relative benefit under this category of evaluation.

4.2.9 User Benefit

An alternative's "user benefit" is the sum of the travel times of each trip in the model as compared to the baseline alternative. When the travel time benefit of each alternative is known, a standard time value can be applied to calculate the monetary benefit of each alternative. By comparing the monetary benefit with the cost estimated based on the method described in Section 4.2.6, numerical benefit/cost ratios for proposed projects were calculated. Since the travel demand model cannot accurately predict the relative benefits of smaller local improvement projects, the user benefit calculation was only applied to larger projects with regional travel demand significance.

User benefits of transportation projects were calculated based on daily and annual time and cost savings for persons and goods movement and by using the procedures established by Metropolitan Transportation Commission for the 2001 RTP. Average values of time were used to convert travel time savings to cost savings. User benefits were calculated for all road segments that are represented in the Solano County travel model. The user benefit calculations were based on the travel demand model results, and did not include the potential additional HOV lanes that would be projected using the Federal Highway Administration (FHWA) methodology.

4.2.9.1 Person-Hours of Travel

The peak period person-hours of travel for each project were estimated by multiplying the persons on each road segment by the peak hour congested time on the segment. The persons on each road segment were calculated as the sum of single occupant vehicles plus two-person vehicles multiplied by 2 plus three-plus person vehicles multiplied by an assumed average occupancy of 3.5. The congested times on each road segment were calculated based on the ratio of projected volume to segment capacity (V/C). The Solano County travel model has defined a volume-delay function for each major type of road: freeways, highways and local streets. The functions are based on data presented in the *Highway Capacity Manual.*

The benefits of improvement projects are expected to extend beyond the a.m. and p.m. peak hour. The duration of peak conditions on each road segment was estimated using procedures established for the Santa Clara County Valley Transportation Plan 2020. The Santa Clara Valley Transportation Authority (VTA) collects data on traffic volumes, congested speeds and duration of congestion on all freeways in the county. VTA data were used to estimate duration of congestion as follows:

- If V/C < 1.07 Duration = 1.0 hours.
- If 1.07 < V/C < 1.20 Duration = (V/C * 25.8) – 26.8.
- If V/C > 1.20 Duration = 4.0 hours.

The congested travel times on each segment were assumed to apply to the vehicles and persons that would travel through the segment during the entire duration of congested conditions.

4.2.9.2 Goods Movement

The benefits of each project on goods movement were calculated based on the time savings for trucks. The total truck hours of travel were calculated by summing the truck volume on each segment multiplied by the congested travel time for the segment.

4.2.9.3 Bus Travel

Improvement projects that include HOV lanes or direct HOV connectors can provide significant time savings for bus transit passengers. Projected peak hour bus volumes were provided from the Transit Corridor Study performed by Wilbur Smith and Associates. It was assumed that these bus volumes would benefit from reductions in congestion for two hours during the morning commute and two hours during the evening commute. An average bus ridership of 20 passengers per vehicle was assumed for the benefit calculation. The total benefits were calculated by multiplying the bus passengers in each corridor times the travel time savings associated with each improvement project.

4.2.9.4 Value of Time

The benefit calculations used in the MTC model assume the following values of time:

- Person Hours – $17.03 per hour (75% of average wage of $22.71).
- Truck Hours – $80.00 per hour.

Annual benefits were calculated as 300 times average weekday benefits. By adding up the monetary values of time-savings for all users derived from each project, the user benefits of different projects can be compared directly.

4.2.10 Prioritization Based on Criteria

The screening analysis based on the above performance measures provided a rationale for prioritizing the most promising options. Efforts were made to develop quantitative information to support as much of the evaluation as is feasible, given the level of detail

involved with some of the evaluation criteria. Sections 6 and 7 detail the alternatives evaluation and prioritization process and results.

4.3 Public Participation

Three levels of public participation occurred throughout the development of this Corridor Study. First, at project initiation, public scoping meetings were held to allow County residents to comment on the study scope and approach. Secondly, monthly Working Group and Project Development Team meetings were held with local decision makers. In addition, the project's scope, progress and recommendations were presented and discussed at a number of STA Board meetings throughout the course of the study.

4.3.1 Public Outreach

Public outreach meetings were held at the project initiation to allow the public to provide input to the study scope and process. Three public meetings were conducted to introduce the study to the public and gain input to the scope and approach. These meetings were as follows:

1. City of Dixon – June 27, 2002;
2. City of Vacaville – July 17, 2002; and
3. City of Fairfield – July 23, 2002.

A presentation was prepared by the project team and presented at the public meeting. The presentation covered the following issues:

- Study Scope of Work;
- Study Goals;
- Study Process;
- Background and Existing Conditions;
- Corridor Operational Issues;
- Study Schedule; and
- Next Steps.

In April and May 2004, presentations were made to update decision makers on the Corridor Study's draft recommendations and findings. These presentations included updates with the following bodies:

- Benicia City Council;
- Dixon City Council;
- Fairfield City Council;
- Rio Vista City Council;
- Solano County Board of Supervisors;
- STA Board;
- Suisun City Council;
- Vacaville City Council; and
- Vallejo City Council.

4.3.2 Working Group/PDT Meetings

A study Working Group and Project Development Team (PDT) were formed to review project work products and guide the direction of the MIS. These two committees met once a month throughout the course of the project. Representatives of the following jurisdictions were included in the Working Group:

- City of Benicia;
- City of Dixon;
- City of Fairfield;
- County of Solano;
- STA;
- City of Vacaville; and
- City of Vallejo.

In addition to the study Working Group, a Project Development Team (PDT) was formed and met once a month throughout the course of the study. The PDT included representatives from the following agencies:

- Caltrans District 4 Division of Transportation Planning and Local Assistance;
- Caltrans District 4 Division of Operations;
- Caltrans District 4 Division of Design, North Counties; and
- Solano Transportation Authority.

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