4.11 TRANSPORTATION/TRAFFIC

This section evaluates the potential for implementation of the proposed Transit Zoning Code (SD 84A and SD 84B) to impact parking, access, traffic, circulation, and other modes of transportation, including the potential for the proposed project to increase local and regional traffic volumes, exceed a level of service (LOS) standard, increase hazards due to a design feature, interfere with emergency access, result in an inadequate parking supply, or conflict with applicable alternative transportation programs. This section will provide a summary of the results of a traffic study performed for the Transit Zoning Code (SD 84A and SD 84B) by KOA Corporation, which is included as Appendix G to this document. The traffic analysis follows the Santa Ana General Guidelines for Traffic Impact Studies and the California Department of Transportation (Caltrans) Traffic Study Guidelines.

Several comment letters were received in response to the NOP for the project related to traffic and circulation. Some of the primary issues raised included the following:

- Connectivity of the Transit Zoning Code (SD 84A and SD 84B) area bikeways with the Golden Loop bikeway and potential bikeways along the Pacific Electric and Red Car rail lines
- Enhancement of alternative modes of transportation in a mixed-use environment
- Amenities and programs needed to support and encourage existing public transit providers, such as Metrolink and local bus service operated by the Orange County Transportation Authority (OCTA)
- Pedestrian and vehicle access to development near the railroad right of way
- Methodology for the traffic impact analysis
- Traffic impacts affecting neighboring cities, including Irvine and Tustin

4.11.1 Environmental Setting

This section documents existing conditions in the study area (Year 2010), including the area roadway network conditions, study area intersections, roadway segments, freeway ramp conditions, and existing transit conditions. The General Plan Circulation Element and the planned improvements in the study area have also been discussed.

Area Roadway Network

The following discusses the specific roadways in the vicinity of the proposed project that would be affected by project-related traffic. The traffic study area was determined through initial consultation with the City of Santa Ana and initial review of the Orange County Transportation Analysis Model (OCTAM) select link analysis. Figure 4.11-1 (Study Location Map) shows the boundary of the study area.

Regional Access

Interstate 5 (I-5, also known as the Santa Ana Freeway) is located east and north of the Transit Zoning Code (SD 84A and SD 84B) area and provides primary north/south regional access to the project site.

I-5 is a major route between Los Angeles, Orange, and San Diego Counties, serving many major employment centers and residential areas, including significant portions of Anaheim, Santa Ana, Tustin, and Irvine. I-5 interchanges that provide access to the project site are at Seventeenth Street and Santa Ana Boulevard. I-5 has an exclusive elevated High Occupancy Vehicle (HOV) facility for carpools and transit with access ramps at Main Street/Edgewood Road north of the site and at Grand Avenue/Santa Ana Boulevard east of the site.

Local Access

Local streets in the project vicinity that would be affected by the proposed project include arterial roadways that provide access to neighboring areas and also to the regional freeway system. These local roadways include First Street, Fourth Street, Fifth Street, Santa Ana Boulevard, Civic Center Drive, Seventeenth Street, Flower Street, Broadway Avenue, Main Street, Santiago Street, and Grand Avenue. A brief description of each roadway is provided below.

It should be noted that several roadways within the Transit Zoning Code (SD 84A and SD 84B) area have different designations in the City's General Plan Circulation Element compared to the County's Master Plan of Arterial Highway (MPAH) classification. The City is currently pursuing a cooperative agreement with OCTA to correct the discrepancies between the City Circulation element and the MPAH.

First Street

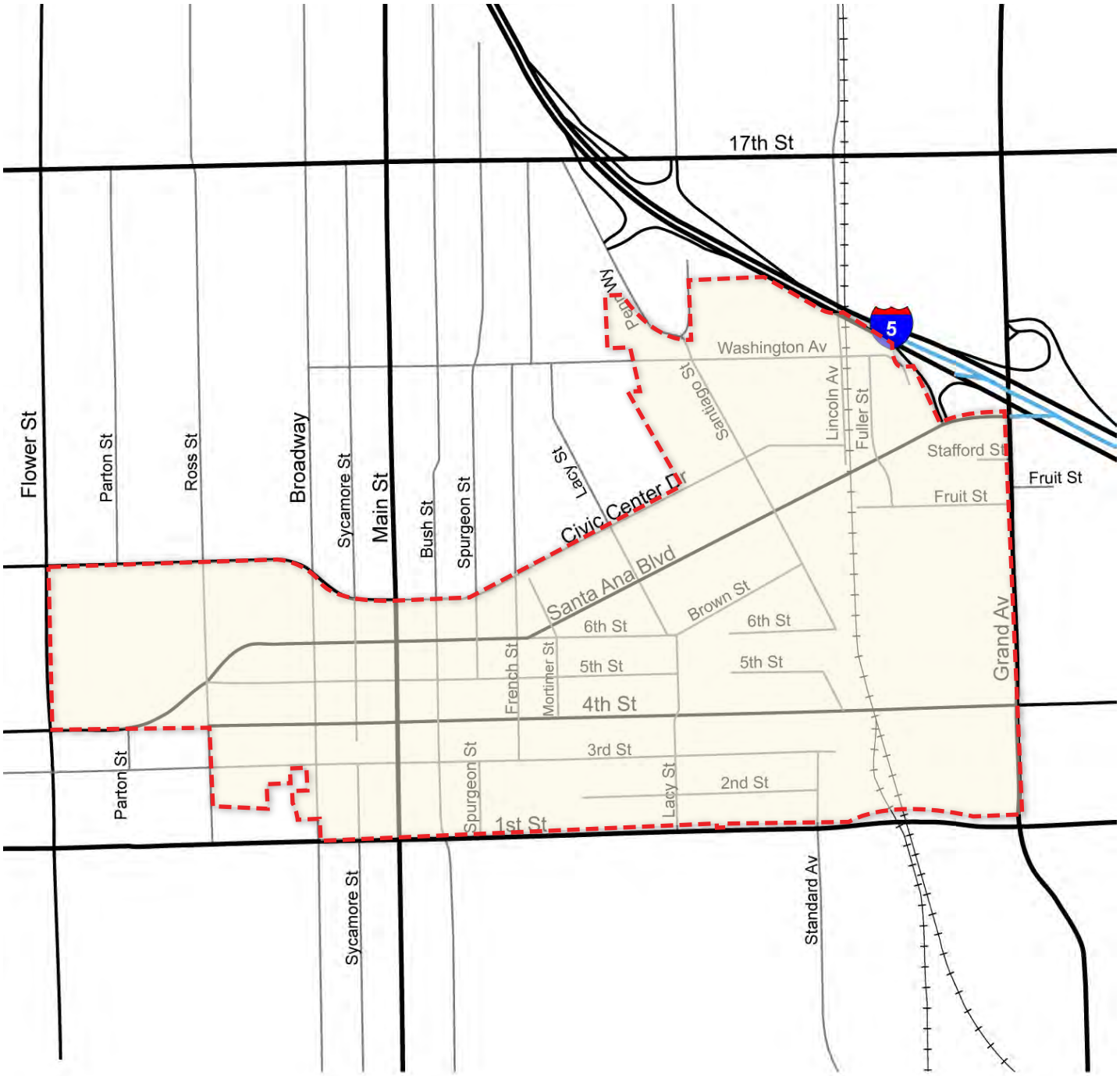
First Street is an east-west six-lane divided road classified as a Major Arterial on the Circulation Element. First Street is designated as a Smart Street on the Orange County CMP Highway System. Within the study area, First Street has a curb-to-curb width of 84 feet with a 4- to 14-foot raised median. Parking is prohibited along First Street. The posted speed limit is 40 mph.

Fourth Street

Fourth Street is a two-lane undivided east/west road that is classified in the City's Circulation Element as a Secondary Arterial between Main Street and Standard Avenue, and a Primary Arterial (six-lane) between Standard Avenue and I-5. In the study area, Fourth Street has a 56-foot curb-to-curb width. Metered parking is allowed on both sides. The posted speed limit is 25 mph.

Fifth Street

Fifth Street is a three-lane east/west road classified as a Secondary Arterial in the City's Circulation Element between Ross Street and French Street. It is currently operated as a one-way street in the eastbound direction in tandem with the one-way westbound operation of Santa Ana Boulevard. Parking is generally prohibited, except for a segment west of Main Street where metered parking spaces are provided along the south side. The posted speed limit is 25 mph.



LEGEND

Study Boundary

Study Area

***Source*:** KOA Corporation, 2007.

FIGURE **4.11-1**

Study Location Map

Santa Ana Boulevard

Santa Ana Boulevard is an east/west road classified in the City's Circulation Element as a Primary Arterial east of Ross Street up to I-5, and a Major Arterial west of Ross Street up to Raitt Street. The segment between Ross Street and French Street is operated as a one-way westbound with three travel lanes and a pavement width of 40 feet. Beyond the one-way segment, the lane configuration varies from four lanes between Bristol Street and Flower Street, to six lanes east of Santiago Street and two lanes west of Santiago Street. Parking is generally prohibited along Santa Ana Boulevard. The posted speed limit is 30 mph.

Civic Center Drive

Civic Center Drive is a four-lane divided east/west road that is classified as a Secondary Arterial in the City's Circulation Element from Fairview Street to French Street. Within the study area, Civic Center Drive has a curb-to-curb width of 64 feet. Parking is prohibited along Civic Center Drive. The posted speed limit is 35 mph.

Seventeenth Street

Seventeenth Street is a six-lane divided east/west road that is classified as a Major Arterial in the City's Circulation Element. Seventeenth Street has a curb-to-curb width of 80 to 88 feet and a 14-foot raised median. Parking is prohibited along Seventeenth Street. The posted speed limit is 40 mph.

Flower Street

South of Seventeenth Street, Flower Street is a four-lane divided north/south road that is classified as a Secondary Arterial in the City's Circulation Element. Parking is not allowed, and the posted speed limit ranges from 30 to 35 mph south of Seventeenth Street. North of Seventeenth Street, Flower Street is a two-lane divided residential street, with parking on both sides and a 25 mph posted speed limit. Northbound through movement is prohibited at the intersection of Seventeenth Street and Flower Street.

Broadway

Broadway is a north/south four-lane undivided road that is classified as a Secondary Arterial in the City's Circulation Element between I-5 and First Street. Within the boundaries of the study area, Broadway varies in width from 55 feet curb-to-curb north of Fifth Street, to 60 feet between Civic Center Drive and Fifth Street. Broadway has a 10-foot two-way center turn lane in the vicinity of the project site. Parking is prohibited. The posted speed limit ranges from 35 mph, south of Seventeenth Street, to 40 mph, north of Seventeenth Street.

Main Street

Main Street is a four-lane north/south road that is classified in the City's Circulation Element as a Secondary Arterial in the vicinity of the project. In the study area, the width of Main Street varies from

52 feet curb-to-curb south of Civic Center Drive, to 72 feet curb-to-curb from I-5 to Civic Center Drive. Main Street, between I-5 and Civic Center Drive, has a 10-foot two-way center turn lane.

Metered parking spaces are provided on certain segments of Main Street between the I-5 southbound ramps/Buffalo Avenue and Fifth Street. Main Street has a posted speed limit of 35 mph, north of Seventeenth Street, and 30 mph, south of Seventeenth Street.

Santiago Street

Santiago Street is a north/south two-lane divided roadway. It is classified in the City's Circulation Element as a Secondary Arterial. The City is currently planning the extension of this roadway through to First Street.

Grand Avenue

Grand Avenue is generally a four-lane divided north/south road that is classified as a Major Arterial in the City's Circulation Element. Parking is prohibited along Grand Avenue. The posted speed limit is 40 mph.

I-5 Freeway

Interstate 5 (Santa Ana Freeway) provides primary north-south regional access to this project. Interstate 5 interchanges that provide access to the site are at 17th Street and Santa Ana Boulevard. I-5 has an exclusive elevated High Occupancy Vehicle (HOV) facility for carpools and transit with access ramps at Main Street/Edgewood Road north of the site and at Grand Avenue/Santa Ana Boulevard east of the site.

Planned Improvements

Several funded or planned roadway improvements are included within the study area. The improvements identified below are consistent with the Long Range Improvement Program and the City's Circulation Element.

Grand Avenue Widening

The City of Santa Ana has proposed to widen the segment of Grand Avenue between Seventeenth Street on the north and First Street on the south, to the General Plan Circulation Element designation of Major Arterial, with six through lanes and enhanced features at intersections, including dedicated right and left-turn lanes.

Santiago Street Widening

The City of Santa Ana has proposed to widen Santiago Street between Civic Center Drive and 1st Street, to the General Plan Circulation Element designation of secondary Arterial, with four through lanes and enhanced features at intersections, including dedicated right and left-turn lanes.

Metrolink Extension

The City of Santa Ana has proposed preferred corridors for consideration in developing a local transit service to operate as an extension to the proposed Metrolink Commuter Rail enhancements outlined by the OCTA 2006 Long-Range Transportation Plan.

Santa Ana Fixed Guideway

The City of Santa Ana, in partnership with the city of Garden Grove, is studying a fixed-guideway system that will travel between the Santa Ana Regional Transportation Center (SARTC) and Bristol Street, with potential future extensions to Harbor Boulevard in Garden Grove. The system will travel along a major east-west corridor through central Orange County, providing access to Santa Ana's downtown area and the Santa Ana civic center, which houses County, State and Federal government offices and courthouses. The proposed fixed-guideway system will integrate into the existing urban environment and transfer riders from the train station directly to key activity centers along the three-mile route.

Santa Ana Regional Transportation Center

The Santa Ana Regional Transportation Center (SARTC) serves more than 200,000 rail passenger trips each year, making the train station one of the busiest along the Los Angeles to San Diego rail line. It's also a hub for regional, interstate, and international bus service. Significant attractions in Santa Ana include Bowers Museum, Discovery Science Center, Santa Ana Zoo, and Main Place and South Coast Village shopping districts. Both Santa Ana College, which serves more than 48,000 students, and the Orange County High School for the Arts, which draws students from 92 cities in Southern California, are within walking distance of the proposed fixed-guideway system.

The Santa Ana Regional Transportation Center (SARTC) Master Plan envisions a range of transportation services to be provided at SARTC, including the following travel modes:

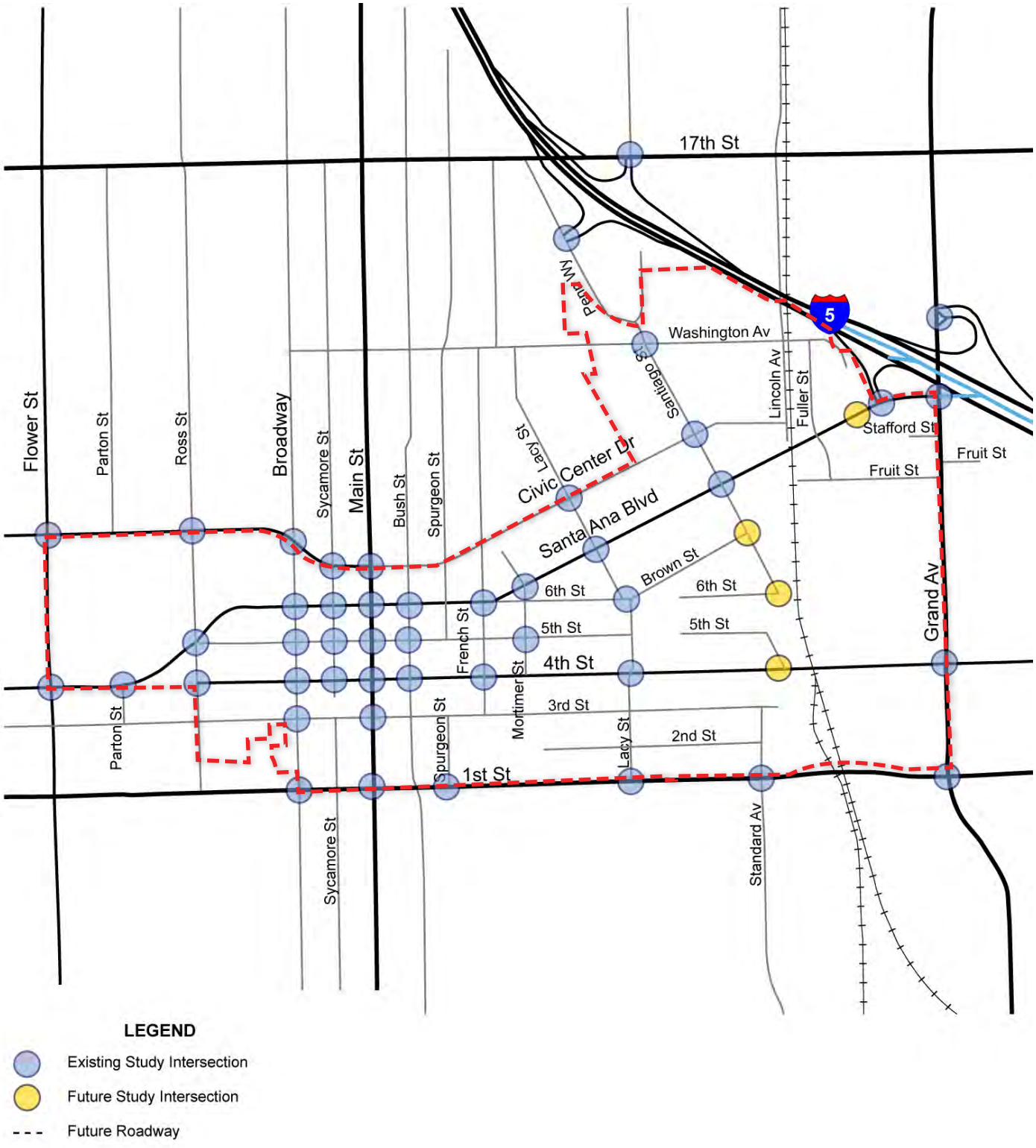
- Metrolink Rail
- Amtrak Rail
- Santa Ana Fixed Guideway
- OCTA Fixed-Route Bus
- OCTA Stationlink
- OCTA Bus Rapid Transit (BRT)
- High Speed Rail
- Greyhound Bus
- International Tour Bus
- Los Angeles World Airports FlyAway Bus
- Carpool

The SARTC Master Plan is also intended to provide improved pedestrian and bicycle access, commercial, retail, and/or residential uses as feasible, and provide efficient parking and support facilities for each of these services. Completion of the SARTC Master Plan is expected to occur in phases which are anticipated to be completed in three planning horizons: 2014, 2020, and 2040 (buildout).

Existing Study Area Intersections

The study area consists of the following fifty intersections in the City of Santa Ana and all intersections are illustrated in Figure 4.11-2 (Study Intersections):

1. Flower Street at Civic Center Drive
2. Flower Street at Santa Ana Boulevard
3. Parton Street at Santa Ana Boulevard
4. Ross Street at Civic Center Drive
5. Ross Street at Santa Ana Boulevard
6. Ross Street at Fourth Street
7. Broadway at Civic Center Drive
8. Broadway at Santa Ana Boulevard
9. Broadway at Fifth Street
10. Broadway at Fourth Street
11. Broadway at Third Street
12. Broadway at First Street
13. Sycamore Street at Civic Center Drive
14. Sycamore Street at Santa Ana Boulevard
15. Sycamore Street at Fifth Street
16. Sycamore Street at Fourth Street
17. Main Street at Civic Center Drive
18. Main Street at Santa Ana Boulevard
19. Main Street at Fifth Street
20. Main Street at Fourth Street
21. Main Street at Third Street
22. Main Street at First Street
23. Bush Street at Santa Ana Boulevard
24. Bush Street at Fifth Street
25. Bush Street at Fourth Street
26. Spurgeon Street at First Street
27. French Street at Santa Ana Boulevard
28. French Street at Fourth Street
29. Lacy Street at Civic Center Drive
30. Lacy Street at Santa Ana Boulevard
31. Lacy Street at Sixth Street
32. Lacy Street at Fourth Street
33. Lacy Street at First Street
34. Santiago Street at Washington Avenue
35. Santiago Street at Civic Center Drive
36. Santiago Street at Santa Ana Boulevard
37. Santiago Street at Brown Street (Future Intersection)
38. Santiago Street at Sixth Street (Future Intersection)
39. Santiago Street at Fourth Street (Future Intersection)
40. Standard Street at First Street
41. U2-4 at Santa Ana Boulevard (Future Intersection)
42. Grand Avenue at Santa Ana Boulevard
43. Grand Avenue at Fourth Street
44. Grand Avenue at First Street
45. Penn Way (Santiago Street) at I-5 Southbound (SB) Ramps
46. I-5 SB Ramps at Santa Ana Boulevard
47. I-5 Northbound (NB) Ramps at Seventeenth Street
48. Grand Avenue at I-5 NB Ramps
49. Mortimer Street at Santa Ana Blvd
50. Mortimer Street at Fifth Street



***Source*:** KOA Corporation, 2007.

FIGURE **4.11-2**
Study Intersections

Transit System

The study area is currently served by buses and commuter rail service. Commuter rail service is provided at the Santa Ana Regional Transportation Center (SARTC) by Metrolink, which is located within the study area at the southeast corner of Santa Ana Boulevard and Santiago Street. Bus transit service is provided by OCTA. It is expected that the Transit Zoning Code (SD 84A and SD 84B) with mixed-use land uses will take advantage of the transit improvement in the area. The project trip generation calculations conducted in the Traffic Impact Study (TIS) prepared by KOA for the project takes credit for mode choices. However, the detailed intersection capacity analysis will not consider the capacity impact of the transit improvement in the area. KOA considers the detail analysis to be deferred to the future Metrolink Extension Traffic Study.

Ten local and express bus routes serve the Santa Ana Transit Terminal, located at Fifth Street and Ross Street. During the AM peak hour, approximately sixty buses per hour enter and leave the transit terminal. In addition to Bus Route 57, Bus Route 53 (over 10,000 daily boardings), Bus Route 55 (over 8,500 daily boardings), and Bus Route 64 (over 10,600 daily boardings) serve downtown Santa Ana.

Air Travel

Air travel for residents, workers, and visitors in Santa Ana is most conveniently available at John Wayne Airport (SNA), located approximately five miles south in unincorporated Orange County surrounded by the Cities of Costa Mesa, Irvine, and Newport Beach. In addition to JWA, air travel is provided at Los Angeles International, Long Beach, Ontario and various other regional airports.

Existing Traffic Volumes and Level of Service

Intersection Analysis

Intersection Level of Service Methodology

The analysis of peak hour intersection conditions was conducted using methodologies consistent with City of Santa Ana General Guidelines and Caltrans Guidelines for Traffic Impact Studies. The following peak periods were selected for analysis:

- Weekday AM (peak hour between 7:00 A.M. and 9:00 A.M.)
- Weekday PM (peak hour between 4:00 P.M. and 6:00 P.M.)

Traffic conditions on roadway facilities are normally analyzed using the principles or the specific analysis methods contained in the Highway Capacity Manual, 2000 Edition (HCM), a publication of the Transportation Research Board, a branch of the Federal government. Chapter 9 of the HCM is devoted to analysis of signalized intersections and Chapter 10 is devoted to the analysis of unsignalized intersections. The methodologies in the HCM for signalized and unsignalized intersections are based upon measurements or forecasts of delay for traffic utilizing all approaches to the intersection.

Traffic conditions at signalized intersections in Southern California are also often evaluated during peak hours at intersections using a methodology known as the Intersection Capacity Utilization (ICU) technique. This is the preferred analysis method for analyzing signalized intersections in Orange County and in the City of Santa Ana. This analysis method is widely accepted and essentially measures the amount of traffic signal "green" time required for the intersection. It is a significant variation from the HCM method; however, it produces results that are generally similar. The City of Santa Ana generally uses this method, so all signalized intersections, with the exception of those intersections related to Caltrans facilities (detailed below), were analyzed based on this method. Unsignalized intersections were analyzed using the HCM 2000 method for unsignalized intersections. Table 4.11-1 (Level of Service Definitions for Signalized Intersections) shows the relationship between level of service (LOS) and Volume/Capacity (V/C) criteria for signalized intersections, and delay for unsignalized intersections.

Table 4.11-1 Level of Service Definitions for Signalized Intersections

Level of Service (LOS)	*Signalized Intersection Volume/Capacity (V/C) Ratio*	*Signalized Intersection Total Delay (seconds) (HCM)*	*Unsignalized Intersection Control Delay (seconds) (HCM)*	*Definition*
A	0.000–0.600	0–10	0–10	At LOS A, there are no cycles that are fully loaded, and few are even close to loaded. No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Typically, the approach appears quite open, turning movements are easily made, and nearly all drivers find freedom of operation.
B	0.601–0.700	10–20	10–15	LOS B represents stable operations. An occasional approach phase is fully utilized and a substantial number are approaching full use. Many drivers begin to feel somewhat restricted with platoons of vehicles.
C	0.701–0.800	20–35	15–25	At LOS C stable operations continue. Full signal cycle loading is still intermittent, but more frequent. Occasionally drivers may have to wait through more than one red signal indication, and back-ups may develop behind turning vehicles.
D	0.801–0.900	35–55	25–35	LOS D encompasses a zone of increasing restriction, approaching instability. Delays to approaching vehicles may be substantial during short peaks within the peak period, but enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive back-ups.
E	0.901–1.000	55–80	35–50	LOS E represents the most vehicles that any particular intersection approach can accommodate. At capacity (V/C=1.00) there may be long queues of vehicles waiting upstream of the intersection and delays may be great (up to several signal cycles.
F	> 1.000	80 or more	50 or more	LOS F represents jammed conditions. Backups from locations downstream or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches; volumes carried are unpredictable. V/C values are highly variable because full utilization of the approach may be prevented by outside conditions.

SOURCE: KOA Corporation 2010

A number of assumptions were required regarding specific input values to the ICU methodology for the City of Santa Ana. The specific assumptions include the use of a saturation flow value of 1,700 vehicles per hour per lane (vphpl) for through lanes, 1,600 vphpl for turn lanes. A lost time factor of 5 percent was applied to the ICU calculations. Finally, no credit for "de facto" right-turn lanes is allowed in the City of Santa Ana.

As mentioned above, in addition to the above discussed ICU analysis method, the 2000 Highway Capacity Manual (HCM) analysis procedures have been used to analyze the intersections which are related to Caltrans facilities (ramp intersections), based on Caltrans requirements. These intersections include:

- Penn Way (Santiago Street) at I-5 SB Ramps
- I-5 SB Ramps at Santa Ana Boulevard
- I-5 NB Ramps at Seventeenth Street
- Grand Avenue at I-5 NB Ramps

Existing Intersection Conditions

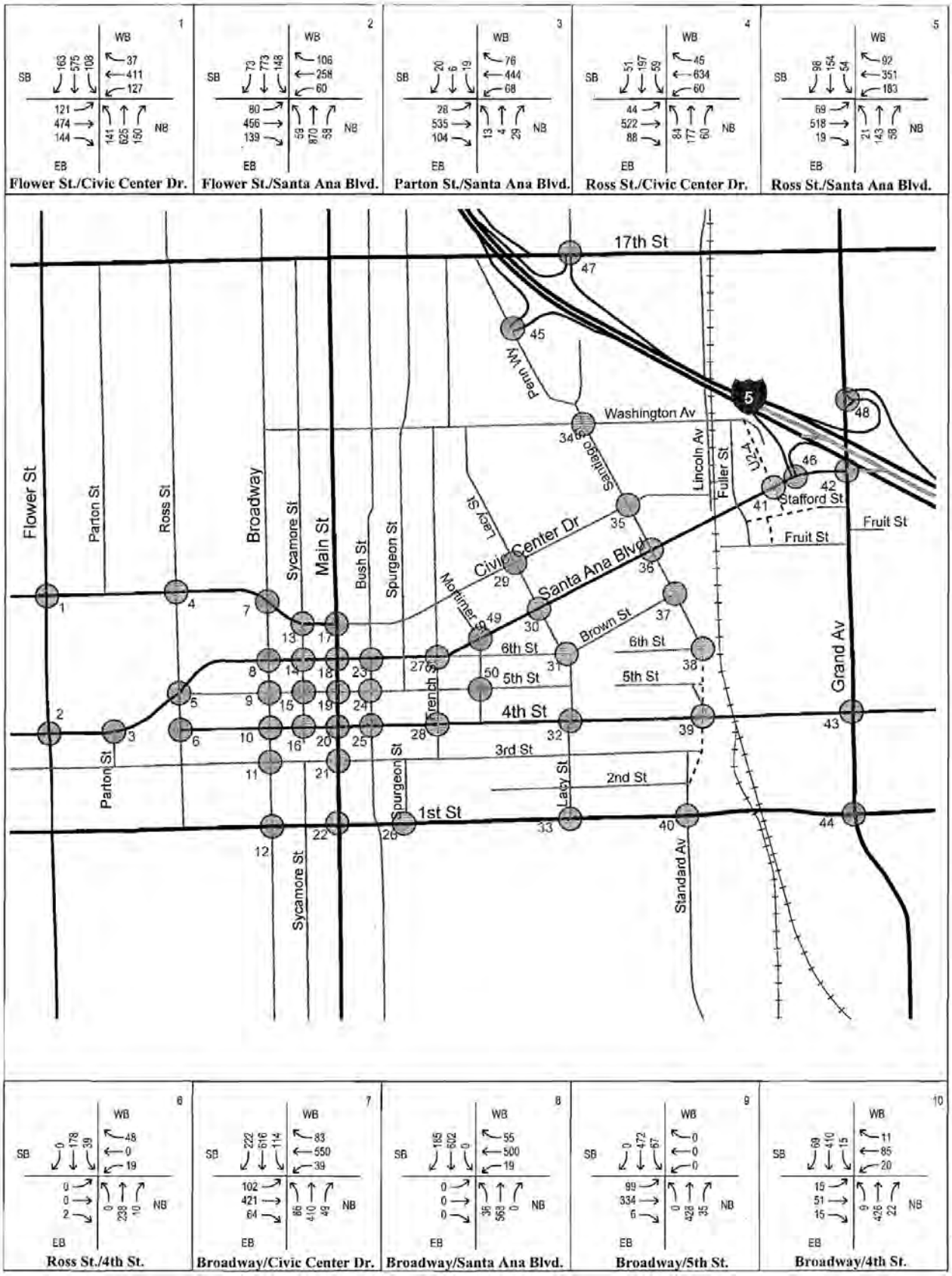
Figure 4.11-3A through Figure 4.11-3E (Existing AM Peak Hour Volumes) and Figure 4.11-4A though Figure 4.11-4E (Existing PM Peak Hour Volumes) show the existing AM and PM peak hour intersection turning movement volumes respectively for all existing intersections. Based on the existing traffic volumes, level of service analyses were conducted for the fifty study intersections. The results of these analyses are summarized in Table 4.11-2 (Existing Peak Hour Intersection Conditions [ICU Method]) using ICU methodology for signalized intersections and in Table 4.11-3 (Existing Peak Hour Intersection Conditions [HCM Method]) using the HCM methodology for unsignalized intersections and Caltrans' signalized intersections. The analysis worksheets for all intersections are included in Appendix G. As shown, all of the fifty intersections operate at LOS D or better under existing conditions.

Existing daily and peak hour traffic data was obtained from the City, other technical sources and recent counts conducted by KOA Corporation. Traffic data collected by KOA Corporation in Orange County in 2009 indicated that 2009 traffic levels were lower than 2007 traffic levels. For this reason 2007 counts were used for this study where available, as they are more conservative from an impact/mitigation point of view. All traffic count data used in this study is compiled in Appendix G.

Traffic flow conservation was evaluated and applied to ensure the continuity of traffic flow. Minor adjustments were applied to a few intersection volumes. Per evaluation of the historical traffic count data, a 0.5 percent annual growth rate was applied to counts older than 2007 in order to generate the 2009 existing conditions volumes. This rate was approved by the city staff during the course of the study.

A preliminary signal warrant study was conducted for unsignalized intersections. The following two intersections currently have four-way stop control but warrant a traffic signal under existing conditions. The signal warrant worksheets are included in Appendix G.

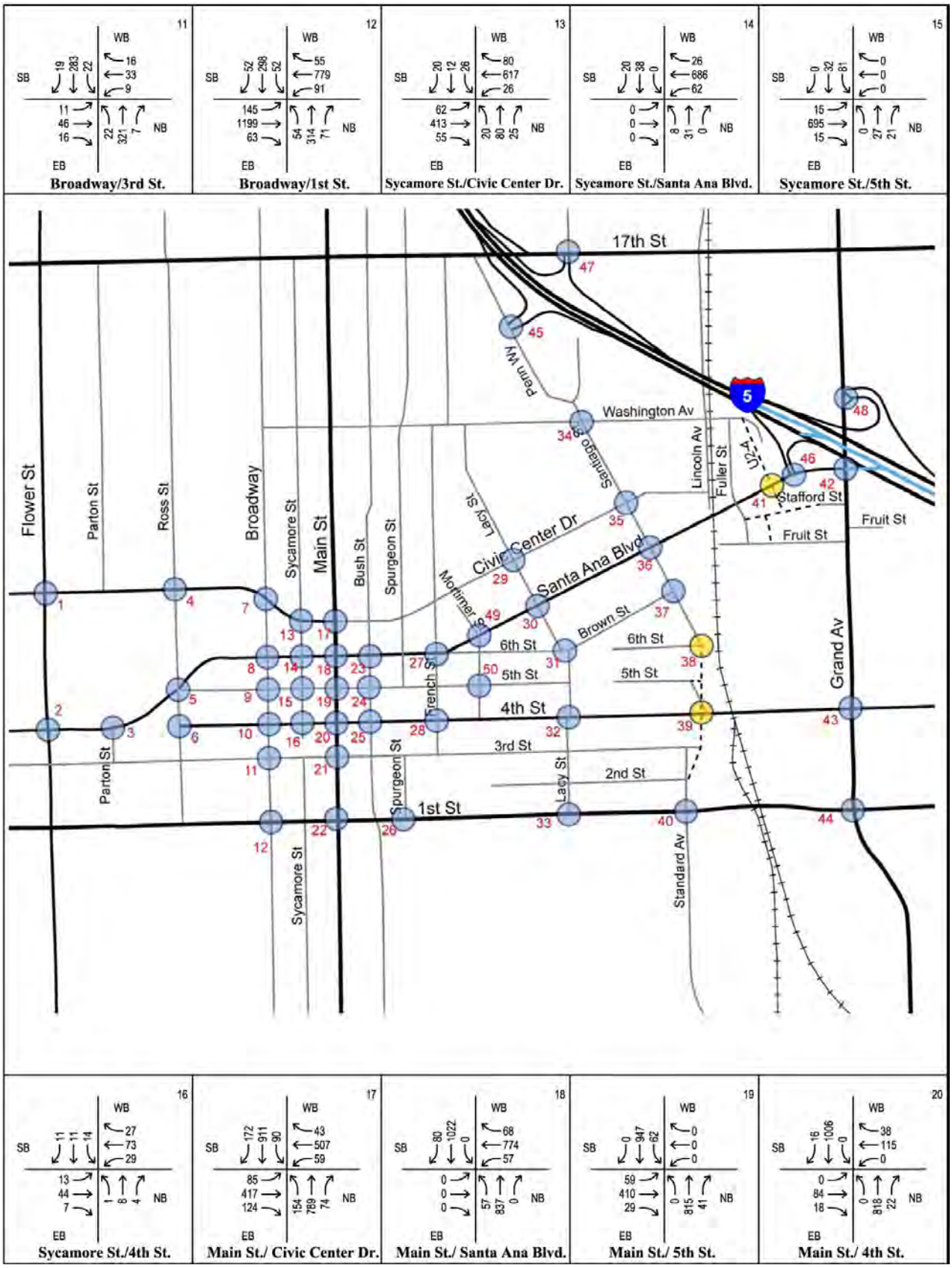
- Santiago Street at Washington Avenue
- Santiago Street at Civic Center Drive



***Source*:** KOA Corporation, 2007.

FIGURE **4.11-3A**

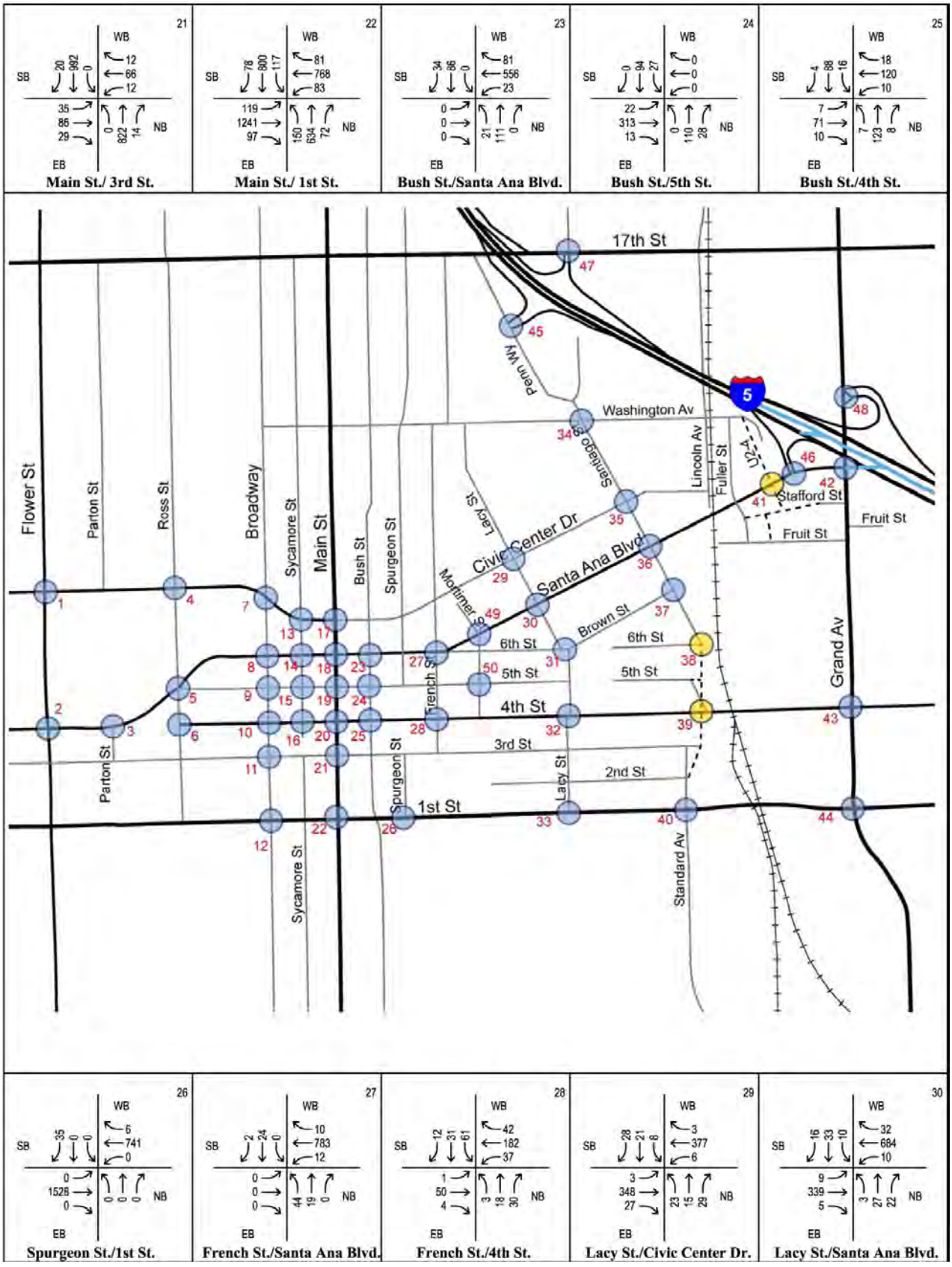
Existing AM Peak Hour Volumes



***Source*:** KOA Corporation, 2010.

FIGURE **4.11-3B**

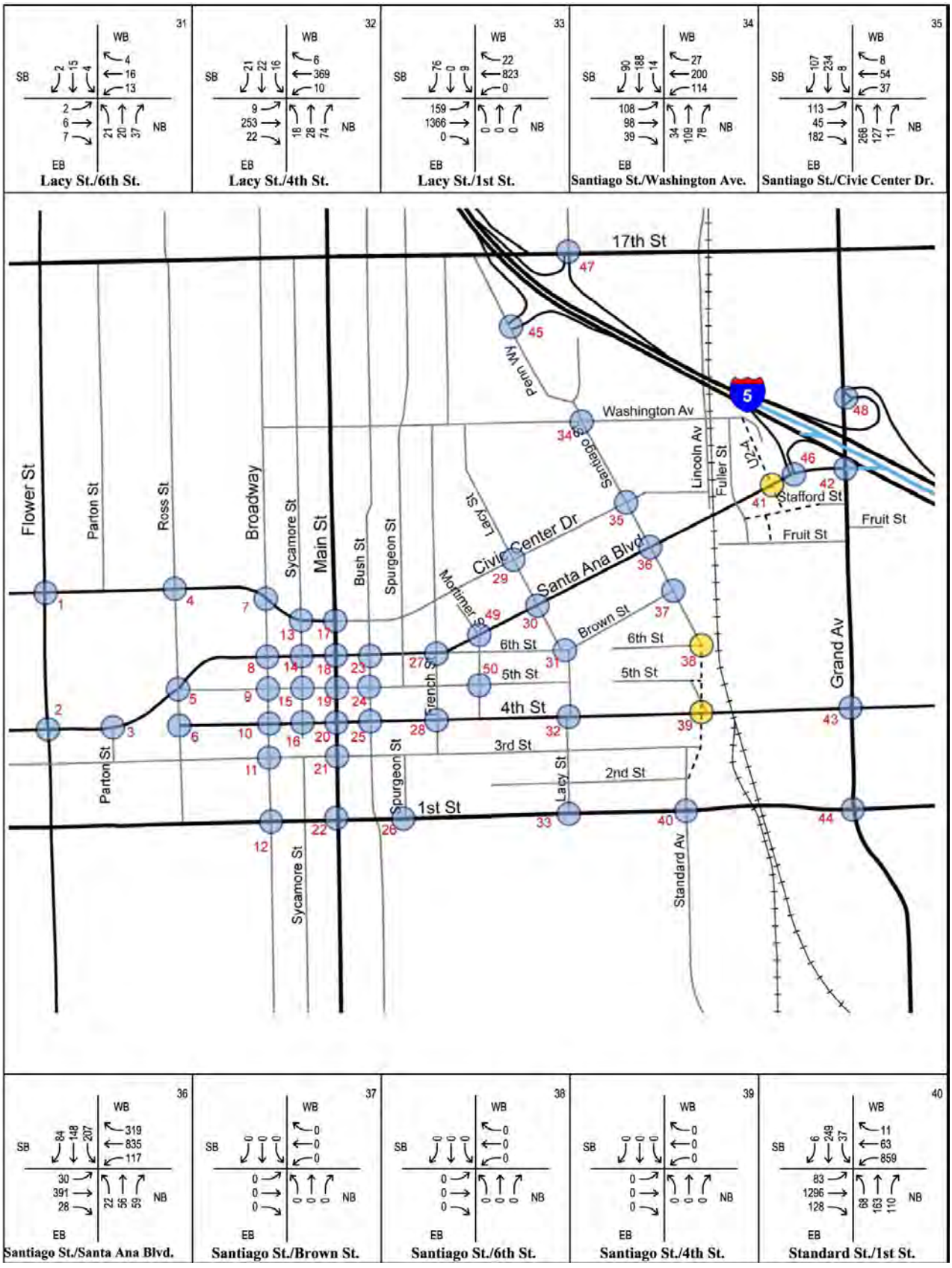
Existing AM Peak Hour Volumes



***Source*:** KOA Corporation, 2010.

FIGURE **4.11-3C**

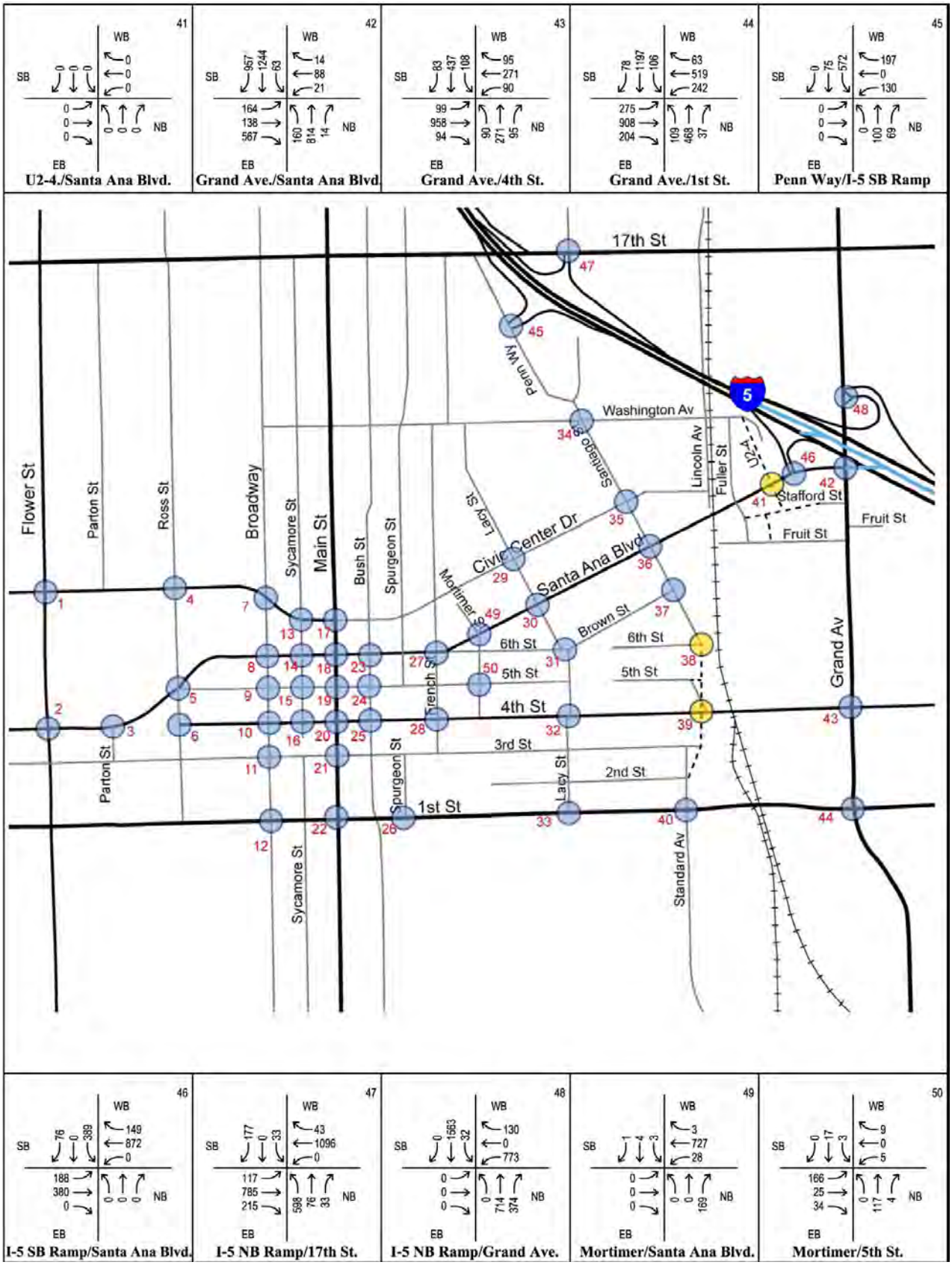
Existing AM Peak Hour Volumes



***Source*:** KOA Corporation, 2010.

FIGURE **4.11-3D**

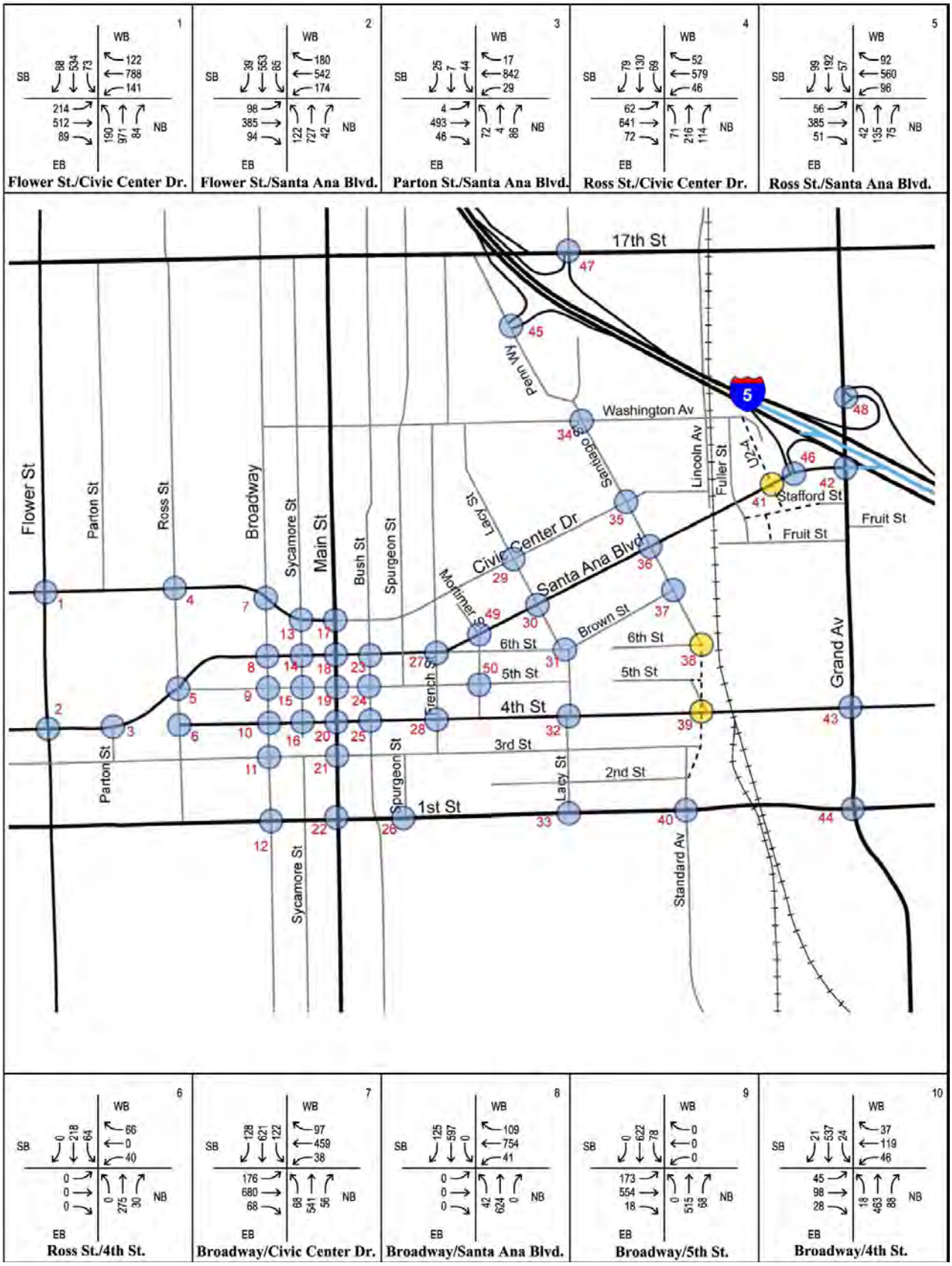
Existing AM Peak Hour Volumes



***Source*:** KOA Corporation, 2010.

FIGURE **4.11-3E**

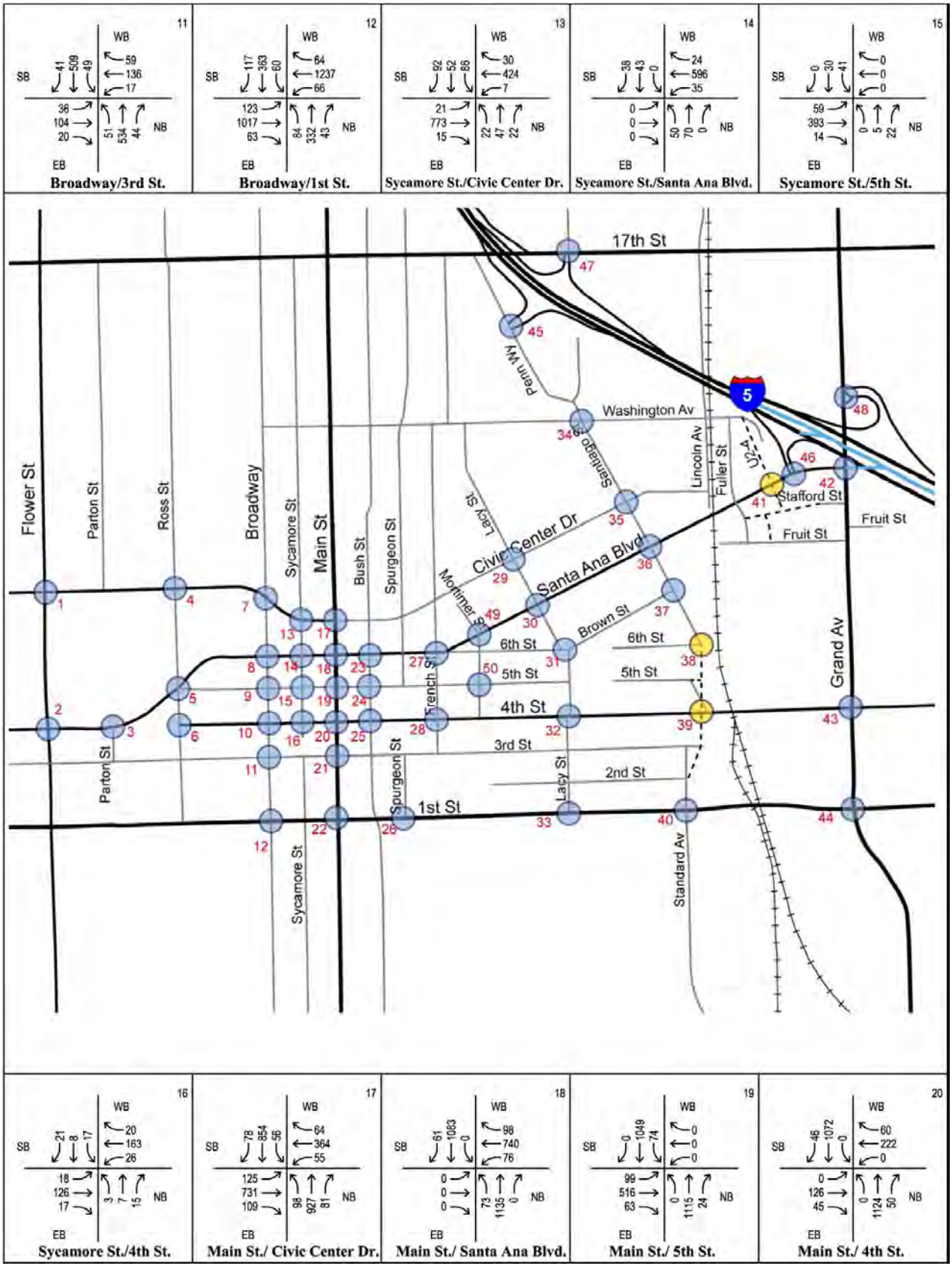
Existing AM Peak Hour Volumes



***Source*:** KOA Corporation, 2010.

FIGURE **4.11-4A**

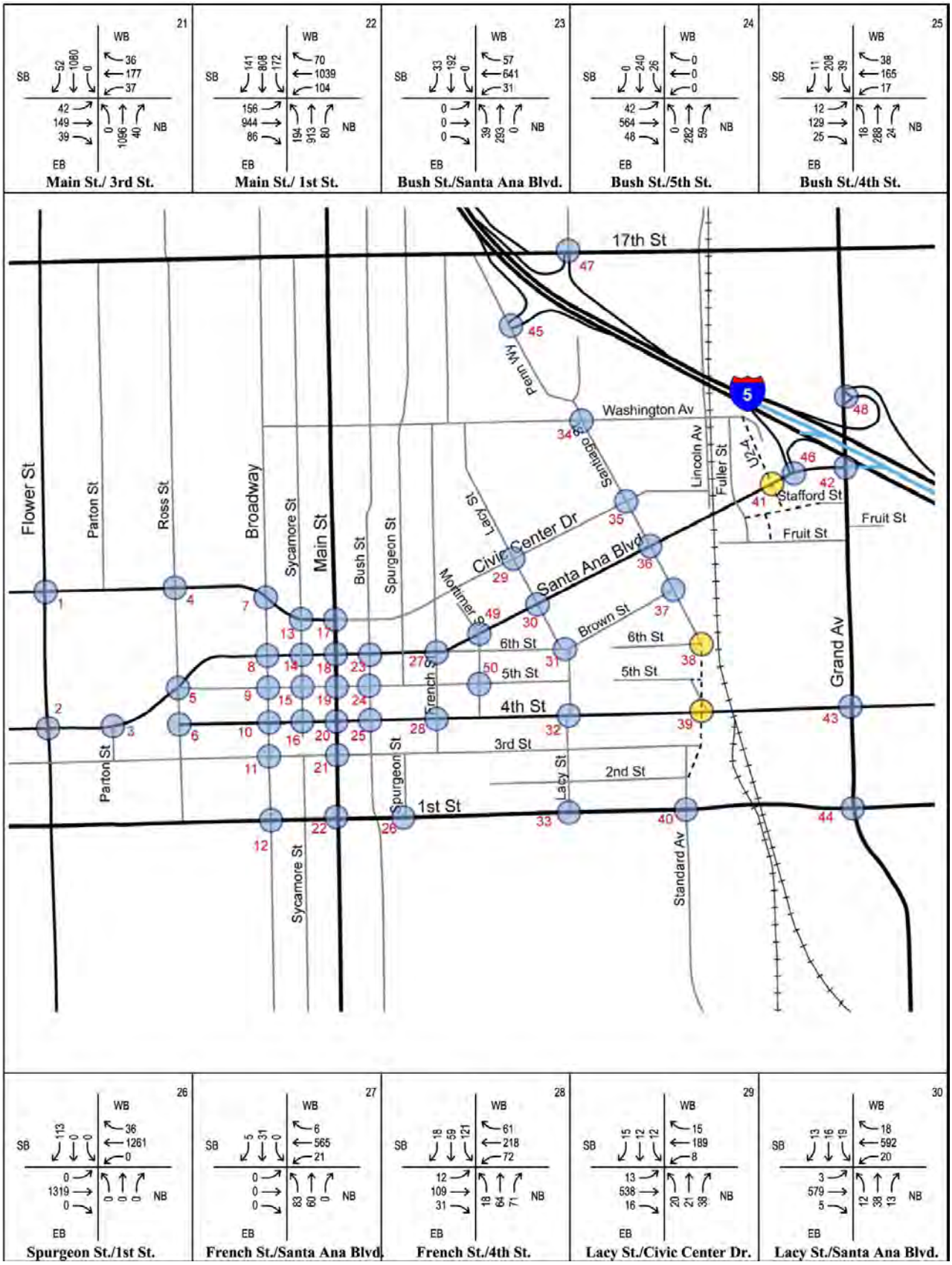
Existing PM Peak Hour Volumes



***Source*:** KOA Corporation, 2010.

FIGURE **4.11-4B**

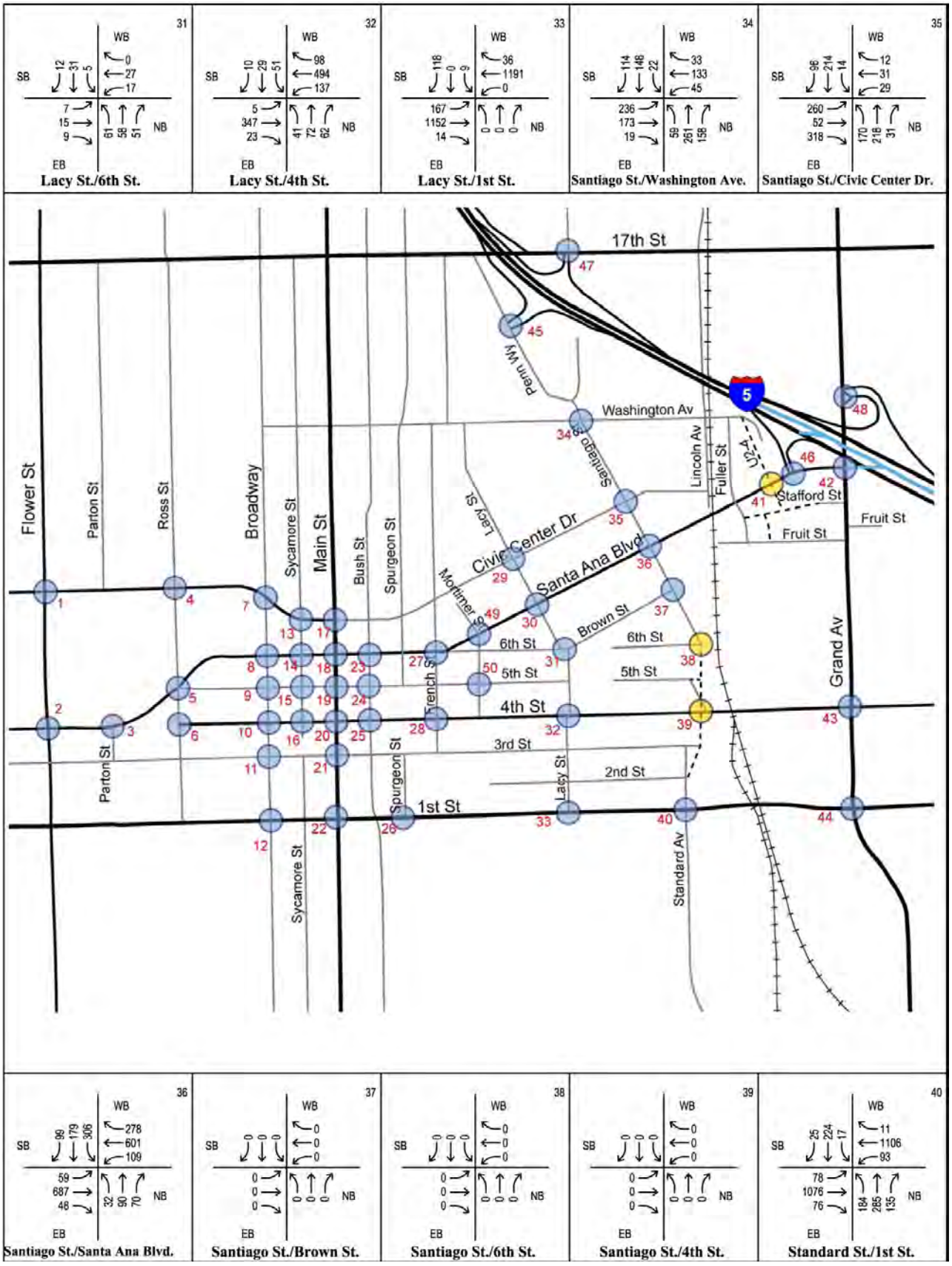
Existing PM Peak Hour Volumes



***Source*:** KOA Corporation, 2010.

FIGURE **4.11-4C**

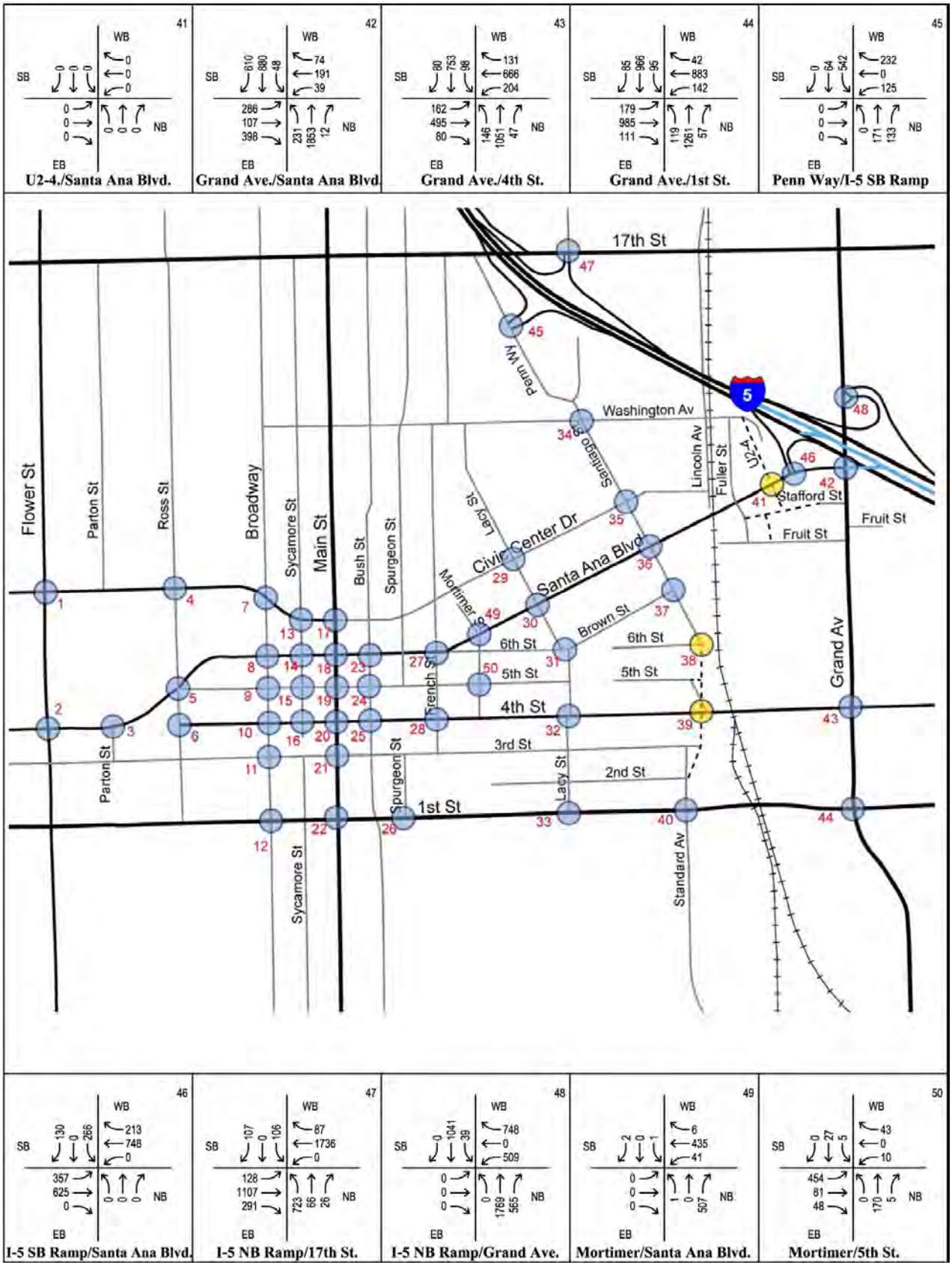
Existing PM Peak Hour Volumes



***Source*:** KOA Corporation, 2010.

FIGURE **4.11-4D**

Existing PM Peak Hour Volumes



***Source*:** KOA Corporation, 2010.

FIGURE **4.11-4E**

Existing PM Peak Hour Volumes

Table 4.11-2 Existing Peak Hour Intersection Conditions (ICU Method)

Intersection	AM Peak Hour		PM Peak Hour	
	ICU	Level of Service	ICU	Level of Service
Signalized Intersections (Using ICU Method)				
Flower St. at Civic Center Dr.	0.617	B	0.662	B
Flower St. at Santa Ana Blvd.	0.524	A	0.538	A
Parton St. at Santa Ana Blvd.	0.256	A	0.342	A
Ross St. at Civic Center Dr.	0.476	A	0.436	A
Ross St. at Santa Ana Blvd.	0.435	A	0.334	A
Broadway at Civic Center Dr.	0.535	A	0.559	A
Broadway at Santa Ana Blvd.	0.417	A	0.466	A
Broadway at Fifth St.	0.314	A	0.416	A
Broadway at Fourth St.	0.274	A	0.372	A
Broadway at Third St.	0.299	A	0.558	A
Broadway at First St.	0.568	A	0.648	B
Sycamore St. at Civic Center Dr.	0.383	A	0.434	A
Main St. at Civic Center Dr.	0.680	B	0.663	B
Main St. at Santa Ana Blvd.	0.586	A	0.611	B
Main St. at Fifth St.	0.438	A	0.564	A
Main St. at Fourth St.	0.441	A	0.561	A
Main St. at Third St.	0.423	A	0.535	A
Main St. at First St.	0.693	B	0.765	C
Bush St. at Santa Ana Blvd.	0.263	A	0.365	A
Bush St. at Fifth St.	0.216	A	0.395	A
Bush St. at Fourth St.	0.228	A	0.394	A
French St. at Fourth St.	0.248	A	0.393	A
Lacy St. at Fourth St.	0.353	A	0.486	A
Santiago St. at Santa Ana Blvd.	0.481	A	0.579	A
Standard St. at First St.	0.723	C	0.719	C
Grand Ave. at Santa Ana Blvd.	0.729	C	0.888	D
Grand Ave. at Fourth St.	0.601	B	0.717	C
Grand Ave. at First St.	0.764	C	0.808	D

SOURCE: KOA Corporation 2010

Table 4.11-3 Existing Peak Hour Intersection Conditions (HCM Method)				
	AM Peak Hour		PM Peak Hour	
Intersection	Average/Worst Case Delay	Level of Service	Average/Worst Case Delay	Level of Service
Unsignalized Intersections				
Ross St. at Fourth St.	10.7	A	11.8	B
Sycamore St. at Santa Ana Blvd.	18.3	C	17.0	C
Sycamore St. at Fifth St.	14.3	B	12.8	B
Sycamore St. at Fourth St.	7.5	A	8.3	A
Bush St. at Fourth St.	8.6	A	12.5	B
Spurgeon St. at First St.	10.0	A	12.8	B
French St. at Santa Ana Blvd.	17.1	C	15.6	C
Lacy St. at Civic Center Dr.	15.8	C	16.8	C
Lacy St. at Santa Ana Blvd.	25.3	D	33.4	D
Lacy St. at Sixth St.	7.1	A	7.7	A
Lacy St. at First St.	16.6	C	23.2	C
Santiago St. at Washington Ave.	12.7	B	18.1	C
Santiago St. at Civic Center Dr.	14.5	B	17.4	C
Mortimer St. at Fifth St	8.7	A	15.5	C
Mortimer St. at Santa Ana Blvd.	17.5	C	15.0	B
Signalized Intersections (Caltrans, Using HCM)				
Penn Way at I-5 SB	18.7	B	21.6	C
Santa Ana Blvd. at I-5 SB	26.6	C	27.3	C
Seventeenth St. at I-5 NB	31.1	C	31.9	C
Grand Ave at I-5 NB	20.0	C	59.9	E

SOURCE: KOA Corporation 2007

Roadway Segment Analysis

Roadway Segment Level of Service Methodology

Road segment analysis is determined based on the methodology presented in the Orange County MPAH and the City of Santa Ana Circulation Element. V/C ratios are not used in segment analysis. Table 4.11-4 (Levels of Service for Arterial Street Segments Based upon Daily Traffic Volumes) indicates the LOS ranges based on the capacity assumptions.

The daily capacity of a roadway correlates to a number of widely varying factors, including traffic peaking characteristics, traffic turning volumes, and the volume of traffic on crossing streets. The daily capacities are therefore most appropriately used as a screening tool to determine the need for more detailed peak hour analysis and to assist in determining the appropriate mitigation measures (i.e., whether additional through lanes may be a necessary or desirable mitigation).

Table 4.11-4 Levels of Service for Arterial Street Segments Based upon Daily Traffic Volumes

Roadway Classification	Lanes/Configuration	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F
Principal Arterial	8 Lanes Divided	45,000	52,500	60,000	67,500	75,000	> 75,000
Major Arterial	6 Lanes Divided	33,900	39,400	45,000	50,600	56,300	> 56,300
Primary Arterial	4 Lanes Divided	22,500	26,300	30,000	33,800	37,500	> 37,500

SOURCE: KOA Corporation 2007

Existing Roadway Segment Conditions

The existing roadway segment average daily traffic (ADT) analysis is presented in Table 4.11-5 (Existing Roadway Segment Daily Traffic Condition). As indicated, a majority of the arterial roadways are operating at acceptable levels. The daily V/C ratio screening analysis indicates that the following locations are potentially experiencing capacity deficiencies under existing conditions:

- Main Street from south of First Street to Santa Ana Boulevard (depicted as four discreet segments in the above table)
- Santa Ana Boulevard west of the I-5 SB Ramps
- Grand Avenue from south of First Street to Seventeenth Street (depicted as four discreet segments in the above table)

The daily volume-to-capacity ratios provide a screening level analysis of daily traffic flows and potential operational problems within the study area. The peak hour analysis for intersections, presented previously, provides a more definitive analysis of the operation of the arterial roadways in the project area.

Table 4.11-5 Existing Roadway Segment Daily Traffic Condition

Road	Segment	Existing ADT	#of Exist Lanes*	LOS E Capacity	LOS	LOS E OK**
Civic Center Dr.	West of Flower St.	17,912	4D	37,500	A	
Flower St.	Santa Ana Blvd. to Civic Center Dr.	17,950	4D	37,500	A	
Flower St.	Seventeenth St. to Civic Center	17,470	4D	37,500	A	
Flower St.	Santa Ana Blvd. to First St.	18,152	4D	37,500	A	
Santa Ana Blvd.	West of Flower St.	10,068	4D	37,500	A	
Santa Ana Blvd.	Flower St. to Parton St.	12,363	4D	37,500	A	
Santa Ana Blvd.	Parton St. to Ross St.	12,363	4D	37,500	A	
Civic Center Dr.	Ross St. to Flower St.	16,943	4D	37,500	A	
Civic Center Dr.	Ross St. to Broadway	15,024	4D	37,500	A	
Santa Ana Blvd.	Ross St. to Broadway	12,000	3D	28,150	A	
Broadway	Civic Center Dr. to Santa Ana Blvd.	18,453	4D	37,500	A	
Broadway	Civic Center Dr. to Washington Ave.	23,755	4D	37,500	B	

Table 4.11-5 Existing Roadway Segment Daily Traffic Condition

Road	Segment	Existing ADT	#of Exist Lanes*	LOS E Capacity	LOS	LOS E OK**
Civic Center Dr.	Broadway to Sycamore St.	14,602	4D	37,500	A	
Santa Ana Blvd.	Broadway to Sycamore St.	10,055	3D	28,150	A	
Fifth St.	Broadway to Ross St.	8,166	3D	28,150	A	
Broadway	Fifth St. to Fourth St.	15,755	4D	37,500	A	
Broadway	Fifth St. to Santa Ana Blvd.	15,994	4D	37,500	A	
Broadway	Fourth St. to Fifth St.	15,755	4D	37,500	A	
First St.	Broadway to Ross St.	38,541	6D	56,300	B	
First St.	Broadway to Main St.	37,162	6D	56,300	B	
Broadway	South of First St.	11,180	4U	25,000	A	
Broadway	First St. to Third St.	15,755	4U	25,000	B	
Civic Center Dr.	Sycamore St. to Main St.	14,602	4D	37,500	A	
Fifth St.	Sycamore St. to Broadway	8,166	3D	28,150	A	
Fifth St.	Sycamore St. to Main St.	8,166	3D	28,150	A	
Civic Center Dr.	Main St. to Bush St.	11,483	4D	37,500	A	
Main St.	Civic Center Dr. to Santa Ana Blvd.	31,571	4D	37,500	E	E ok
Main St.	Civic Center Dr. to Washington Ave.	32,104	4D	37,500	E	E ok
Santa Ana Blvd.	Main St. to Sycamore	10,055	3D	28,150	A	
Santa Ana Blvd.	Main St. to Bush St.	10,094	3D	28,150	A	
Fifth St	Main St. to Bush St.	5,881	3D	28,150	A	
Main St.	Fifth St. to Fourth St.	31,571	4U	25,000	F	
Main St.	Fifth St. to Santa Ana Blvd.	31,571	4D	37,500	F	
Main St.	Third St. to Fourth St.	27,791	4U	25,000	F	
First St.	Main St. to Spurgeon St.	37,667	6D	56,300	B	
Main St.	First St. to Third St.	27,791	4U	25,000	F	
Santa Ana Blvd.	Bush St. to Spurgeon St.	10,094	3D	28,150	A	
Fifth St	Bush St. to French St.	5,881	2U	12,500	A	
Santa Ana Blvd.	Lacy St. to Standard Ave	14,350	4D	37,500	A	
Civic Center Dr.	French St to Lacy St.	11,483	4D	37,500	A	
Santa Ana Blvd.	Lacy St. to French St.	14,350	2D	18,750	C	
Fourth St.	Lacy St. to French St.	11,974	2D	18,750	B	
First St.	Lacy St. to Spurgeon St.	37,667	6D	56,300	B	
First St.	Lacy St. to Standard Ave.	37,667	6D	56,300	B	
Santiago St.	Washington Ave. to Seventeenth St.	9,527	2U	12,500	C	

Table 4.11-5 Existing Roadway Segment Daily Traffic Condition

Road	Segment	Existing ADT	#of Exist Lanes*	LOS E Capacity	LOS	LOS E OK**
Civic Center Dr.	Santiago St to Lacy St	11,910	2U	12,500	E	E ok
Civic Center Dr.	Lincoln Ave to Santiago St	11,483	2U	12,500	E	E ok
Santiago St.	Washington Ave to Civic Center Dr.	9,931	2U	12,500	C	
Santa Ana Blvd.	Santiago St. to Lacy St.	14,350	4D	37,500	A	
Santa Ana Blvd.	Santiago St. to U2-4	19,413	6D	56,300	A	
Santiago St.	Santa Ana Blvd. to Brown St.	6,751	2U	12,500	A	
Santiago St.	Santa Ana Blvd. to Civic Center Dr.	9,044	2U	12,500	C	
Fourth St.	Santiago St. to Lacy St.	17,626	4U	25,000	C	
Grand Ave.	Fourth St. to Santa Ana Blvd.	36,377	4D	37,500	E	
Grand Ave.	Santa Ana Bl. to Seventeenth St.	31,111	4D	37,500	E	
Santa Ana Blvd.	East of Grand Ave.	7,660	4D	37,500	A	
Fourth St.	Grand Ave to Santiago St.	17,626	4D	37,500	A	
Fourth St.	East of Grand Ave.	19,984	4D	37,500	A	
First St.	Standard Ave to Grand Ave.	39,273	6D	56,300	B	
First St.	East of Grand Ave.	36,393	6D	56,300	B	
Grand Ave.	South of First St.	39,273	4D	37,500	F	
Grand Ave.	Fourth St to First St.	31,391	4D	37,500	E	
Penn Way	South of I-5 SB Ramps	8,000	2U	12,500	B	
Penn Way	North of I-5 SB Ramps	14,000	4D	37,500	A	
Santa Ana Blvd.	West of I-5 SB Ramps	36,200	4D	37,500	E	
Santa Ana Blvd.	East of I-5 SB Ramps	23,000	4D	37,500	B	
Seventeenth St.	West of I-5 NB Ramps	44,504	6D	56,300	C	
Seventeenth St.	East of I-5 NB Ramps	35,341	6D	56,300	B	
Grand Ave.	South of I-5 NB Ramps	45,235	4D	37,500	F	
Grand Ave.	North of I-5 NB Ramps	42,211	4D	37,500	F	

SOURCE: KOA Corporation. *Santa Ana Renaissance Specific Plan Traffic Study*. December 2010.

* D corresponds to a divided roadway. U corresponds to an undivided roadway.

** LOS E is considered acceptable within major development areas.

Freeway Ramp Analysis

Freeway Ramp Level of Service Methodology

Peak hour freeway ramp traffic operations analysis is conducted by calculating a peak hour volume to capacity (V/C) ratio. Table 4.11-6 (Levels of Service for Freeway Ramps) summarizes the peak hour ramp capacity assumptions. The freeway ramp performance criteria have been derived from the Caltrans

Highway Design Manual (July 1995) and the Caltrans Ramp Meter Design Manual (January 2000). These criteria have been used previously in studies by other local jurisdictions. The Caltrans Publication Guide for the Preparation of Traffic Impact Studies (State of California Department of Transportation, January 2001) cites both of these resources as appropriate analysis methodology sources for ramp and ramp junction analysis.

Table 4.11-6 Levels of Service for Freeway Ramps

	Roadway Type	Peak Hour Capacity at LOS E (vehicles/hour)
1	One-lane Metered On-Ramp, 1 Mixed Flow Lane at Meter	900
2	One-lane Metered On-Ramp, 1 Mixed Flow + 1 HOV Lane at Meter	1,080
3	One-lane Metered On-Ramp, 2 Mixed Flow Lanes at Meter	1,500
4	Two-lane Metered On-Ramp, 2 Mixed Flow Lanes at Meter	1,800
5	One-lane Unmetered Ramp	1,500
6	Two-lane Unmetered On-Ramp, tapers to one merge lane at or beyond gore point	2,250
7	Two-lane Unmetered Off-Ramp, with only one auxiliary lane	2,250
8	Two-lane Unmetered On-Ramp, does not taper to one merge lane	3,000
9	Two-lane Unmetered Off-Ramp, with two auxiliary lanes	3,000

SOURCE: KOA Corporation 2010

Existing Freeway Ramp Conditions

Existing peak hour ramp analysis results are presented on Table 4.11-7 (Existing Freeway Ramp Analysis). All ramps operate at LOS D or better during the AM and PM peak hour time periods:

Table 4.11-7 Existing Freeway Ramp Analysis

Inter-change	Ramp	Ramp Type Code*	Lanes	Peak Hour Capacity	AM Peak Hour			PM Peak Hour		
					VOL	V/C	LOS	VOL	V/C	LOS
I-5 at Seventeenth St.	SB On	4	2	1,800	658	0.37	A	681	0.38	A
	NB Loop On	4	2	1,800	217	0.12	A	294	0.16	A
	SB Off	5	1	1,500	330	0.22	A	360	0.24	A
	NB Off	5	1	1,500	714	0.48	A	823	0.55	A
I-5 at Santa Ana Blvd.	SB Direct On (HOV)	6	2	2,250	215	0.10	A	167	0.07	A
	SB Loop On	4	2	1,800	341	0.19	A	576	0.32	A
	NB Loop On	4	2	1,800	394	0.22	A	611	0.34	A
	SB Off	5	1	1,500	470	0.31	A	399	0.27	A
	NB Off	5	1	1,500	876	0.58	A	1,269	0.85	D

SOURCE: KOA Corporation 2010

* Ramp Type Code:
4—Two-lane Metered On-Ramp, 2 Mixed Flow Lanes at Meter
5—One-lane Unmetered Ramp
6—Two-lane Unmetered On-Ramp, tapers to one merge lane at or beyond gore point

4.11.2 Regulatory Framework

Federal

There are no federal regulations related to transportation/traffic that apply to the proposed Transit Zoning Code (SD 84A and SD 84B) project area.

State

Statewide Transportation Improvement Program (STIP)

Caltrans administers transportation programming for the state. Transportation programming is the public decision-making process that sets priorities and funds projects envisioned in long-range transportation plans. It commits expected revenues over a multi-year period to transportation projects. The STIP is a multi-year capital improvement program of transportation projects on and off the State Highway System, funded with revenues from the State Highway Account and other funding sources.

Regional

Orange County Congestion Management Plan

The Congestion Management Plan (CMP) requires that a traffic impact analysis be conducted for any project generating 2,400 or more daily trips, or 1,600 or more daily trips for projects that directly access the CMP Highway System (CMPHS). Per the CMP guidelines, this number is based on the desire to analyze any impacts that will be 3 percent or more of the existing CMP highway system facilities' capacity. The CMPHS includes specific roadways, which include State Highways and Super Streets, which are now known as Smart Streets, and CMP arterial monitoring locations/intersections. There are six CMP intersections that were evaluated within the traffic study area for the proposed project, which includes:

- Broadway at First Street
- Main Street at First Street
- Standard Street at First Street
- Grand Avenue at First Street
- Spurgeon Street at First Street
- Lacy Street at First Street

Therefore, the CMP traffic impact analysis requirements relate to the potential impacts only on the specified CMPHS intersection.

Orange County Growth Management Plan

In August 1988, Orange County adopted a Growth Management Plan, which presents a conceptual framework for coordinating traffic facilities and public facilities and services with new development. The Growth Management Plan also spawned several plans and programs, including the Development

Monitoring Program, which evaluates the extent of new development and compliance with phasing requirements, and the Facilities Implementation Plans, which evaluate public facility needs and propose financing mechanisms.

The most comprehensive legislation affecting growth management is Measure M, approved by the County voters in November, 1990, and re-approved in 2006. The measure requires each jurisdiction in the County to adopt a Growth Management Element with specific contents and guidelines.

Local

City of Santa Ana General Plan—Circulation Element

The General Plan Circulation Element for City of Santa Ana was reviewed for goals and policies that would be applicable to the proposed project. Goals and policies presented in the Circulation Element of the General Plan related to traffic that are potentially relevant to the proposed project are identified below:

Goal 1.0 Provide and maintain a comprehensive circulation system that facilitates the efficient movement of people and goods throughout the City, and enhances its economic viability

- **Policy 1.1** Coordinate transportation improvements in a manner which minimizes disruptions to the community
- **Policy 1.4** Maintain at least a level of service "D" on arterial street intersections, except in major development areas
- **Policy 1.6** Improve intersection capacity on major arterials to accommodate increased traffic demands

Goal 3.0 Provide a full spectrum of travel alternatives for the community's residents, employees, and visitors

- **Policy 3.4** Encourage the development of multi-modal transit opportunities within major development areas
- **Policy 3.5** Enhance sidewalks and pedestrian systems to promote their use as a means of travel
- **Policy 3.7** Support system enhancements and bikeway support facilities that encourage bicycle usage
- **Policy 3.8** Develop bicycle paths that maximize access to major activity centers, neighboring jurisdictions, and regional bicycle paths

Goal 4.0 Fully coordinate transportation and land use planning activities

- **Policy 4.1** Program and prioritize transportation improvements to stimulate growth in major development areas

Policy 4.2 Assess land use and transportation project impacts through the development review process

Policy 4.3 Assess all development projects in order to identify their traffic impacts and require that they pay their fair-share of the system improvements necessary to accommodate traffic generated by the project

Goal 5.0 Create attractive circulation corridors to enhance the City's image

Policy 5.1 Preserve rights-of-way along circulation corridors to provide landscaped parkways and setback areas

Policy 5.2 Enhance street design standards to promote attractive circulation corridors

Policy 5.3 Provide landscaped medians on major arterials

Goal 6.0 Protect local streets from through traffic to preserve neighborhood character

Policy 6.1 Implement street design features that discourage through traffic on residential streets

Goal 7.0 Utilize alternative parking strategies as a means of managing transportation demand

Policy 7.1 Encourage large employers to utilize parking control measures to reduce vehicle trips, and enhance the use of alternative travel modes

Policy 7.2 Encourage the joint use of parking facilities

Goal 8.0 Strengthen the coordination of transportation and land use planning activities with adjacent jurisdictions and regional agencies

Policy 8.1 Participate in inter-jurisdictional planning forums and other inter-agency opportunities to coordinate transportation and land use projects

Consistency Analysis

Generally, the proposed project is consistent with applicable policies of the Circulation Element. As described under Impact 4.11-8, the proposed project with mitigation measures implemented would maintain an acceptable LOS throughout the project area. The proposed project is intended to provide a live-work community that would reduce daily vehicle trips, thereby encouraging alternative transportation via rail, bus, pedestrian and bicycle traffic. The transportation impacts of the proposed project have been assessed and the proposed project encourages coordination with agencies outside the City's jurisdiction. The proposed project would also be consistent with corridor enhancement policies because the project also includes street and network standards, which would provide uniform guidance for the development and enhancement of right-of-ways, sidewalks, planters, landscaping, and street lighting. Consequently, implementation of the proposed project would not conflict with the above-listed policies.

Municipal Code

Guidelines and provisions related to transportation and parking are addressed in Chapter 36 (Traffic) and Chapter 41 (Zoning Code) of the City's Municipal Code. Any development project that would generate two hundred fifty (250) or more employees may adversely impact existing transportation and parking facilities, resulting in deteriorating levels of traffic service, increased motor vehicle emissions, and possibly significant additional capital expenditures to augment and improve the existing transportation system. All such projects are required to prepare and submit a transportation demand management (TDM) strategy plan to the city. In order to more efficiently utilize the existing and planned transportation system and to reduce vehicle emissions, it is the policy of the City to do the following:

- Reduce the number of peak period vehicle trips generated in association with additional development
- Promote and encourage the use of alternative transportation modes such as ridesharing, carpools, vanpools, public bus and rail transit, bicycles and walking, as well as those facilities that support such modes
- Promote and encourage the implementation of flexible working hours and parking management strategies
- Achieve related reductions in vehicle trips, traffic congestion and public expenditure and achieve air quality improvements through utilization of existing local mechanisms and procedures for project review and permit processing
- Promote coordinated interjurisdictional implementation of strategies to reduce transportation demand and increase transportation system capacity
- Achieve the most efficient use of local resources through coordinated regional and local TDM and traffic system monitoring programs
- Complement, not duplicate, the South Coast Air Quality Management District's Regulation XV and Appendix IV-E, Control Measures of the 1991 Air Quality Management Plan
- Assure perpetual compliance with approved TDM programs regardless of changes in property ownership through recorded covenants, conditions and restrictions (CC&R's)

4.11.3 Project Impacts and Mitigation

Analytic Method

The Circulation and Land Use Elements of the City of Santa Ana General Plan set LOS D as the threshold for an acceptable service level for intersections located outside of major development areas (MDA). The City of Santa Ana considers LOS E as the maximum acceptable service level for intersections located within an MDA. These criteria are consistent with Measure M target levels, and are either more stringent than, or meet Congestion Management Plan (CMP) criteria which designates LOS E as the minimum acceptable level of service.

For the purposes of traffic study preparation, a project is considered to have a significant traffic impact at an intersection if traffic level of service deteriorates to an unacceptable level of service (i.e., LOS E or F) at intersections outside of an MDA, LOS F within an MDA with the addition of project traffic. For study intersections located outside of an MDA, if the intersection is expected to operate at an unacceptable level of service (LOS E or F) under base conditions (conditions without the project), measures to achieve acceptable levels of service at the intersections should be recommended. For study intersections located within an MDA, if the intersection is expected to operate at unacceptable Levels of Service (intersection LOS F at Santa Ana intersections within an MDA) under base conditions (conditions without the project), improvement and recommendations are requested to achieve acceptable levels of service.

For those signalized intersections which may not contribute to 0.01 or greater ICU or V/C increases, the City requires a fair share contribution toward the expected cost of improvements at the subject intersection. The fair share is based upon the project's relative contribution toward the total future added traffic, which consists of traffic from the project, other cumulative project traffic, and growth of ambient background traffic.

Improvements are required for locations that operate at acceptable level of service without the project, but which operate at an unacceptable level of service with the project. For locations that are forecast to operate worse than the acceptable level even without the project, the traffic analysis must include improvements to achieve acceptable levels of service per the City of Santa Ana's criteria.

Anticipated Project Buildout (2030) Without Project Condition

This section documents the future (2030) traffic conditions without the addition of project-related traffic to the surrounding street system. To forecast the near-term growth conditions for the year 2030, the peak hour background traffic volumes were increased by a factor of 0.5 percent per year (approximately 11 percent from 2010 to 2030). Also considered are future traffic increases that may be generated by other developments that have been approved in the study area.

Cumulative Projects

For the purposes of this traffic analysis, KOA Corporation has collected the active project lists from the City of Santa Ana, the City of Tustin, and the City of Orange in order to identify the relevant projects near the Transit Zoning Code (SD 84A and SD 84B) area. Per discussion with the project team, all cumulative projects within a 1.5 miles radius from the project boundary are considered as relevant to this project. Twenty-one projects are included as cumulative projects. These are listed in Appendix G. The recently added Minter Court project (11 units of live/work) is not included in the cumulative project trip generation calculation as it provides minimum trip growth (about 6 peak hour trips and should be covered by the 0.5% annual ambience growth incorporated in the future volume forecasts). The added cumulative "Future Specific Plan" project (30 units development) was included in both 2030 and 2035 conditions analysis.

The trip generation and trip distribution for all cumulative projects are included in Appendix G. The assumptions for the trip generation and trip distribution are primarily based on the traffic study reports provided by the City of Santa Ana. Appendix G also includes the cumulative project only volumes for both AM and PM peak hours which are generated based on the trip generation and trip distribution for the cumulative projects.

Anticipated Project Buildout (2030) Without Project Intersection Conditions

As indicated in the previous section, the Anticipated Project Buildout (2030) Without Project intersection volumes are composed of the existing volumes with 0.5 percent growth per year plus the cumulative project only volumes. Figure 4.11-5A through Figure 4.11-5E (2030 Without Project AM Peak Hour Volumes) illustrate the AM peak hour volumes for the fifty intersections while Figure 4.11-6A through Figure 4.11-6E (2030 Without Project PM Peak Hour Volumes) illustrate the PM peak hour volumes for 2030 Without Project conditions. Table 4.11-8 (2030 Without Project Peak Hour Intersection Conditions [ICU Method]) and Table 4.11-9 (2030 Without Project Peak Hour Intersection Conditions [HCM Method]) illustrate the future without project intersection level of service conditions. Appendix G includes the analysis worksheets for all intersections under 2030 Without Project conditions. As shown in the table, all intersections are expected to operate at LOS D or better under the future without project condition for the year 2030 except the following three intersections:

- Grand Avenue at Santa Ana Boulevard (Signalized)
- Lacy Street at Santa Ana Boulevard (Two-way stop control)
- Lacy Street at First Street (Two-way stop control)

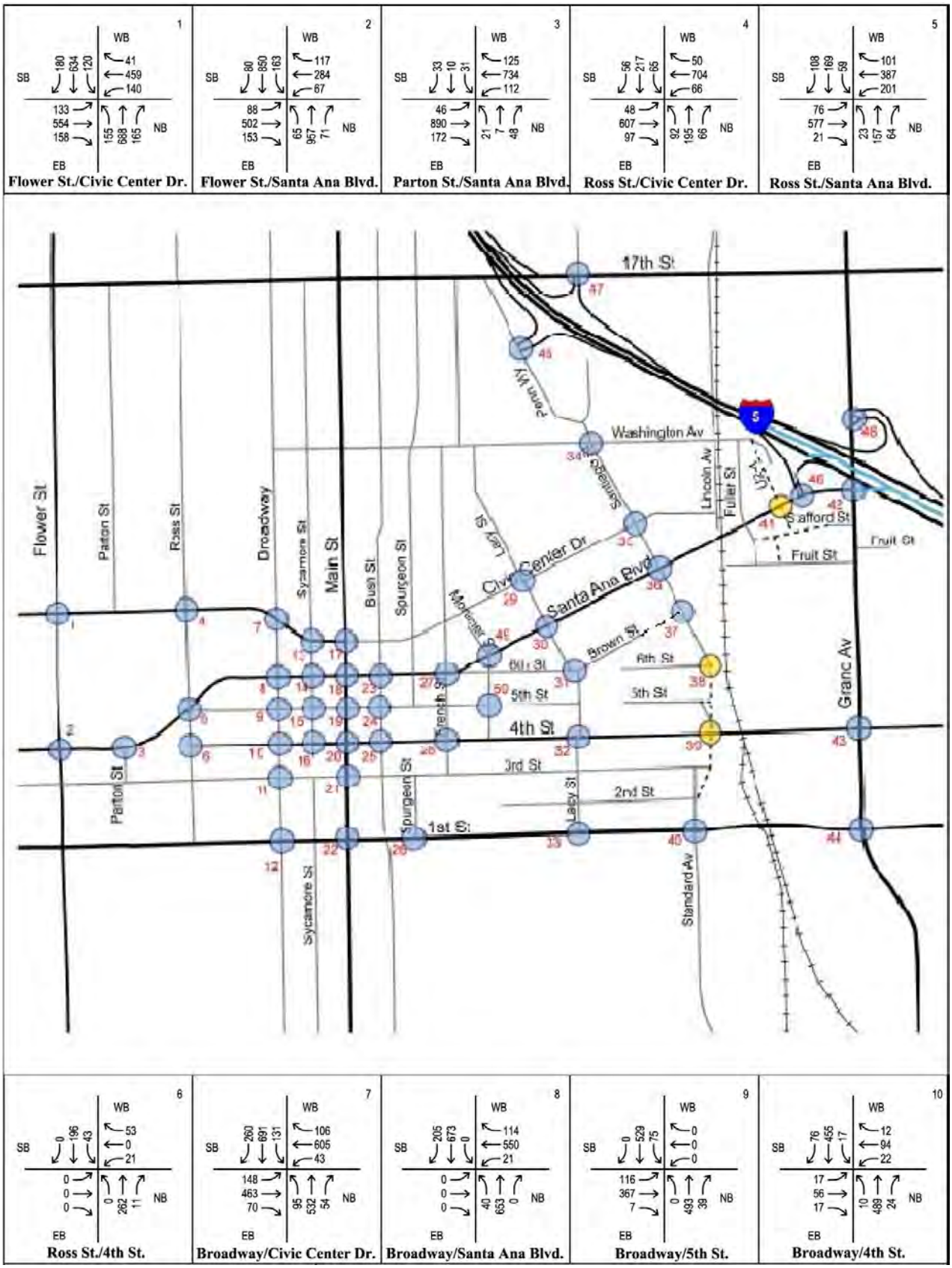
Lacy Street at First Street warrants a traffic signal under the 2030 Without Project conditions. All Signal Warrant analysis worksheets are included in Appendix G of this document.

Anticipated Project Buildout (2030) Without Project Roadway Segment Conditions

The roadway segment ADT analysis for 2030 Without Project conditions is included in Table 4.11-10 (2030 Without Project Roadway Segment Daily Traffic Condition). As indicated, a majority of the arterial roadways are operating at acceptable levels. The daily V/C ratio screening analysis indicates that the following locations are potentially experiencing capacity deficiencies under 2030 Without Project conditions:

- Main Street between First Street and Fifth Street (indicated a three discreet segments on Table 4.11-10)
- Santa Ana Boulevard West of I-5 SB Ramps
- Civic Center Drive between Lacy Street and Lincoln Avenue (indicated as two discreet segments on Table 4.11-10)

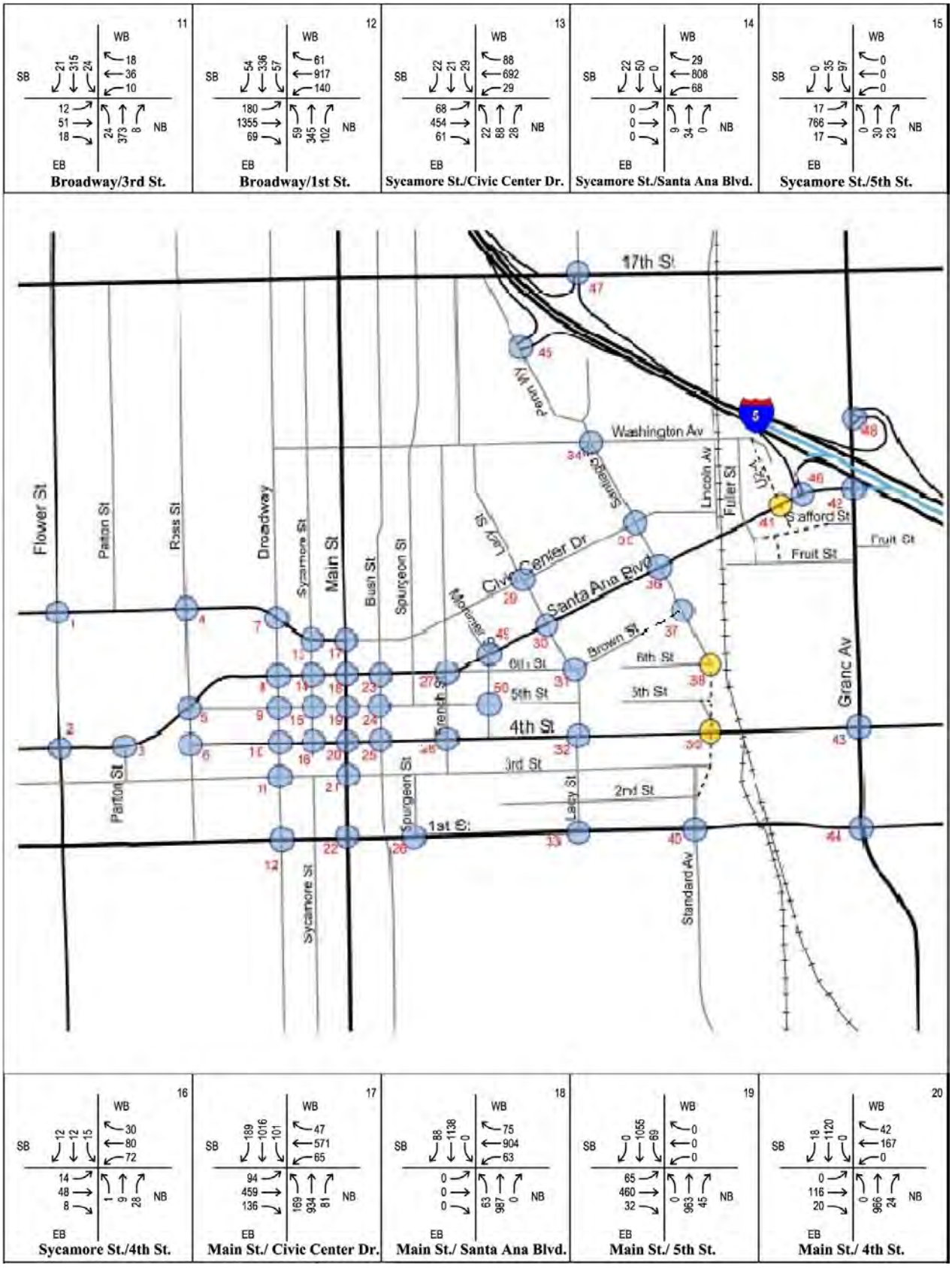
It should be noted that the daily volume-to-capacity ratios provide a screening level analysis of daily traffic flows and potential operational problems within the study area. The peak hour analysis for intersections, presented in the previous tables (Table 4.11-8 and Table 4.11-9), provides a more definitive analysis of the operation of the arterial roadways in the project area.



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-5A**

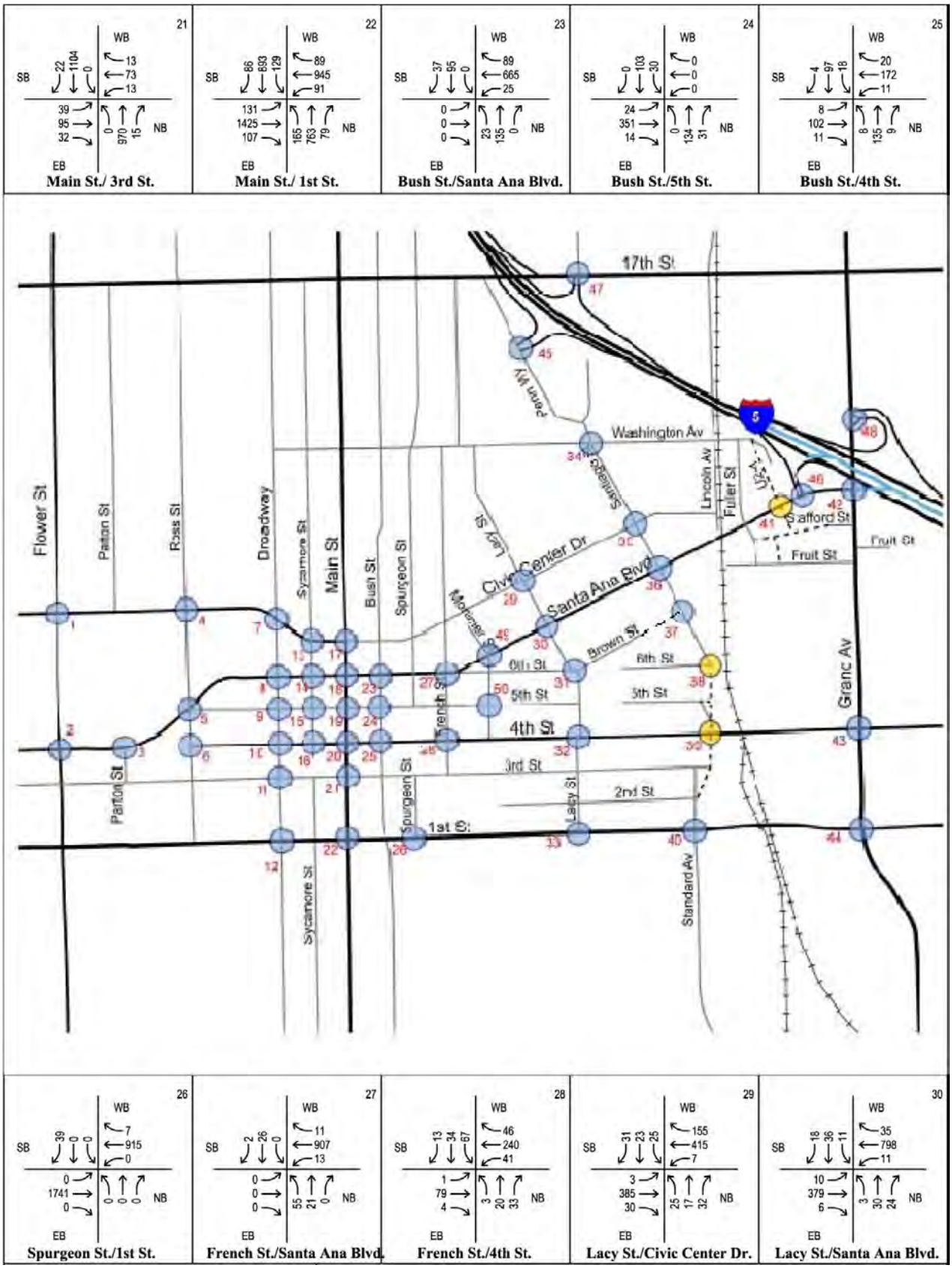
2030 Without Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-5B**

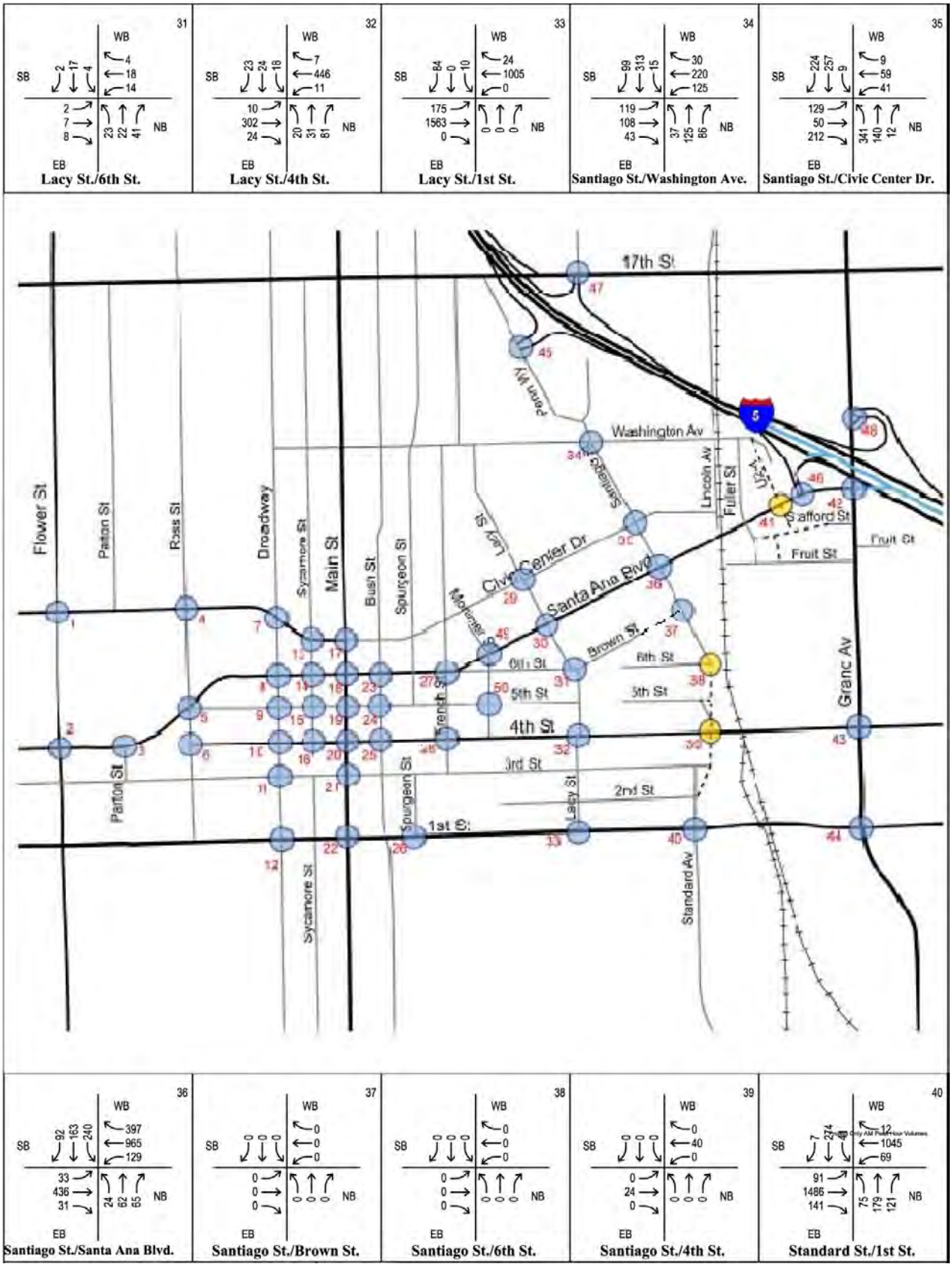
2030 Without Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-5C**

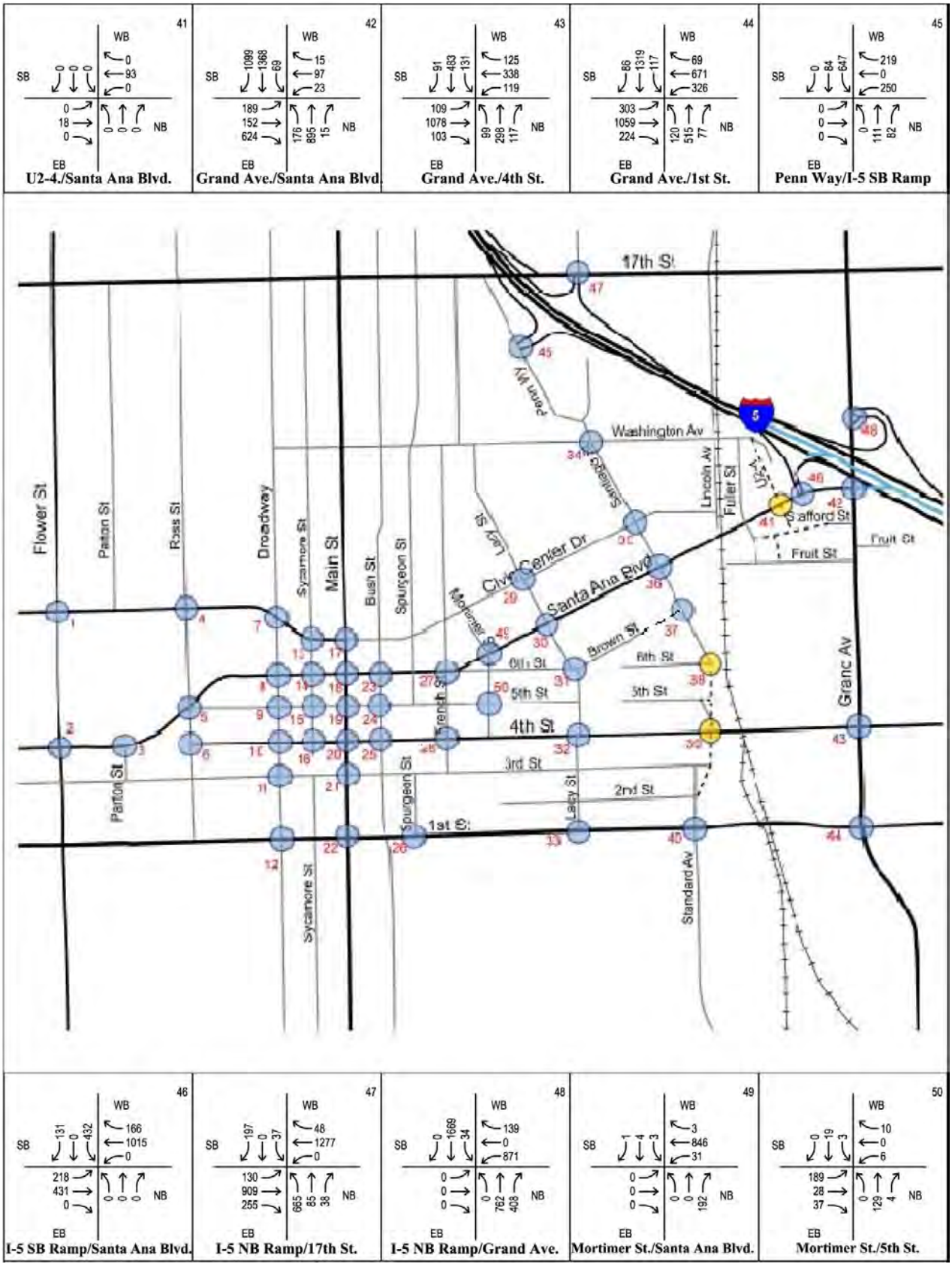
2030 Without Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-5D**

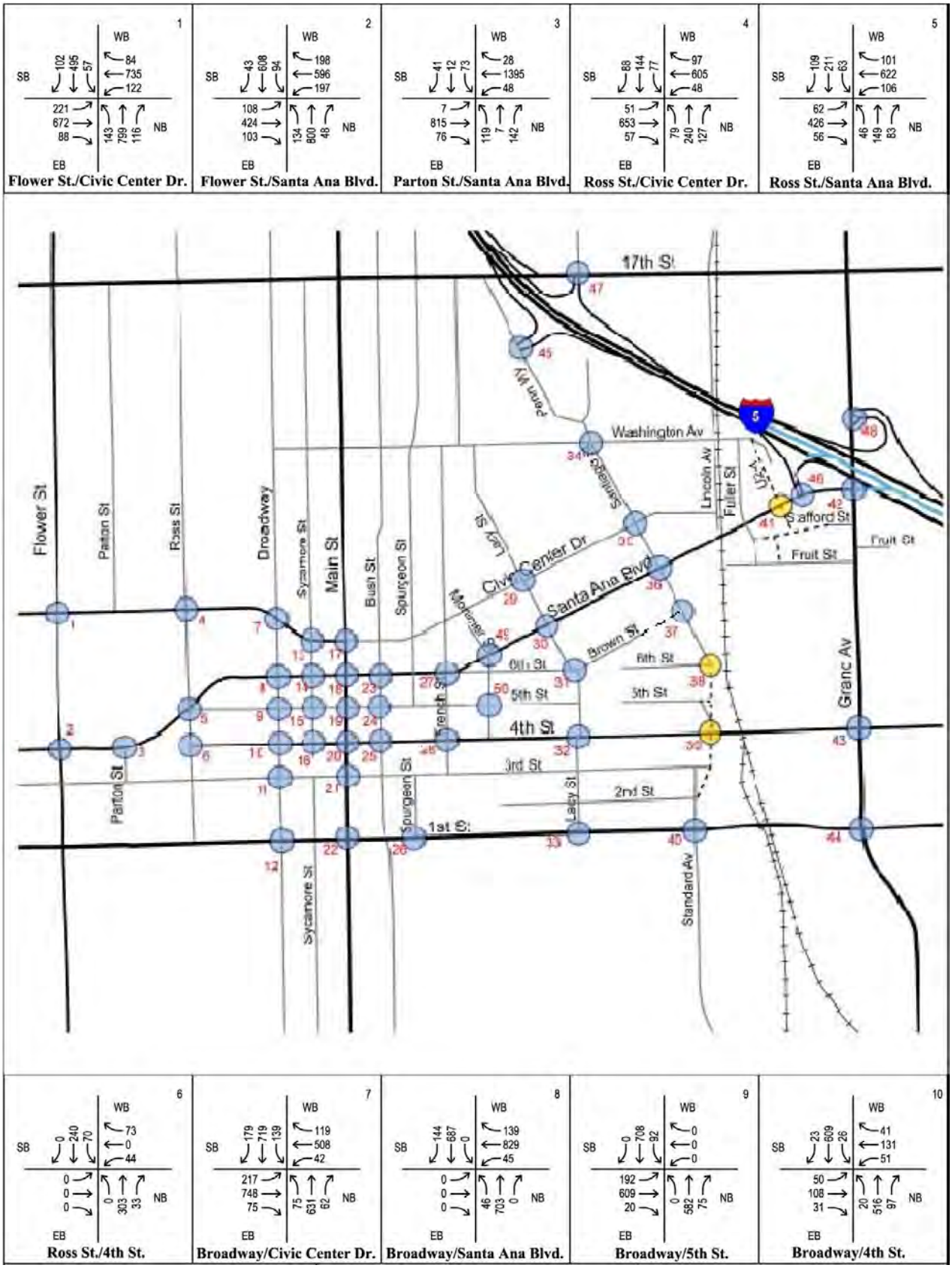
2030 Without Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-5E**

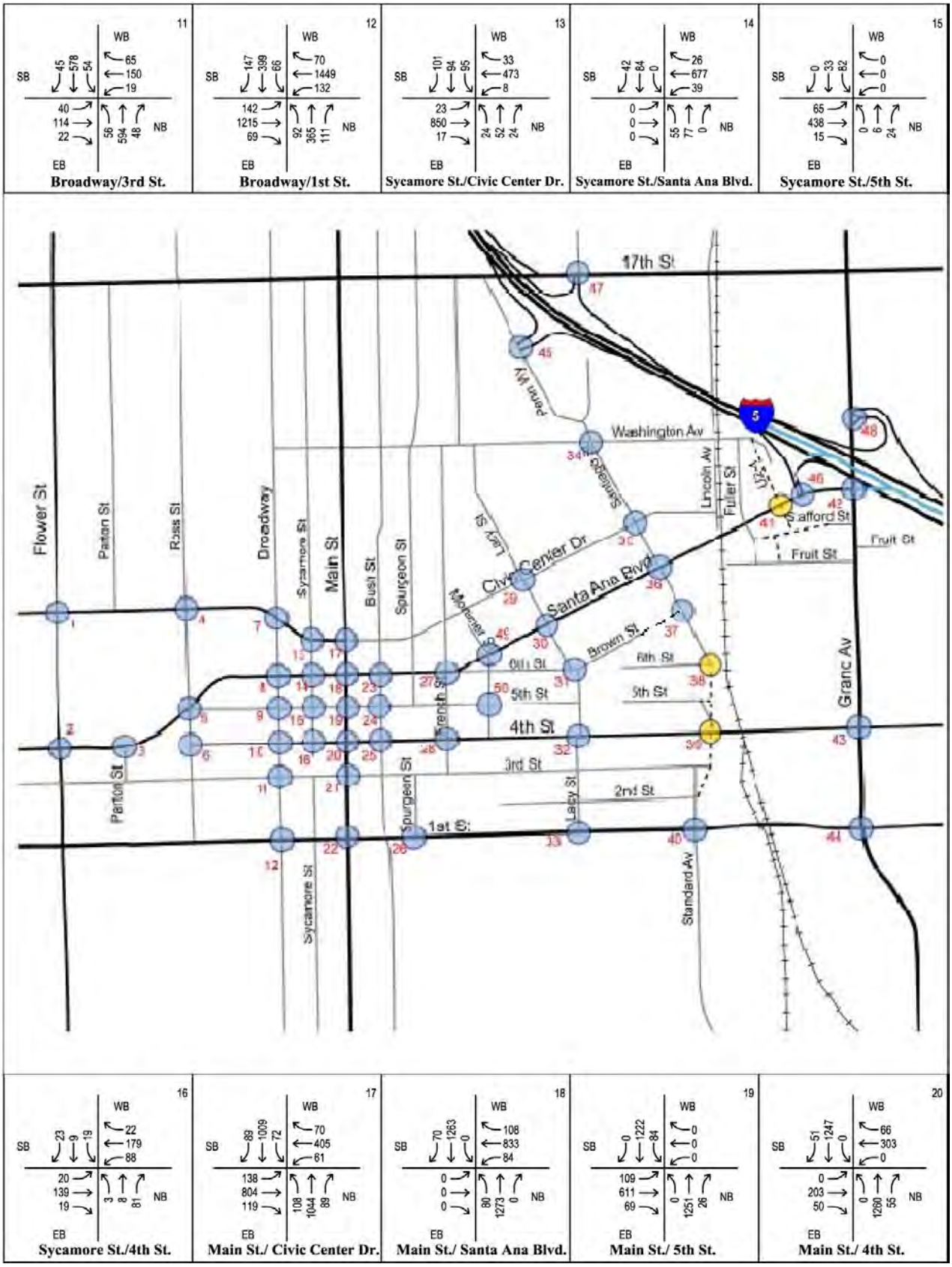
2030 Without Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-6A**

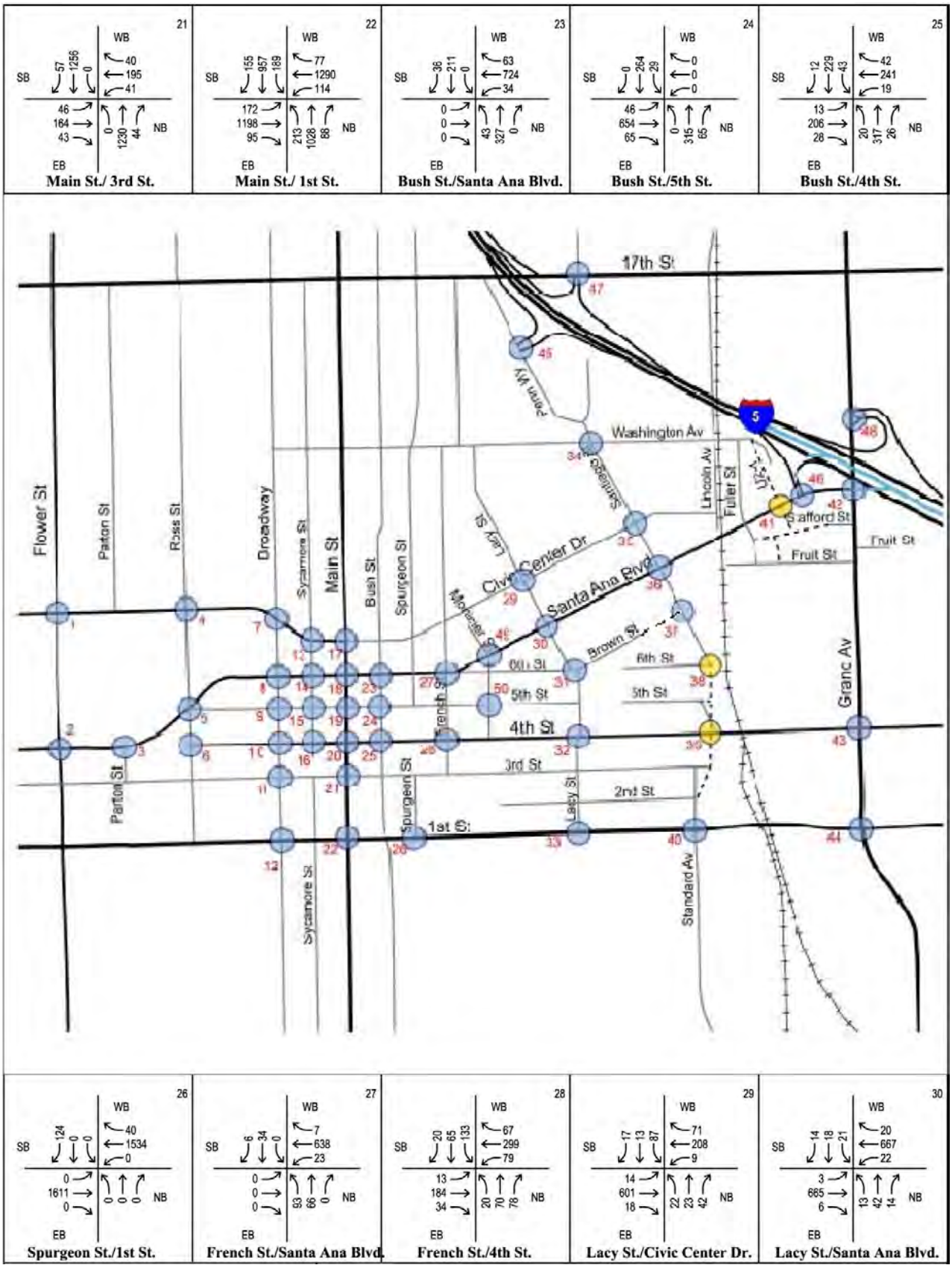
2030 Without Project PM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-6B**

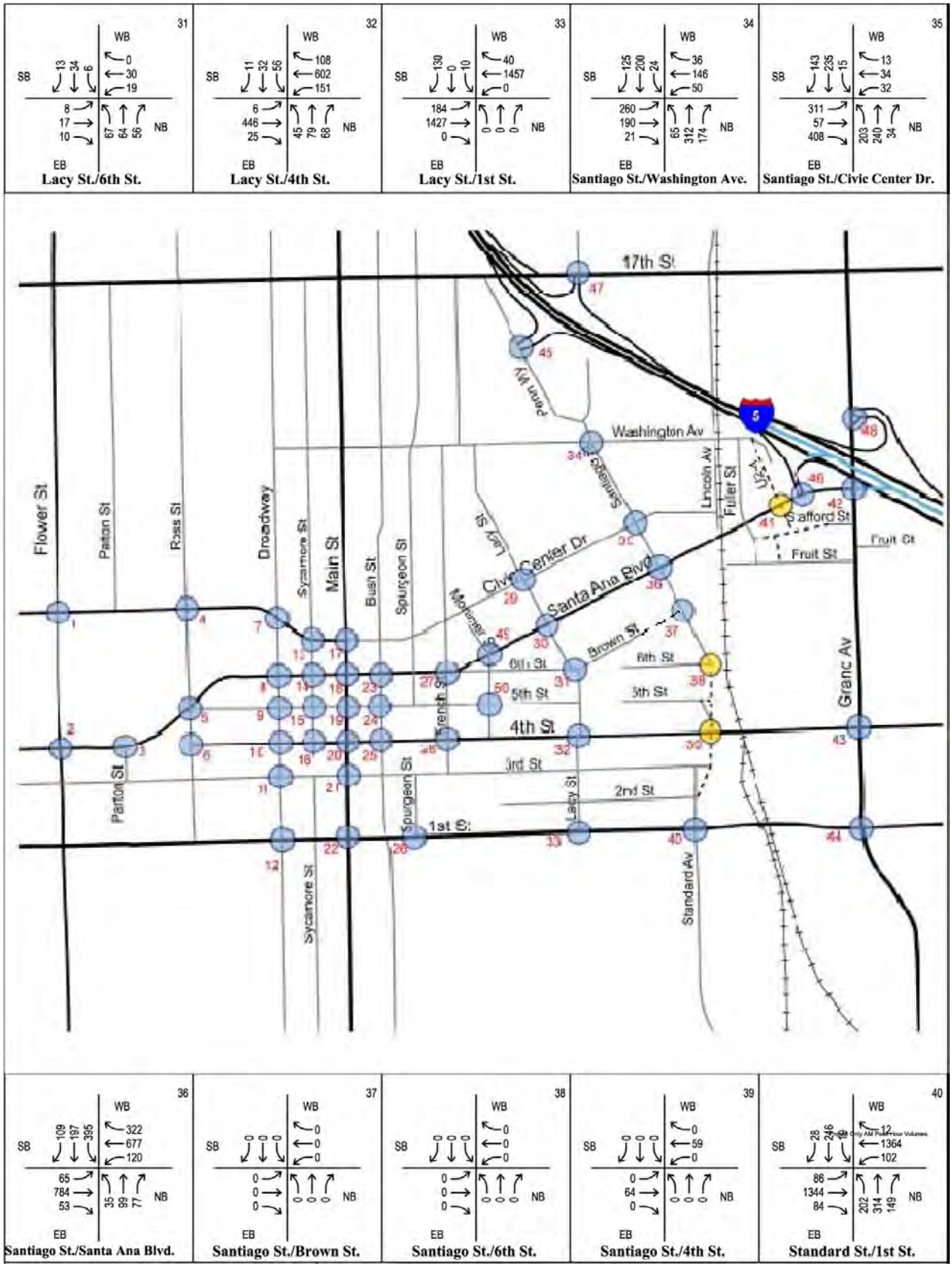
2030 Without Project PM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-6C**

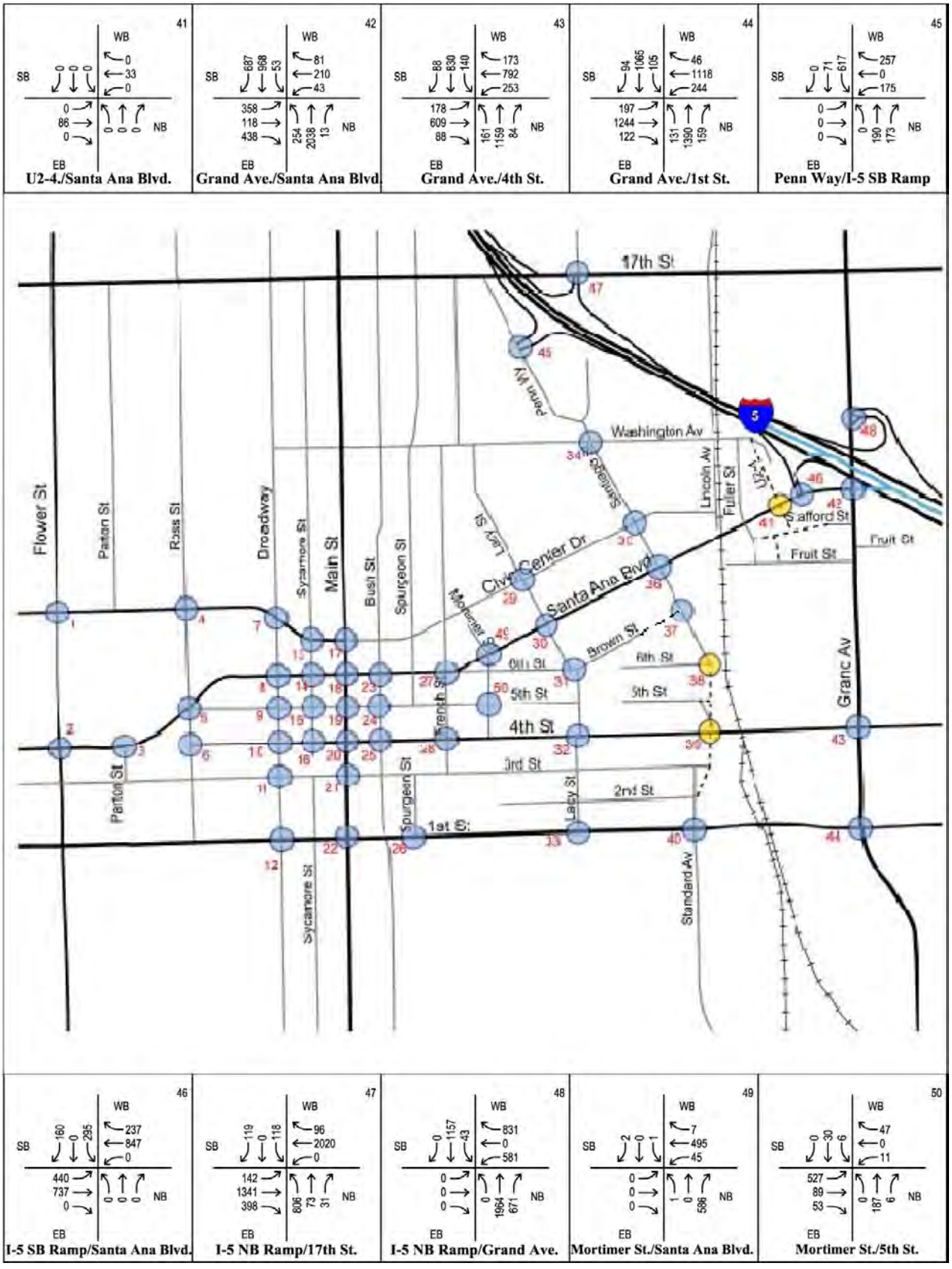
2030 Without Project PM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-6D**

2030 Without Project PM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-6E**

2030 Without Project PM Peak Hour Volumes

Table 4.11-8 2030 Without Project Peak Hour Intersection Conditions (ICU Method)

Intersection	AM Peak Hour		PM Peak Hour	
	ICU	Level of Service	ICU	Level of Service
Signalized Intersections (Using ICU Method)				
Flower St. at Civic Center Dr.	0.683	B	0.734	C
Flower St. at Santa Ana Blvd.	0.572	A	0.587	A
Parton St. at Santa Ana Blvd.	0.391	A	0.534	A
Ross St. at Civic Center Dr.	0.517	A	0.474	A
Ross St. at Santa Ana Blvd.	0.475	A	0.395	A
Broadway at Civic Center Dr.	0.614	B	0.643	A
Broadway at Santa Ana Blvd.	0.468	A	0.522	A
Broadway at Fifth St.	0.349	A	0.462	A
Broadway at Fourth St.	0.298	A	0.409	A
Broadway at Third St.	0.336	A	0.613	B
Broadway at First St.	0.651	B	0.729	C
Sycamore St. at Civic Center Dr.	0.420	A	0.495	A
Main St. at Civic Center Dr.	0.751	C	0.750	C
Main St. at Santa Ana Blvd.	0.654	B	0.693	B
Main St. at Fifth St.	0.499	A	0.633	B
Main St. at Fourth St.	0.508	A	0.654	B
Main St. at Third St.	0.464	A	0.603	B
Main St. at First St.	0.773	C	0.872	D
Bush St. at Santa Ana Blvd.	0.295	A	0.403	A
Bush St. at Fifth St.	0.242	A	0.442	A
Bush St. at Fourth St.	0.270	A	0.464	A
French St. at Fourth St.	0.291	A	0.462	A
Lacy St. at Fourth St.	0.407	A	0.567	A
Santiago St. at Santa Ana Blvd.	0.541	A	0.677	B
Standard St. at First St.	0.808	D	0.833	D
Grand Ave. at Santa Ana Blvd.	0.807	D	0.902	E
Grand Ave. at Fourth St.	0.646	B	0.728	C
Grand Ave. at First St.	0.700	C	0.777	D

SOURCE: KOA Corporation 2010

Table 4.11-9 2030 Without Project Peak Hour Intersection Conditions (HCM Method)

Intersection	AM Peak Hour		PM Peak Hour	
	Average/Worst Case Delay	LOS	Average/Worst Case Delay	LOS
Unsignalized Intersections				
Ross St. at Fourth St.	10.8	B	12.3	B
Sycamore St. at Santa Ana Blvd.	21.8	C	20.8	C
Sycamore St. at Fifth St.	15.7	C	13.7	B
Sycamore St. at Fourth St.	7.9	A	9.1	A
Spurgeon St. at First St.	10.5	B	14.6	B
French St. at Santa Ana Blvd.	19.7	C	17.7	C
Lacy St. at Civic Center Dr.	20.3	C	33.2	D
Lacy St. at Santa Ana Blvd.	34.2	D	51.6	F
Lacy St. at Sixth St.	7.2	A	7.9	A
Lacy St. at First St.	23.3	C	57.2	F
Santiago St. at Washington Ave.	17.1	B	26.9	D
Santiago St. at Civic Center Dr.	26.2	D	26.3	D
Mortimer St. at Fifth St.	20.3	C	17.8	C
Mortimer St. at Santa Ana Blvd	9.0	A	21.4	C
Signalized Intersections (Caltrans, Using HCM)				
Penn Way at I-5 SB	0.462	C	0.458	C
Santa Ana Blvd at I-5 SB	0.499	C	0.520	C
Seventeenth St. at I-5 NB	0.782	C	0.958	D
Grand Ave at I-5 NB	0.648	C	1.042	D

SOURCE: KOA Corporation 2010

Table 4.11-10 2030 Without Project Roadway Segment Daily Traffic Condition

Road	Segment	2030 Without Project ADT	Number of Lanes*	LOS E Capacity	LOS	LOS E OK**
Flower St.	Santa Ana Blvd to Civic Center Dr.	20,606	4D	37,500	A	
Flower St.	Seventeenth St to Civic Center	19,312	4D	37,500	A	
Civic Center Dr.	West of Flower St.	20,065	4D	37,500	A	
Civic Center Dr.	Flower St. to Ross St.	18,993	4D	37,500	A	
Flower St.	Santa Ana Blvd. to First St.	20,739	4D	37,500	A	
Santa Ana Blvd.	West of Flower St.	11,075	4D	37,500	A	
Santa Ana Blvd.	Parton St. to Flower St.	13,704	4D	37,500	A	
Santa Ana Blvd.	Parton St. to Ross St.	13,704	4D	37,500	A	
Civic Center Dr.	Ross St. to Broadway	17,380	4D	37,500	A	

Table 4.11-10 2030 Without Project Roadway Segment Daily Traffic Condition

Road	Segment	2030 Without Project ADT	Number of Lanes*	LOS E Capacity	LOS	LOS E OK**
Broadway	Civic Center Dr. to Santa Ana Blvd.	21,230	4D	37,500	A	
Broadway	Civic Center Dr to Washington Ave.	27,580	4D	37,500	C	
Civic Center Dr.	Broadway to Sycamore St	16,974	4D	37,500	A	
Broadway	Santa Ana Blvd. to Fifth St.	18,029	4D	37,500	A	
Santa Ana Blvd.	Broadway to Sycamore St.	11,716	3D	28,150	A	
Broadway	Fifth St. to Fourth St.	17,961	4D	37,500	A	
Fifth St	Broadway to Ross St.	9,017	3D	28,150	A	
Fifth St	Broadway to Main St.	9,017	3D	28,150	A	
Broadway	Third St. to Fourth St.	17,537	4U	25,000	C	
Broadway	Third St. to First St.	17,799	4U	25,000	C	
Broadway	South of First St.	13,732	4U	25,000	A	
First St.	Broadway to Ross St.	44,751	6D	56,300	C	
Civic Center Dr.	Sycamore St. to Main St.	16,142	4D	37,500	A	
Santa Ana Blvd.	Sycamore St. to Main St.	11,342	3D	28,150	A	
Fifth St	Sycamore St. to Main St.	9,229	3D	28,150	A	
Main St.	Civic Center Dr. to Santa Ana Blvd.	35,475	4D	37,500	E	E ok
Main St.	Civic Center Dr. to Washington Ave.	36,653	4D	37,500	E	E ok
Civic Center Dr.	Main St. to Bush St.	12,756	4D	37,500	A	
Main St.	Santa Ana Blvd. To Fifth St.	37,204	4D	37,500	E	
Santa Ana Blvd.	Main St. to Bush St.	11,378	3D	28,150	A	
Main St.	Fifth St. to Fourth St.	37,179	4U	25,000	F	
Fifth St	Main St. to Bush St.	6,729	3D	28,150	A	
Main St.	Third St. to Fourth St.	32,491	4U	25,000	F	
Main St.	First St. to Third St.	32,491	4U	25,000	F	
First St.	Main St. to Broadway	46,020	6D	56,300	D	
Santa Ana Blvd.	Bush St. to Main St.	11,378	3D	28,150	A	
Santa Ana Blvd.	Bush St. to Spurgeon St.	11,294	3D	28,150	A	
Fifth St	Bush St. to French St.	6,538	3D	28,150	A	
First St.	Spurgeon St. to Main St.	42,436	6D	56,300	C	
Fourth St.	Santiago St to Lacy St.	19,389	4D	37,500	A	
Civic Center Dr.	French St to Lacy St.	14,027	4D	37,500	A	
Santa Ana Blvd.	Lacy St. to French St.	16,199	2D	18,750	D	
Fourth St.	Lacy St. to French St.	13,171	2D	18,750	C	

Table 4.11-10 2030 Without Project Roadway Segment Daily Traffic Condition

Road	Segment	2030 Without Project ADT	Number of Lanes*	LOS E Capacity	LOS	LOS E OK**
First St.	Lacy St. to Spurgeon St.	42,984	6D	56,300	C	
First St.	Lacy St. to Standard Ave.	42,984	6D	56,300	C	
Santiago St.	Washington Ave. to Civic Center Dr.	11,475	4D	37,500	A	
Santiago St.	Washington Ave. to Seventeenth St	11,031	4D	37,500	A	
Santiago St.	Santa Ana Blvd to Civic Center Dr.	11,126	4D	37,500	A	
Civic Center Dr.	Santiago St to Lacy St	13,373	2U	12,500	F	
Civic Center Dr.	Lincoln Ave to Santiago St	13,320	2U	12,500	F	
Santiago St.	Santa Ana Blvd. to Brown St.	7,426	4D	37,500	A	
Santiago St.	Santa Ana Blvd. to Civic Center Dr.	11,126	4D	37,500	A	
Santa Ana Blvd.	Santiago St. to Lacy St	16,429	4D	37,500	A	
Santa Ana Blvd.	Santiago St. to U-24	22,625	6D	56,300	A	
Grand Ave.	Fourth St. to Santa Ana Blvd.	41,729	6D	56,300	C	
Grand Ave.	Santa Ana Blvd to Seventeenth St.	36,191	6D	56,300	B	
Santa Ana Blvd.	East of Grand Ave.	8,908	4D	37,500	A	
Grand Ave.	First St. to Fourth St.	35,290	6D	56,300	B	
Fourth St.	Grand Ave to Santiago St.	19,769	4D	37,500	A	
Fourth St.	East of Grand Ave.	22,742	4D	37,500	B	
Grand Ave.	South of First St.	45,394	6D	56,300	D	
Grand Ave.	Fourth St to First St	35,290	6D	56,300	B	
First St.	Standard Ave to Grand Ave	44,898	6D	56,300	C	
First St.	East of Grand Ave.	40,076	6D	56,300	C	
Penn Way	South of I-5 SB Ramps	9,489	2D	18,750	A	
Penn Way	North of I-5 SB Ramps	15,452	4D	37,500	A	
Santa Ana Blvd.	West of I-5 SB Ramps	40,061	4D	37,500	F	
Santa Ana Blvd.	East of I-5 SB Ramps	25,782	4D	37,500	B	
Seventeenth St.	West of I-5 NB Ramps	48,954	6D	56,300	D	
Seventeenth St.	East of I-5 NB Ramps	38,875	6D	56,300	B	
Grand Ave.	South of I-5 NB Ramps	50,241	6D	56,300	D	
Grand Ave.	North of I-5 NB Ramps	46,432	6D	56,300	D	

SOURCE: KOA Corporation 2010

* D corresponds to a divided roadway. U corresponds to an undivided roadway.

** LOS E is considered acceptable within major development areas.

Anticipated Project Buildout (2030) Without Project Peak Hour Freeway Ramp Conditions

2030 Without Project peak hour ramp analysis results are presented on Table 4.11-11 (2030 Without Project Peak Hour Freeway Ramp Analysis). All ramps operate at LOS D or better during the AM and PM peak hour time periods except the northbound on-ramp at the interchange of I-5 and Santa Ana Boulevard during the PM peak hour time period.

Table 4.11-11 2030 Without Project Peak Hour Freeway Ramp Analysis

Interchange	Ramp	Ramp Type Code*	Lanes	Peak Hour Capacity	AM Peak Hour			PM Peak Hour		
					VOL	V/C	LOS	VOL	V/C	LOS
I-5 at Seventeenth St.	SB On	4	2	1,800	729	0.41	A	790	0.44	A
	NB Loop On	4	2	1,800	255	0.14	A	398	0.22	A
	SB Off	5	1	1,500	469	0.31	A	432	0.29	A
	NB Off	5	1	1,500	788	0.53	A	910	0.61	A
I-5 at Santa Ana Blvd.	SB Direct On (HOV)	6	2	2,250	236	0.10	A	184	0.08	A
	SB Loop On	4	2	1,800	384	0.21	A	677	0.38	A
	NB Loop On	4	2	1,800	442	0.25	A	714	0.40	A
	SB Off	5	1	1,500	563	0.38	A	455	0.30	A
	NB Off	5	1	1,500	1010	0.67	B	1412	0.94	E

SOURCE: KOA Corporation 2010

* Ramp Type Code:
4—Two-lane Metered On-Ramp, 2 Mixed Flow Lanes at Meter
5—One-lane Unmetered Ramp
6—Two-lane Unmetered On-Ramp, tapers to one merge lane at or beyond gore point

General Plan (2035) Without Project Traffic Conditions

This section documents the General Plan Buildout (2035) traffic conditions without the addition of project-related traffic to the surrounding street system. It includes development of the buildout traffic conditions in the study area based on traffic growth projections provided by the OCTAM model applied to existing traffic patterns. Appendix G includes the output link volumes for AM, PM, and ADT from the 2000 and 2030 traffic models, the existing (2007) observed traffic volumes and the resulted 2035 adjusted link volumes for AM, PM, and ADT. In addition, Appendix G includes the refined 2035 turning movement volumes for each intersection for both AM and PM peak hours based on the NCHRP-255 methodology. Those volumes are then compared with the 2030 Without Project conditions to ensure all cumulative projects being considered under the General Plan conditions. The final result is a set of AM and PM intersection volumes suitable to conduct the analysis for 2035 Without Project conditions.

This section documents the General Plan Buildout (2035) traffic conditions without the addition of project-related traffic to the surrounding street system. It includes development of the buildout traffic conditions in the study area based on traffic growth projections provided by the OCTAM model applied to existing traffic patterns. Traffic analyzed as part of the 2035 traffic analysis was obtained from the OCTA Traffic Demand model. Previous analysis was conducted by using OCTAM 3.2 travel demand

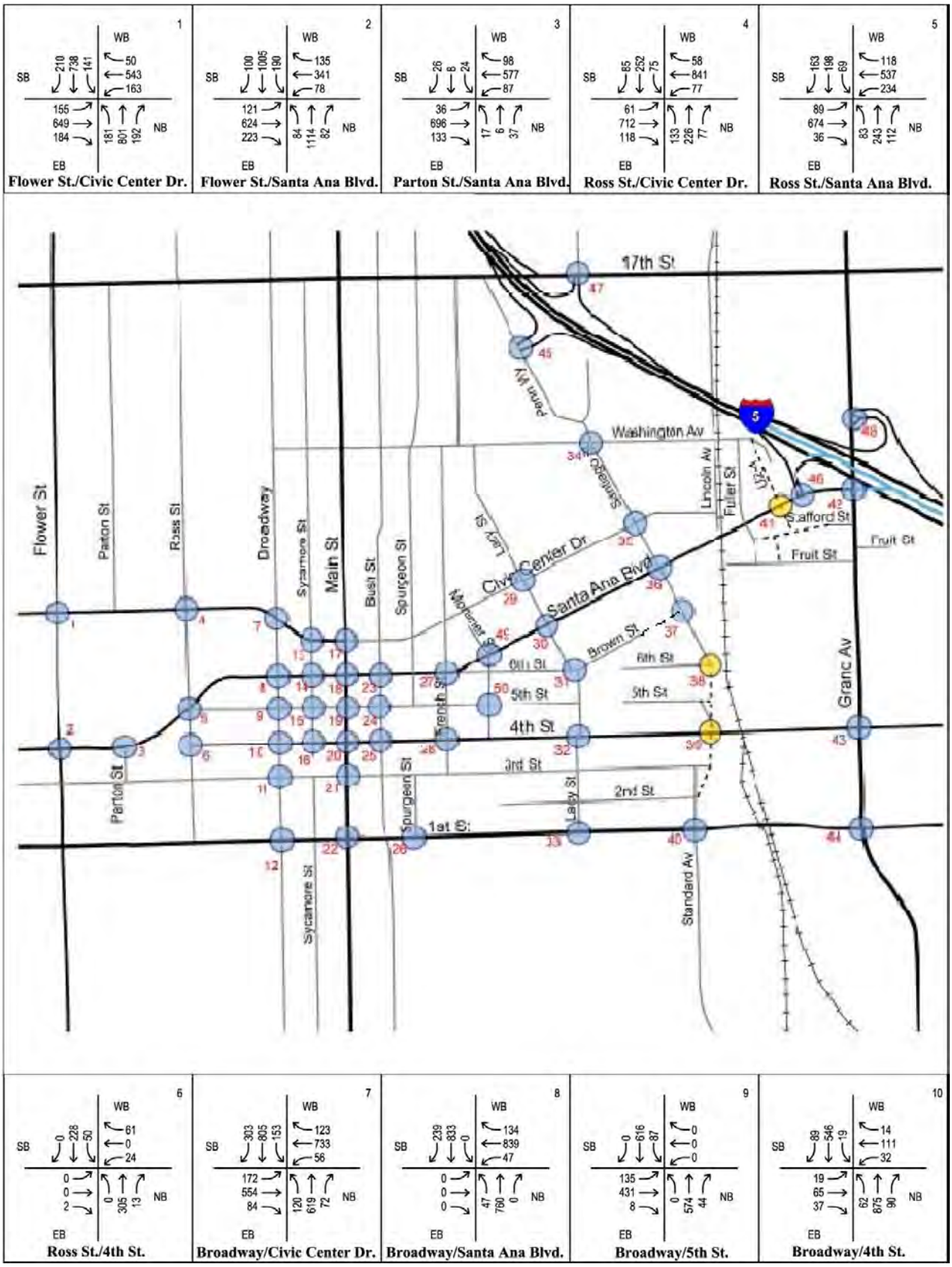
forecasting model. KOA conducted screenline analysis for OCTA's later version model OCTAM 3.3. The screenline analysis surrounding the City indicates that OCTAM 3.3 represents about 11 percent higher traffic volumes forecasting for both the AM and PM peak hour models. KOA therefore applied an 11 percent growth factor to the original OCTAM 3.2 traffic volume forecast. The growth in housing, population, and employment included in the OCP-2004 demographic projections is consistent with the anticipated growth that is expected in conjunction with buildout of the City of Santa Ana General Plan land uses and circulation element. The final result is a set of AM and PM intersection volumes suitable to conduct the analysis for 2035 Without Project conditions.

General Plan (2035) Without Project Intersection Conditions

Figure 4.11-7A through Figure 4.11-7E (2035 Without Project AM Peak Hour Volumes) illustrate the AM peak hour volumes for the fifty intersections while Figure 4.11-8A through Figure 4.11-8E (2035 Without Project PM Peak Hour Volumes) illustrate the PM peak hour volumes for General Plan 2035 Without Project conditions. Table 4.11-12 (2035 Without Project Peak Hour Intersection Conditions [ICU Method]) and Table 4.11-13 (2035 Without Project Peak Hour Intersection Conditions [HCM Method]) illustrate the future without project intersection level of service conditions. As shown in the table, the following ten intersections will operate at unacceptable levels of service during AM or PM peak hours under 2035 Without Project conditions. Appendix G includes all analysis worksheets for 2035 Without Project conditions.

- Flower Street at Civic Center Drive (Signalized)
- Main Street at First Street (Signalized)
- Grand Avenue at Santa Ana Boulevard (Signalized)
- Grand Avenue at I-5 NB Ramp (Signalized)
- Seventeenth Street at I-5 NB Ramp (Signalized)
- Lacy Street at Civic Center Drive (Two-way stop control)
- Lacy Street at Santa Ana Boulevard (Two-way stop control)
- Lacy Street at First Street (Two-way stop control)
- Santiago Street at Washington Avenue (All-way stop control)
- Santiago Street at Civic Center Drive (All-way stop control)

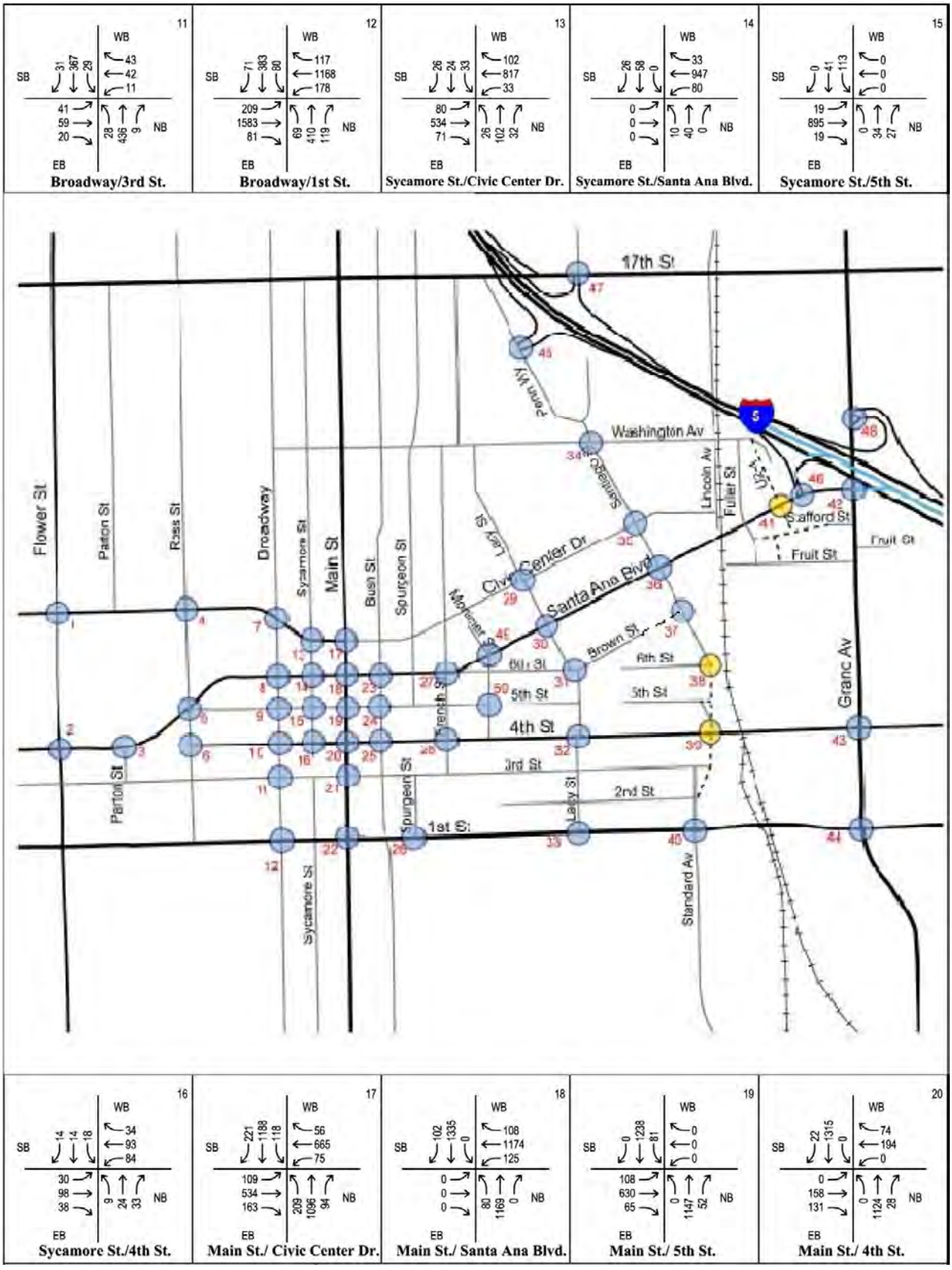
In addition to the two intersections that would warrant signals, as previously indicated (Santiago Street at Washington Street and Santiago Street at Civic Center Drive), two additional intersections warrant signals under 2035 Without Project conditions: Lacy Street at First Street and Lacy Street. No other intersections would warrant a signal under 2035 Without Project conditions. All Signal Warrant analysis worksheets are included in Appendix G.



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-7A**

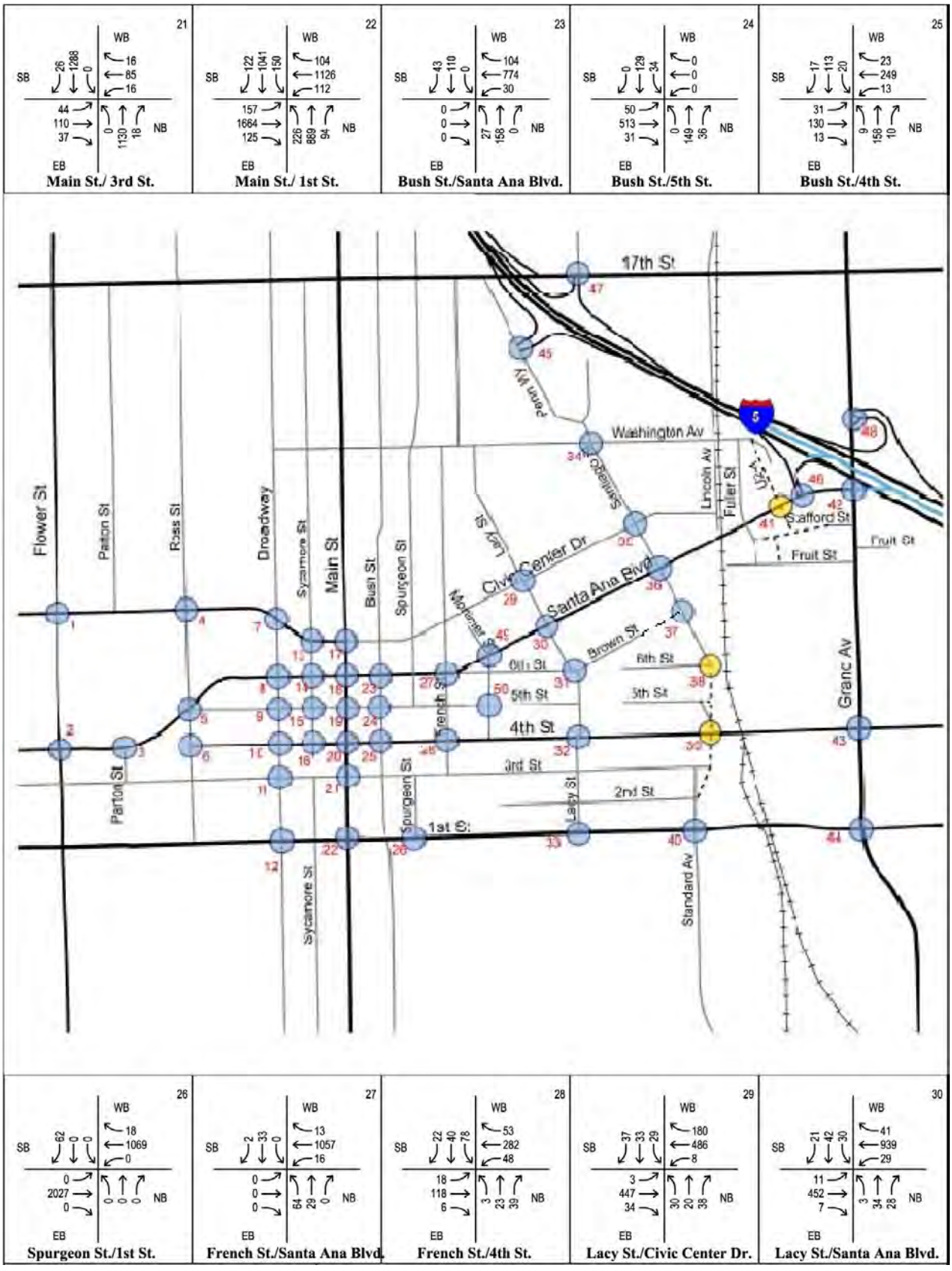
2035 Without Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-7B**

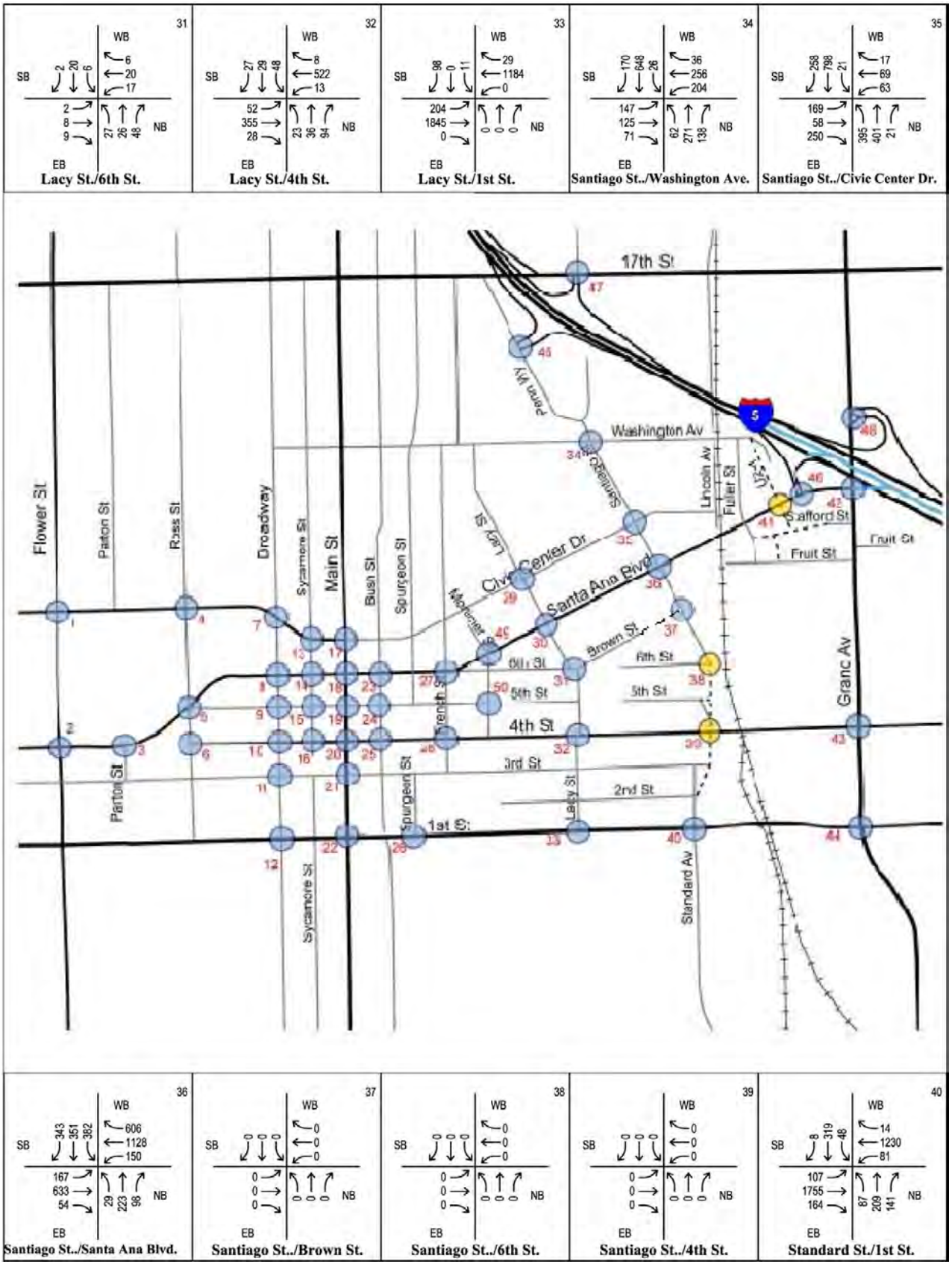
2035 Without Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-7C**

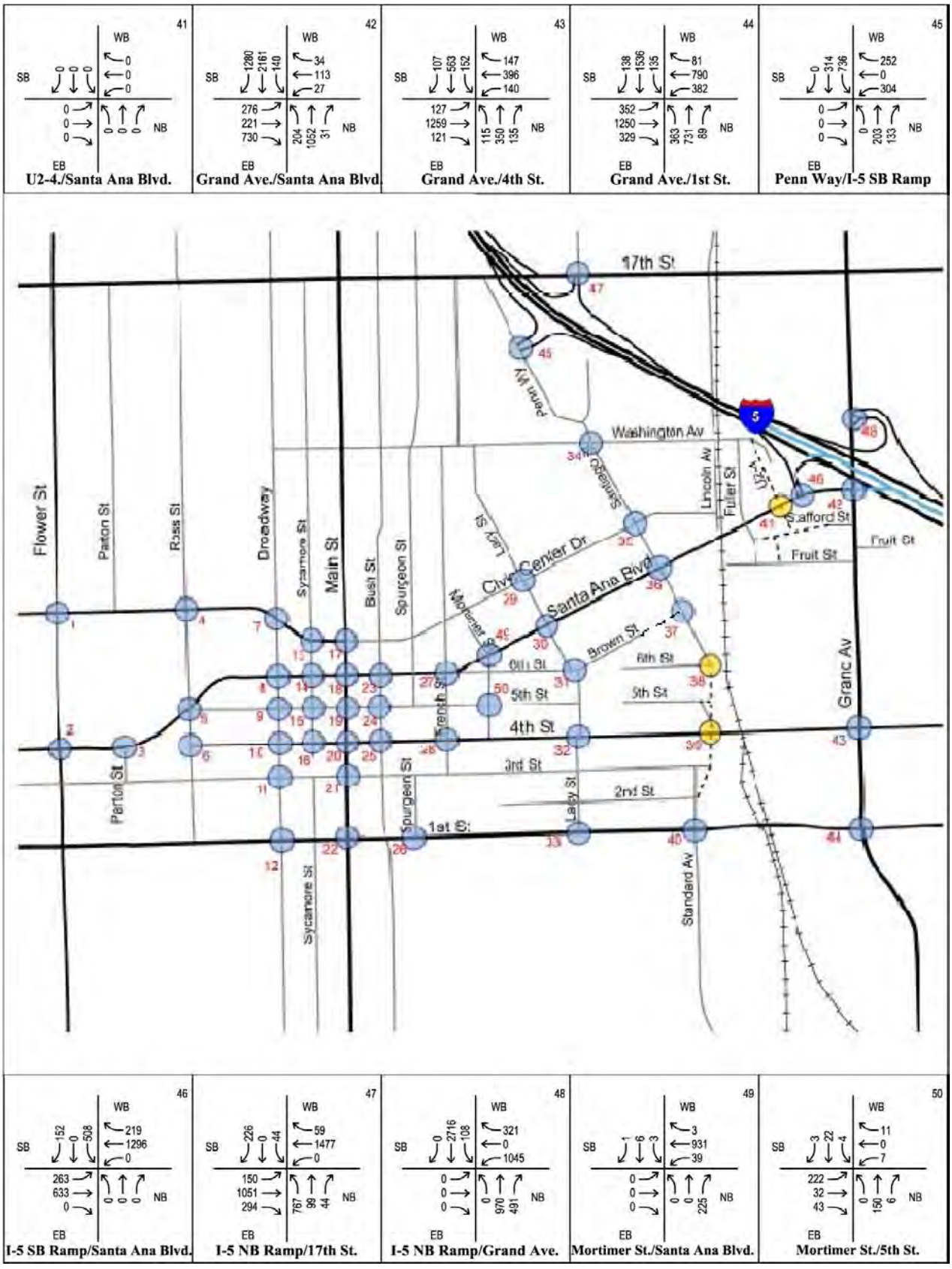
2035 Without Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-7D**

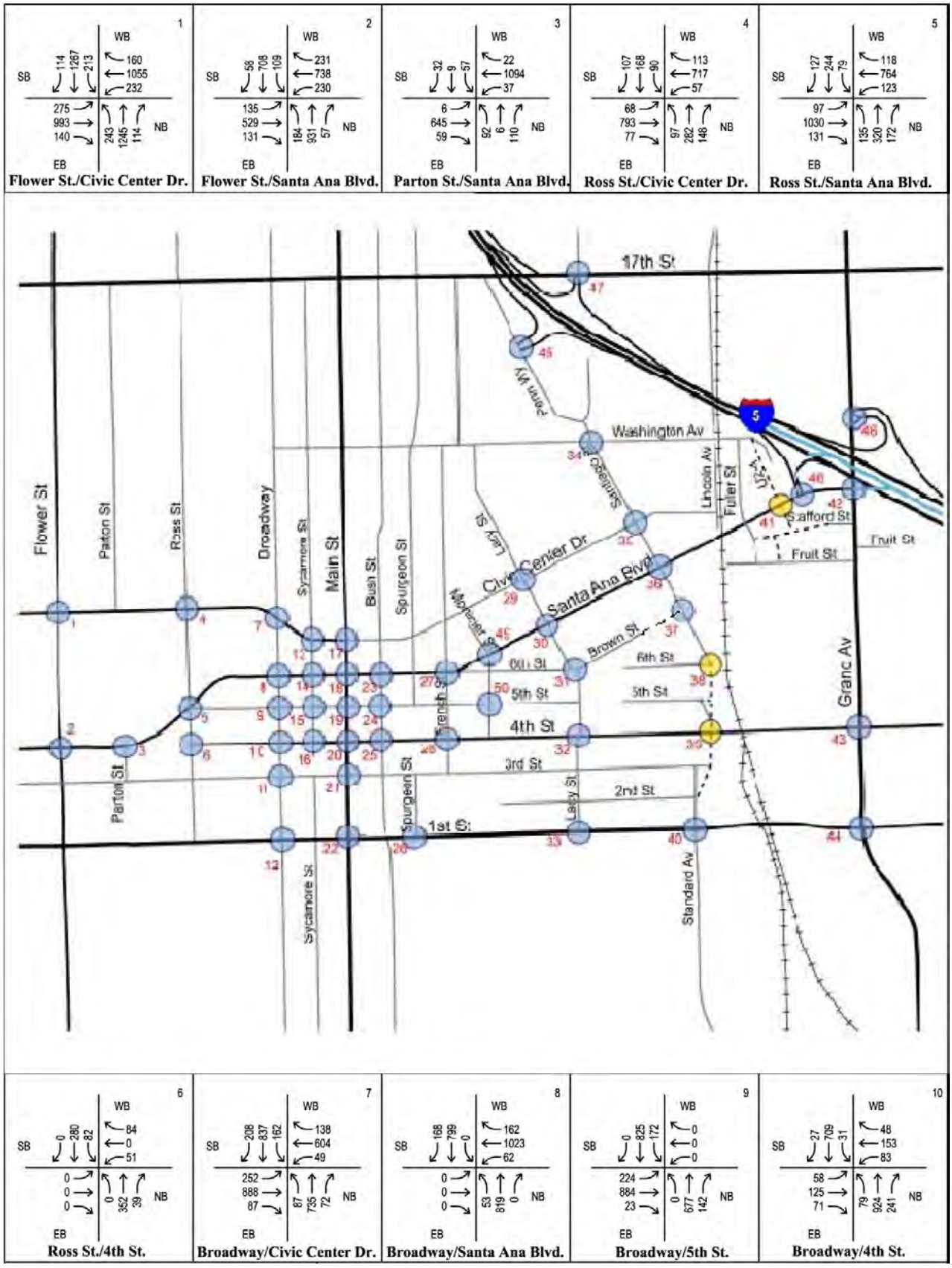
2035 Without Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-7E**

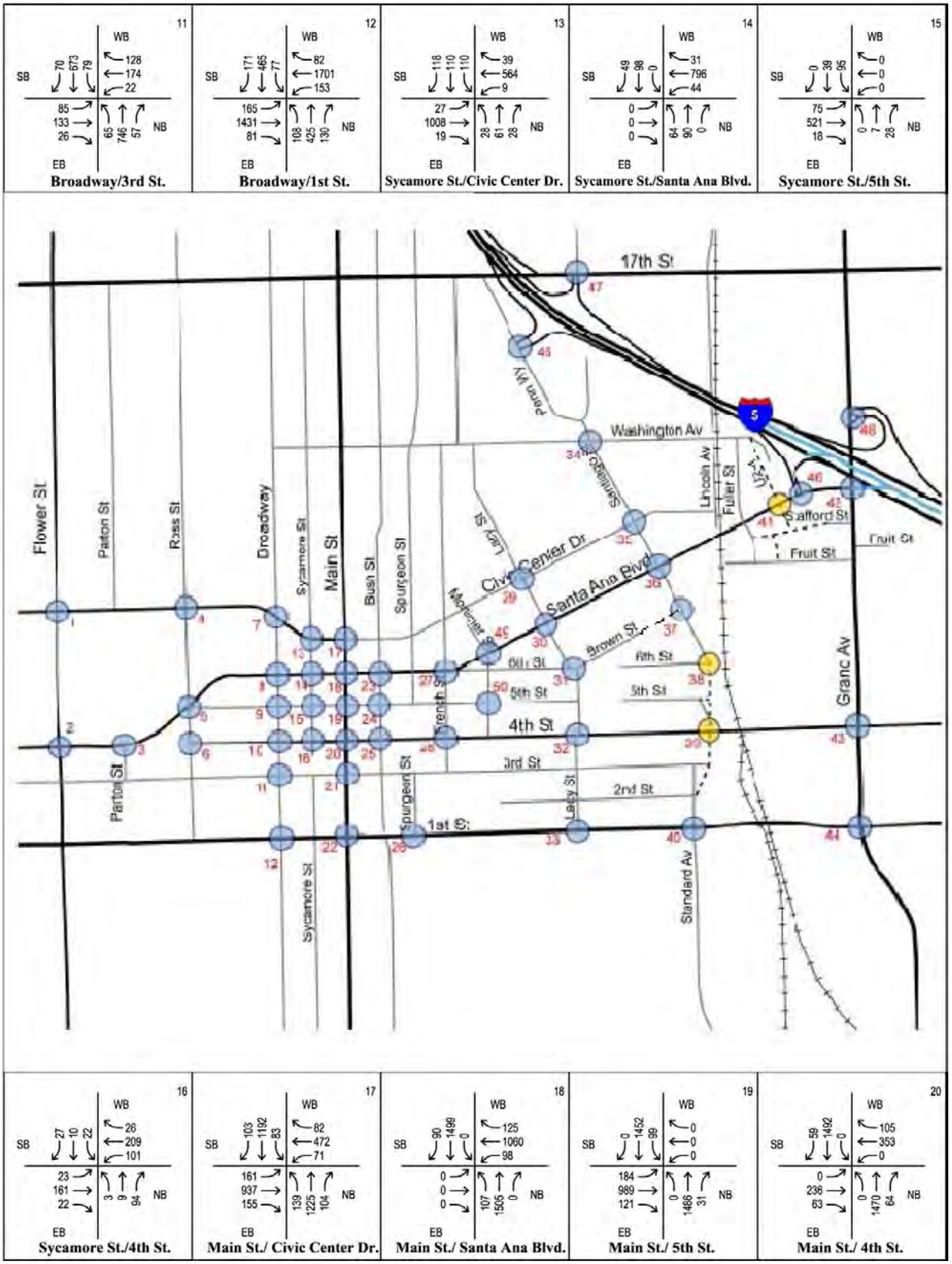
2035 Without Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-8A**

2035 Without Project PM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

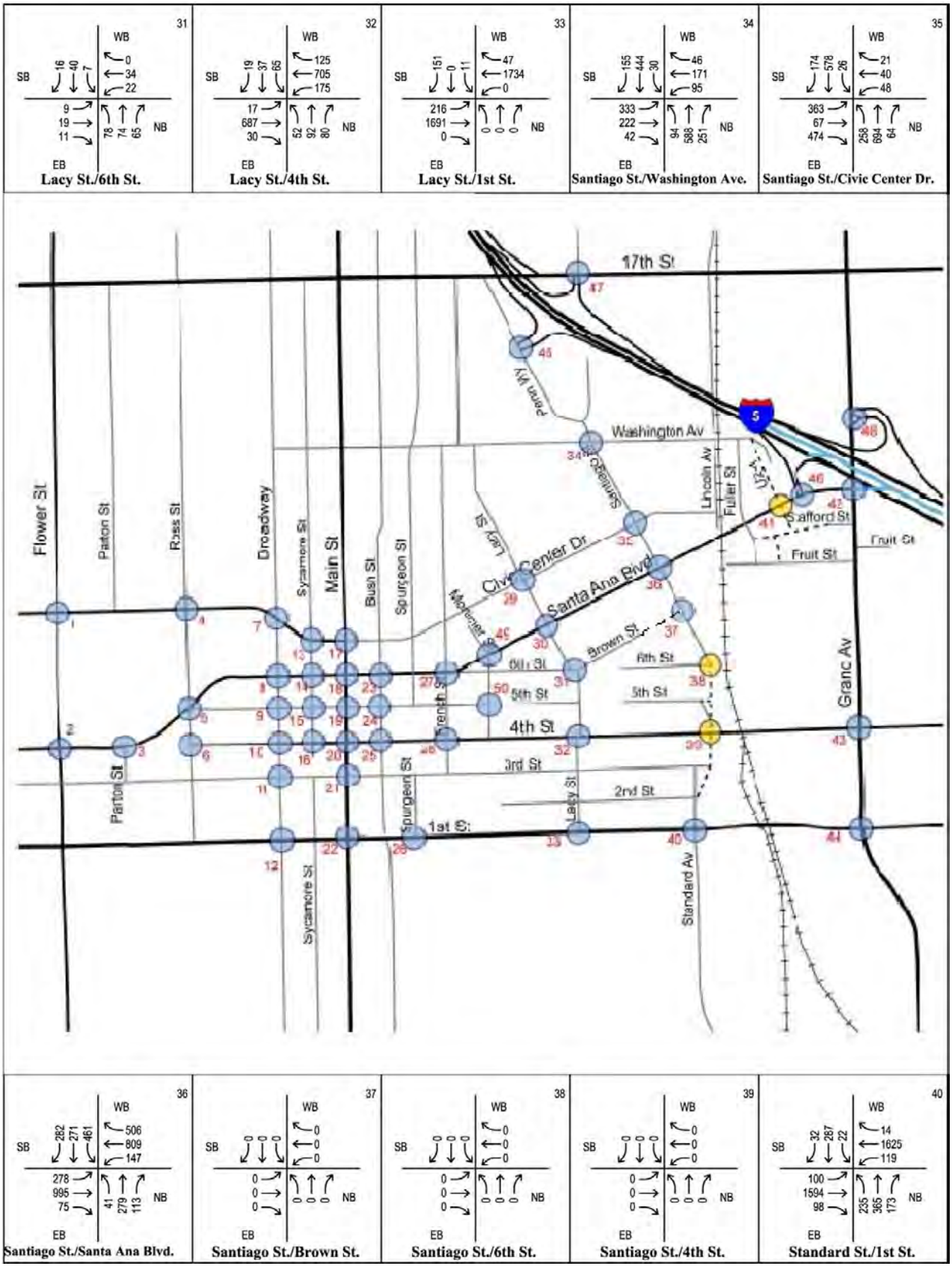
FIGURE **4.11-8B**

2035 Without Project PM Peak Hour Volumes

***Source*:** KOA Corporation, 2009.

FIGURE **4.11-8C**

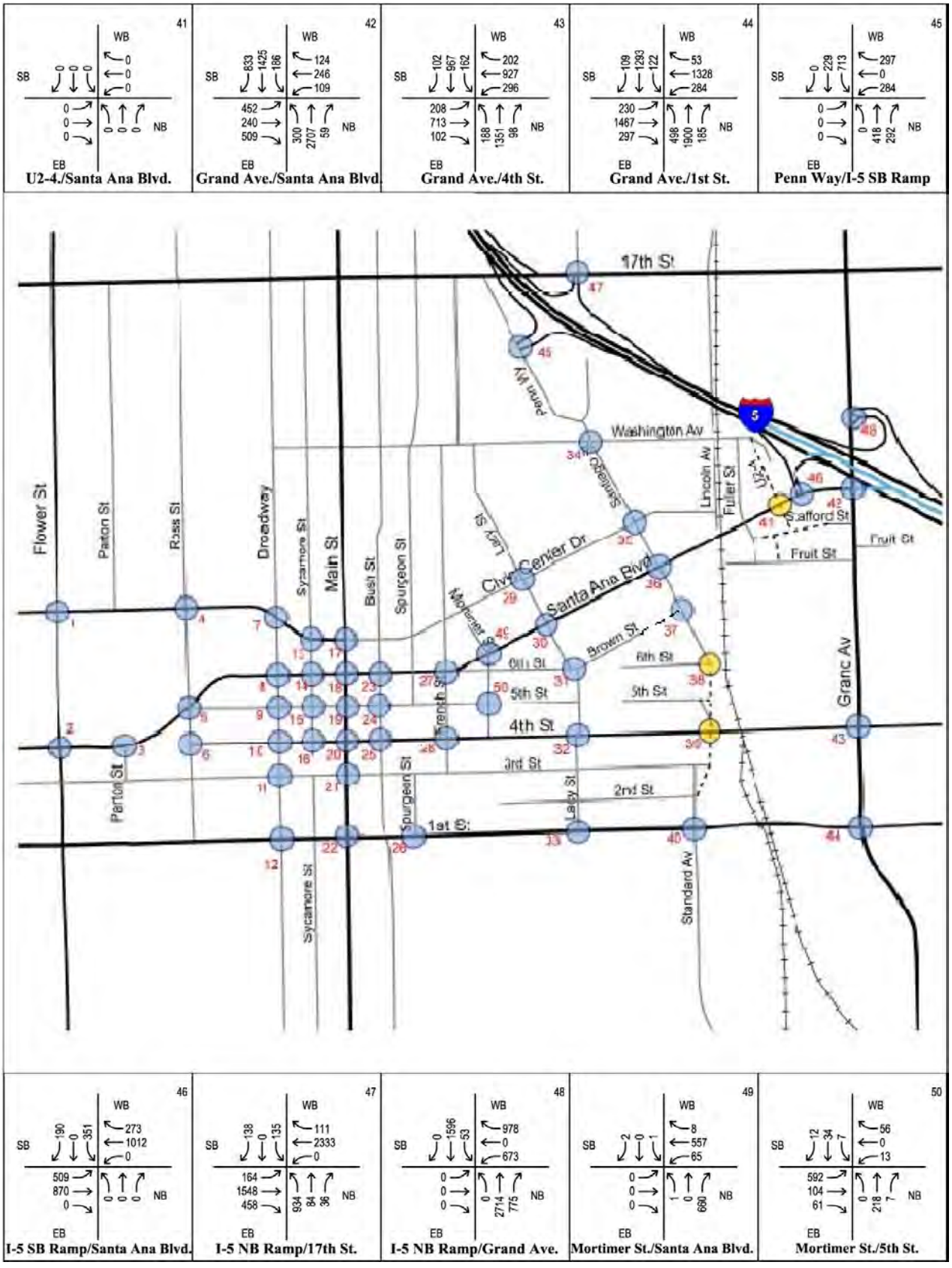
2035 Without Project PM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-8D**

2035 Without Project PM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-8E**

2035 Without Project PM Peak Hour Volumes

Table 4.11-12 2035 Without Project Peak Hour Intersection Conditions (ICU Method)

Intersection	AM Peak Hour		PM Peak Hour	
	ICU	LOS	ICU	LOS
Signalized Intersections (Using ICU Method)				
Flower St. at Civic Center Dr.	0.789	C	1.138	F
Flower St. at Santa Ana Blvd.	0.685	B	0.694	B
Parton St. at Santa Ana Blvd.	0.316	A	0.428	A
Ross St. at Civic Center Dr.	0.634	B	0.564	A
Ross St. at Santa Ana Blvd.	0.581	A	0.668	B
Broadway at Civic Center Dr.	0.721	C	0.743	C
Broadway at Santa Ana Blvd.	0.595	A	0.612	B
Broadway at Fifth St.	0.399	A	0.620	B
Broadway at Fourth St.	0.449	A	0.610	B
Broadway at Third St.	0.406	A	0.803	D
Broadway at First St.	0.779	C	0.844	D
Sycamore St. at Civic Center Dr.	0.484	A	0.573	A
Main St. at Civic Center Dr.	0.875	D	0.883	D
Main St. at Santa Ana Blvd.	0.799	C	0.836	D
Main St. at Fifth St.	0.611	B	0.812	D
Main St. at Fourth St.	0.613	B	0.776	C
Main St. at Third St.	0.533	A	0.694	B
Main St. at First St.	0.918	E	1.013	F
Bush St. at Santa Ana Blvd.	0.335	A	0.462	A
Bush St. at Fifth St.	0.297	A	0.560	A
Bush St. at Fourth St.	0.347	A	0.576	A
French St. at Fourth St.	0.342	A	0.543	A
Lacy St. at Fourth St.	0.508	A	0.751	C
Santiago St. at Santa Ana Blvd.	0.904	E	0.993	E
Standard St. at First St.	0.940	E	0.970	E
Grand Ave. at Santa Ana Blvd.	0.966	E	1.172	F
Grand Ave. at Fourth St.	0.747	C	0.841	D
Grand Ave. at First St.	0.894	D	0.960	E

SOURCE: KOA Corporation 2010

Table 4.11-13 2035 Without Project Peak Hour Intersection Conditions (HCM Method)

Intersection	AM Peak Hour		PM Peak Hour	
	Average/Worst Case Delay	Level of Service	Average/Worst Case Delay	Level of Service
Unsignalized Intersections				
Ross St. at Fourth St.	11.7	B	13.6	B
Sycamore St. at Santa Ana Blvd.	28.7	D	29.8	D
Sycamore St. at Fifth St.	19.2	C	15.7	C
Sycamore St. at Fourth St.	8.4	A	9.8	A
Spurgeon St. at First St.	11.3	B	18.7	C
French St. at Santa Ana Blvd.	24.5	C	24.0	C
Lacy St. at Civic Center Dr.	28.6	D	69.9	F
Lacy St. at Santa Ana Blvd.	122.1	F	179.1	F
Lacy St. at Sixth St.	7.3	A	8.1	A
Lacy St. at First St.	45.3	E	410.8	F
Santiago St. at Washington Ave.	126.8	F	143.1	F
Santiago St. at Civic Center Dr.	280.0	F	221.7	F
Mortimer St. at Fifth St.	9.5	A	33.5	D
Mortimer St. at Santa Ana Blvd.	23.1	A	23.0	C
Signalized Intersections (Caltrans, Using HCM)				
Penn Way at I-5 SB	25.1	C	28.5	C
Santa Ana Blvd. at I-5 SB	29.2	C	29.7	C
Seventeenth St. at I-5 NB	39.9	D	73.0	E
Grand Ave at I-5 NB	30.2	C	119.9	F

SOURCE: KOA Corporation 2010

General Plan (2035) Without Project Roadway Segment Conditions

The roadway segment ADT analysis for 2035 is presented in Table 4.11-14 (2035 Without Project Roadway Segment Daily Traffic Condition). As indicated, a majority of the arterial roadways are operating at acceptable levels. The daily V/C ratio screening analysis indicates that the following locations are potentially experiencing capacity deficiencies under 2035 Without Project conditions:

- First Street between Standard Avenue and Grand Avenue
- Main Street between Washington Avenue and Fourth Street
- Civic Center Drive between Santiago Street and Lincoln Avenue
- Seventeenth Street at West of I-5 NB Ramps
- Grand Avenue South of First Street
- Grand Avenue South of I-5 NB Ramps
- Grand Avenue North of I-5 NB Ramps

Table 4.11-14 2035 Without Project Roadway Segment Daily Traffic Condition

Road	Segment	2035 Without Project ADT	Number of Lanes*	LOS E Capacity	LOS	LOS E OK**
Flower St.	Santa Ana Blvd to Civic Center Dr.	23,899	4D	37,500	B	
Flower St.	Seventeenth St to Civic Center	22,362	4D	37,500	A	
Civic Center Dr.	West of Flower St.	22,865	4D	37,500	B	
Civic Center Dr.	Flower St. to Ross St.	21,628	4D	37,500	A	
Flower St.	Santa Ana Blvd. to First St.	25,802	4D	37,500	B	
Santa Ana Blvd.	West of Flower St.	13,071	6D	56,300	A	
Santa Ana Blvd.	Parton St. to Flower St.	15,823	6D	56,300	A	
Santa Ana Blvd.	Parton St. to Ross St.	17,917	6D	56,300	A	
Civic Center Dr.	Ross St. to Broadway	19,769	4D	37,500	A	
Broadway	Civic Center Dr. to Santa Ana Blvd.	23,770	4D	37,500	B	
Broadway	Civic Center Dr. to Washington Ave	30,191	4D	37,500	D	
Civic Center Dr.	Broadway to Sycamore St.	19,827	4D	37,500	A	
Broadway	Santa Ana Blvd. To Fifth St.	20,416	4D	37,500	A	
Santa Ana Blvd.	Broadway to Sycamore St.	13,769	3D	28,150	A	
Broadway	Fifth St. to Fourth St.	20,416	4D	37,500	A	
Fifth St.	Broadway to Ross St.	10,424	3D	28,150	A	
Fifth St.	Broadway to Main St.	13,844	3D	28,150	A	
Broadway	Third St. to Fourth St.	20,111	4D	37,500	A	
Broadway	Third St. to First St.	25,856	4D	37,500	B	
Broadway	South of First St.	14,281	4D	37,500	A	
First St.	Broadway to Ross St.	49,198	6D	56,300	D	
First St.	Broadway to Main St.	49,245	6D	56,300	D	
Civic Center Dr.	Sycamore St. to Main St.	18,639	4D	37,500	A	
Santa Ana Blvd.	Sycamore St. to Main St.	12,835	3D	28,150	A	
Fifth St.	Sycamore St. to Main St.	10,424	3D	28,150	A	
Main St.	Civic Center Dr. to Santa Ana Blvd.	40,300	4D	37,500	F	
Main St.	Civic Center Dr. to Washington Ave	41,588	4D	37,500	F	
Civic Center Dr.	Main St. to Bush St.	14,658	4D	37,500	A	
Main St.	Santa Ana Blvd. To Fifth St.	42,313	4D	37,500	F	
Santa Ana Blvd.	Main St. to Bush St.	13,859	3D	28,150	A	
Main St.	Fifth St. to Fourth St.	42,313	4U	25,000	F	
Fifth St.	Main St. to Bush St.	9,622	3D	28,150	A	
Main St.	Third St. to Fourth St.	36,873	4D	37,500	E	E ok

Table 4.11-14 2035 Without Project Roadway Segment Daily Traffic Condition

Road	Segment	2035 Without Project ADT	Number of Lanes*	LOS E Capacity	LOS	LOS E OK**
Main St.	First St. to Third St.	36,873	4D	37,500	E	E ok
Santa Ana Blvd.	Bush St. to Spurgeon St.	12,885	3D	28,150	A	
Fifth St.	Bush St. to French St.	7,507	3D	28,150	A	
First St.	Spurgeon St. to Main St.	48,245	6D	56,300	D	
Civic Center Dr.	French St to Lacy St	15,359	4D	37,500	A	
Civic Center Dr.	Santiago St to Lacy St	15,359	2U	12,500	F	
Santa Ana Blvd.	Lacy St. to French St.	18,798	4D	37,500	A	
Fourth St.	Lacy St. to French St.	15,285	4D	37,500	A	
Fourth St.	Lacy St. to Santiago St.	22,500	4D	37,500	A	
First St.	Lacy St. to Spurgeon St.	49,881	6D	56,300	D	
First St.	Lacy St. to Standard Ave.	49,881	6D	56,300	D	
Santiago St.	Washington Ave. to Civic Center Dr.	19,851	4D	37,500	A	
Santiago St.	Washington Ave. to Seventeenth St.	17,204	4D	37,500	A	
Santiago St.	Santa Ana Blvd to Civic Center Dr.	20,771	4D	37,500	A	
Civic Center Dr.	Lincoln Ave to Santiago St.	14,658	2U	12,500	F	
Santiago St.	Santa Ana Blvd. to Brown St.	8,618	4D	37,500	A	
Santa Ana Blvd.	Santiago St. to Lacy St.	24,852	4D	37,500	B	
Santa Ana Blvd.	Santiago St. to U-24	29,178	6D	56,300	A	
Fourth St.	Santiago St. to Grand Ave.	22,500	4D	37,500	A	
Grand Ave.	Fourth St. to Santa Ana Blvd	48,424	6D	56,300	D	
Grand Ave.	Santa Ana Blvd to Seventeenth St	47,112	6D	56,300	D	
Santa Ana Blvd.	East of Grand Ave.	9,779	4D	37,500	A	
Grand Ave.	First St. to Fourth St.	40,071	6D	56,300	C	
Fourth St.	East of Grand Ave.	25,510	4D	37,500	B	
Grand Ave.	South of First St.	53,061	6D	56,300	E	
First St.	Standard Ave to Grand Ave	52,076	6D	56,300	E	
First St.	East of Grand Ave.	46,456	6D	56,300	D	
Penn Way	South of I-5 SB Ramps	15,508	2D	18,750	D	
Penn Way	North of I-5 SB Ramps	17,871	4D	37,500	A	
Santa Ana Blvd.	West of I-5 SB Ramps	46,209	6D	56,300	C	
Santa Ana Blvd.	East of I-5 SB Ramps	29,984	4D	37,500	C	
Seventeenth St.	West of I-5 NB Ramps	56,809	6D	56,300	F	
Seventeenth St.	East of I-5 NB Ramps	45,113	6D	56,300	D	

Table 4.11-14 2035 Without Project Roadway Segment Daily Traffic Condition

Road	Segment	2035 Without Project ADT	Number of Lanes*	LOS E Capacity	LOS	LOS E OK**
Grand Ave.	South of I-5 NB Ramps	61,046	6D	56,300	F	
Grand Ave.	North of I-5 NB Ramps	57,596	6D	56,300	F	

SOURCE: KOA Corporation 2007

* D corresponds to a divided roadway. U corresponds to an undivided roadway.

** LOS E is considered acceptable within major development areas.

The daily volume-to-capacity ratios provide a screening level analysis of daily traffic flows and potential operational problems within the study area. The peak hour analysis for intersections, presented in the previous section, provides a more definitive analysis of the operation of the arterial roadways in the project area. Although several roadway segments indicate deficiencies, the proposed mitigation should be based on the intersection analysis recommendations. All roadway segments should operate at acceptable level of services under City's General Plan circulation element designations with spot improvements at intersections proposed based on the intersection analysis.

General Plan (2035) Without Project Peak Hour Freeway Ramp Conditions

Without project peak hour ramp analysis results are presented on Table 4.11-15 (2035 Without Project Peak Hour Freeway Ramp Analysis). All ramps operate at LOS D or better during the AM and PM peak hour time periods except the northbound off ramp at the interchange of I-5 at Santa Ana Boulevard.

Table 4.11-15 2035 Without Project Peak Hour Freeway Ramp Analysis

Inter-change	Ramp	Ramp Type Code*	Lanes	Peak Hour Capacity	AM Peak Hour			PM Peak Hour		
					VOL	V/C	LOS	VOL	V/C	LOS
I-5 at Seventeenth St.	SB On	4	2	1,800	869	0.48	A	1,005	0.56	A
	NB Loop On	4	2	1,800	294	0.16	A	458	0.25	A
	SB Off	5	1	1,500	556	0.37	A	581	0.39	A
	NB Off	5	1	1,500	910	0.61	A	1,054	0.70	B
I-5 at Santa Ana Blvd.	SB Direct On (HOV)	6	2	2,250	392	0.17	A	485	0.22	A
	SB Loop On	4	2	1,800	482	0.27	A	782	0.43	A
	NB Loop On	4	2	1,800	599	0.33	A	828	0.46	A
	SB Off	5	1	1,500	660	0.44	A	541	0.36	A
	NB Off	5	1	1,500	1366	0.91	E	1,651	1.10	F

SOURCE: KOA Corporation 2010

* Ramp Type Code:
4—Two-lane Metered On-Ramp, 2 Mixed Flow Lanes at Meter
5—One-lane Unmetered Ramp
6—Two-lane Unmetered On-Ramp, tapers to one merge lane at or beyond gore point

Project-Related Traffic

Project Trip Generation

The trip generation for the project is based on the most recent Institute of Transportation Engineers (ITE) *Trip Generation*, 7th Edition. Table 4.11-16 (Project Trip Generation Rates) presents the ITE trip generation rates used to calculate project trip generation. Table 4.11-17 (Project Trip Generation) summarizes the peak hour inbound and outbound project trips and the daily project trips for the entire project area. The project site has been subdivided into thirteen traffic analysis zones (TAZs), based on the development potential of the Transit Zoning Code, as well as the roadway system in the project area. Appendix G provides a map of the Transit Zoning Code area TAZs and detailed trip generation for each TAZ.

Table 4.11-16 Project Trip Generation Rates

				AM Peak Hour			PM Peak Hour		
Land Use	*ITE Code*	*Unit*	*Daily*	*Total*	*In*	*Out*	*Total*	*In*	*Out*
Single Family Housing	210	DU	9.57	0.75	0.19	0.56	1.01	0.64	0.37
Multi Family Housing	230	DU	5.86	0.44	0.07	0.37	0.52	0.35	0.17
High Rise Tower	222	DU	4.2	0.31	0.08	0.23	0.35	0.21	0.14
Retail	820	TSF	42.94	1.03	0.63	0.4	3.75	1.8	1.95
Industrial	110	TSF	6.97	0.92	0.81	0.11	0.98	0.12	0.86
Commercial	710	TSF	11.01	1	0.88	0.12	1	0.17	0.83
Civic	730	TSF	68.93	5.88	4.94	0.94	1.21	0.38	0.83

SOURCE: *ITE Trip Generation*, 7th Edition, 2003

As indicated in Table 4.11-17, the final net project is anticipated to consist of a total of 294 dwelling units of single family housing, 3,104 dwelling units of multi-family housing, 402 high-rise residential units, and 351,000 square feet (sf) of retail uses. The project will also remove 990,000 sf of industrial uses, 124,000 sf of commercial uses, and 21,000 sf of civic uses. The land use data reflects the net growth of the potential development, subtracting the existing land uses to be displaced.

Long-term cumulative development under implementation of the Transit Zoning Code (SD 84A and SD 84B) is anticipated to generate approximately 22,246 ADT with 529 additional trips during the AM peak hour and 1,726 trips during the PM peak hour. As also indicated in Table 4.11-17, a 5 percent mode choice reduction has been applied for the final trips. This is based on the previous discussion of the circulation changes in City of Santa Ana and the review of the Regional Transportation Center Metrolink Extension Study. The Regional Transportation Center Metrolink Extension Study project team agreed that the Transit Zoning Code (SD 84A and SD 84B) will benefit from the transit improvement plans for the long-range conditions. The 5 percent reduction considers both local and regional transit modal split credit. In addition, due to the mixed-use nature of the project, internal capture credit has been applied to

the project trip generation. Table 4.11-17 includes 20 percent internal capture reduction for the residential trips. For further clarification regarding trip generation assumptions, refer to Appendix G.

Table 4.11-17 Project Trip Generation

Land Use	Quantity	ITE Code	Unit	Daily	AM Peak Hour			PM Peak Hour		
					Total	In	Out	Total	In	Out
Single Family Housing	294	210	DU	2,814	221	56	165	297	188	109
Multi Family Housing	3,104	230	DU	19,800	1,366	217	1,148	1,614	1,086	528
High Rise Tower	402	222	DU	1,688	125	32	92	141	84	56
Residential Subtotal	*3,800*			*24,302*	*1,711*	*305*	*1,406*	*2,052*	*1,359*	*693*
Retail	351	820	TSF	15,072	362	221	140	1,316	632	684
Industrial	-990	110	TSF	-6,900	-910	-802	-109	-970	-119	-851
Commercial	-124	710	TSF	-1,365	-124	-109	-15	-124	-21	-103
Civic	-21	730	TSF	-1,448	-123	-104	-20	-25	-8	-17
All TAZ Project Total				***29,661***	***914***	***-488***	***1,402***	***2,248***	***1,843***	***405***
5 percent mode choice deduction for all trips				**-1,483**	**-46**	**-24**	**-70**	**-112**	**-92**	**-20**
20 percent residential internal capture*				**-5,932**	**-342**	**-61**	**-281**	**-410**	**-272**	**-139**
Final Net Project Trips				***22,246***	***526***	***-574***	***1,051***	***1,726***	***1,479***	***247***

SOURCE: KOA Corporation 2010

* Due to the nature of the project, internal capture credit has been applied to the project trip generation. Specifically, the trip generation includes 20 percent internal capture reduction for the residential trips, which is considered a reasonable internal capture rate for residential trips as it is based on previous studies performed in the area (including the MacArthur Place EIR) and the size of this study area.

Project Trip Distribution and Traffic Volumes

The project trip distribution and assignment process represents the directional orientation of traffic to and from the project site. Trip distribution is heavily influenced by the geographical location of the site, the location of surrounding uses, and the proximity to the regional freeway system.

The Orange County Transportation Analysis Model (OCTAM 3.2) has been used to evaluate the distribution and likely travel routes of the project traffic. A series of select link (trip distribution) analyses were performed using the OCTAM 3.2 model 2030 horizon year scenario. Figures presenting the project trip distribution patterns during AM and PM peak hour for each TAZ can be found in Appendix G. The project only traffic forecasts have been developed by applying the trip generation, distribution, and traffic assignment calculations.

Future Traffic Volumes Forecasts

Two scenarios (2030 and 2035 conditions) were analyzed with respect to the proposed project. Year 2030 represents the ultimate project build-out year which assumes the full build-out of the proposed plan together with all approved projects within the study vicinity. Year 2035 represents the Long Range

General Plan horizon for City of Santa Ana, which is also consistent with Caltrans' long-range year definition.

The 2030 With Project traffic is composed of 2030 background traffic plus the project only traffic which was generated based on the trip generation, trip distribution, and traffic assignment methodology. The project trip generation is based on the most recent ITE trip generation rates. A series of select link (trip distribution) analyses were performed using the OCTAM 3.2 model 2030 horizon year scenario.

The 2035 With Project traffic is composed of 2035 background traffic plus the project-only traffic that would exist at full build-out which was generated based on the trip generation, trip distribution, and traffic assignment methodology. The project trip generation is based on the most recent ITE trip generation rates. As discussed previously, traffic analyzed as part of the 2035 traffic analysis was obtained from the OCTAM 3.2 using an 11 percent growth factor.

Anticipated Project Buildout (2030) With Project Conditions

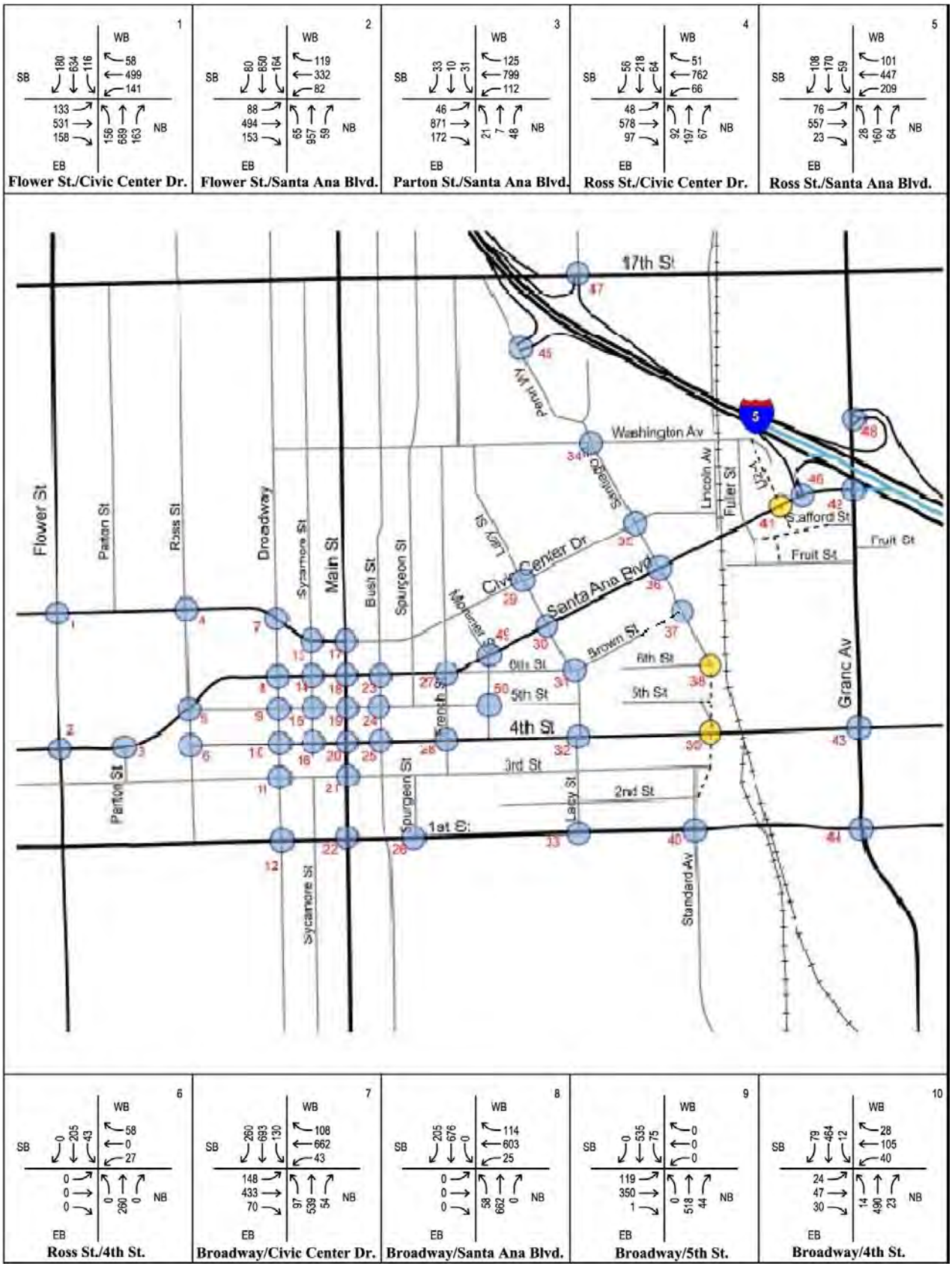
This section documents the future (2030) traffic conditions with the addition of the Transit Zoning Code (SD 84A and SD 84B) project-related traffic to the surrounding street system. To forecast anticipated project buildout traffic conditions for year 2030, the 2030 Without Project peak hour background traffic volumes shown in Figure 4.11-5A through Figure 4.11-5E and Figure 4.11-6A through Figure 4.11-6E were increased by adding the project-related traffic volumes. Appendix G includes figures illustrating project-related traffic volumes.

Anticipated Project Buildout (2030) With Project Intersection Conditions

Figure 4.11-9A through Figure 4.11-9E (2030 With Project AM Peak Hour Volumes) illustrate the 2030 With Project AM peak hour traffic volumes while Figure 4.11-10A through Figure 4.11-10E (2030 With Project PM Peak Hour Volumes) illustrate the 2030 With Project PM peak hour traffic volumes. Table 4.11-18 (2030 With Project Peak Hour Intersection Conditions [ICU Method]) and Table 4.11-19 (2030 with Project Peak Hour Intersection Conditions [HCM Method]) illustrate the 2030 With Project intersection LOS conditions. As shown in the table, all intersections are expected to operate at LOS D or better under the 2030 With Project condition for the year 2030 except the following nine intersections. 2030 with Project conditions include the three intersections that were operating below acceptable LOS plus six additional intersections. Appendix G includes the analysis worksheets for all intersections under 2030 With Project conditions.

The following exceeded LOS standards in 2030 Without Project conditions:

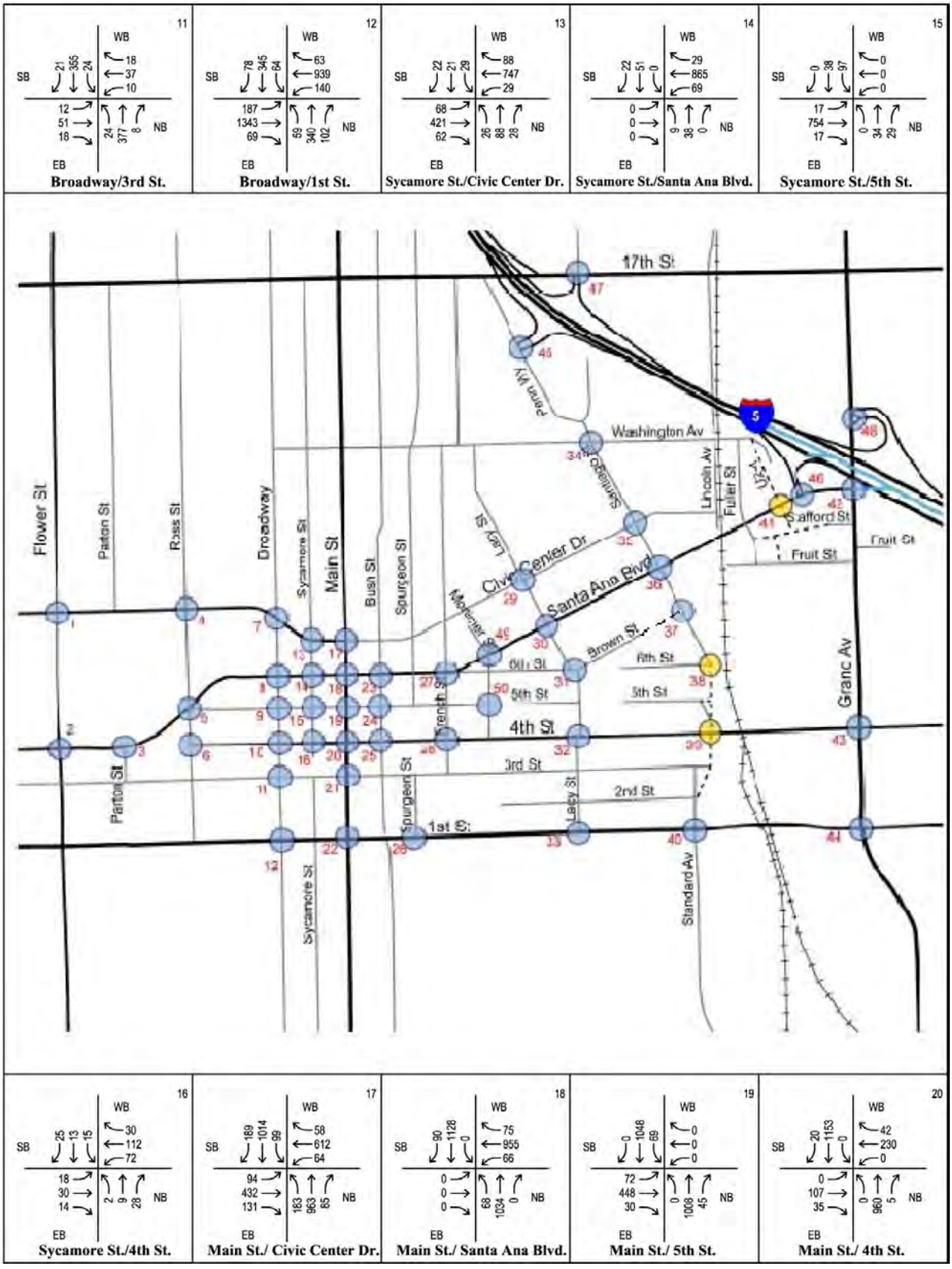
- Grand Avenue at Santa Ana Boulevard (Signalized)
- Lacy Street at Santa Ana Boulevard (Two-way stop control)
- Lacy Street at First Street (Two-way stop control)



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-9A**

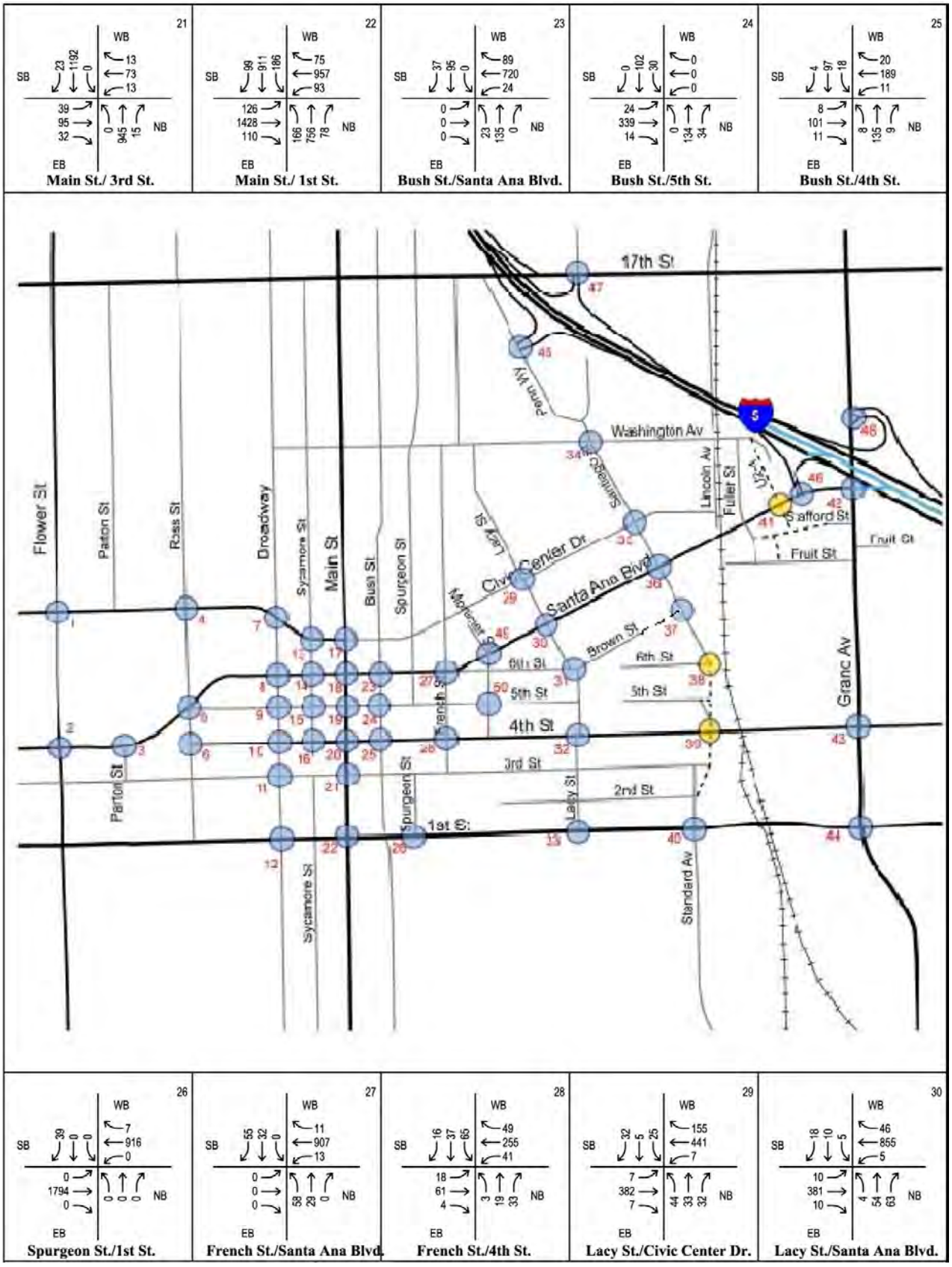
2030 With Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-9B**

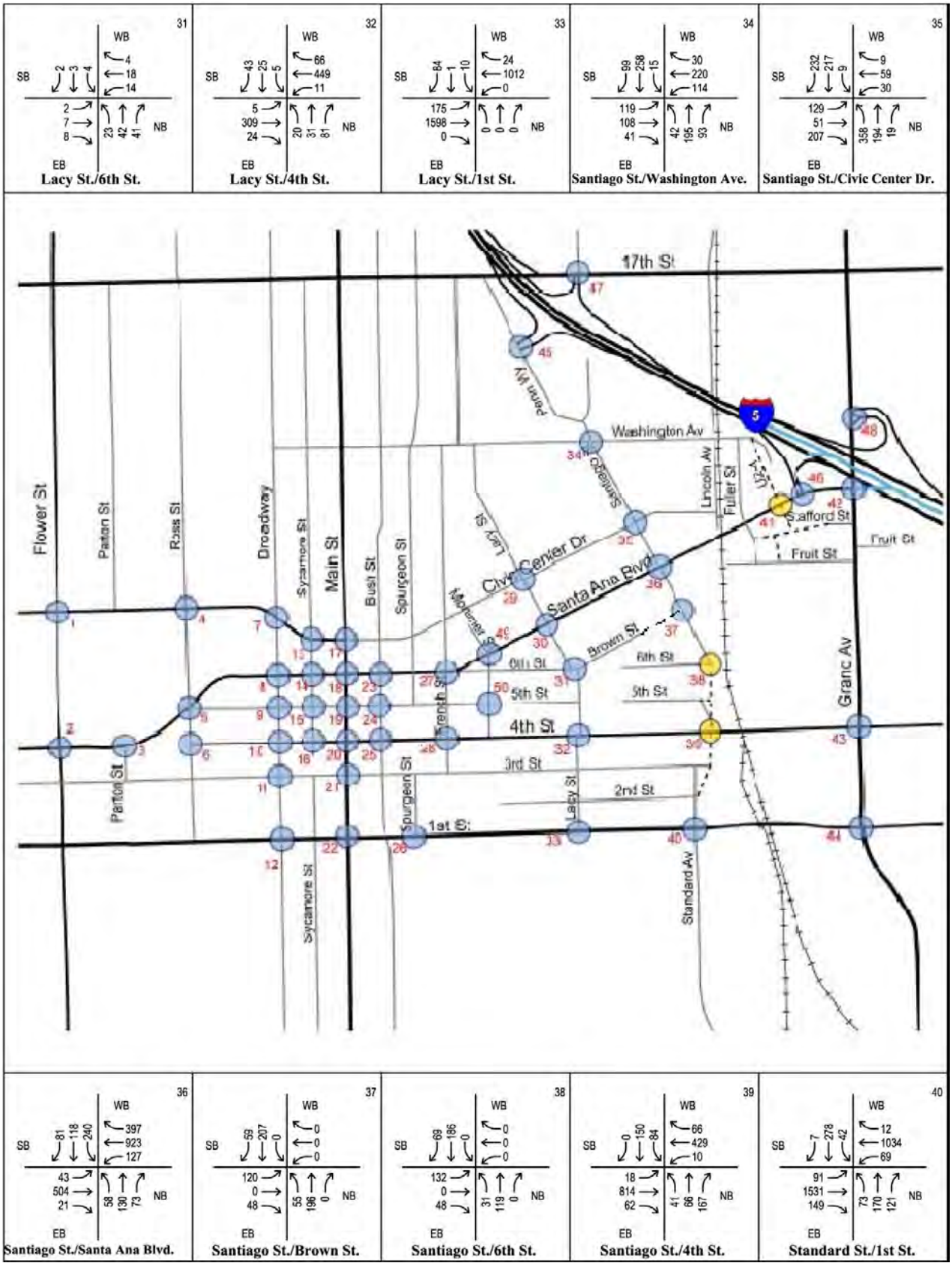
2030 With Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-9C**

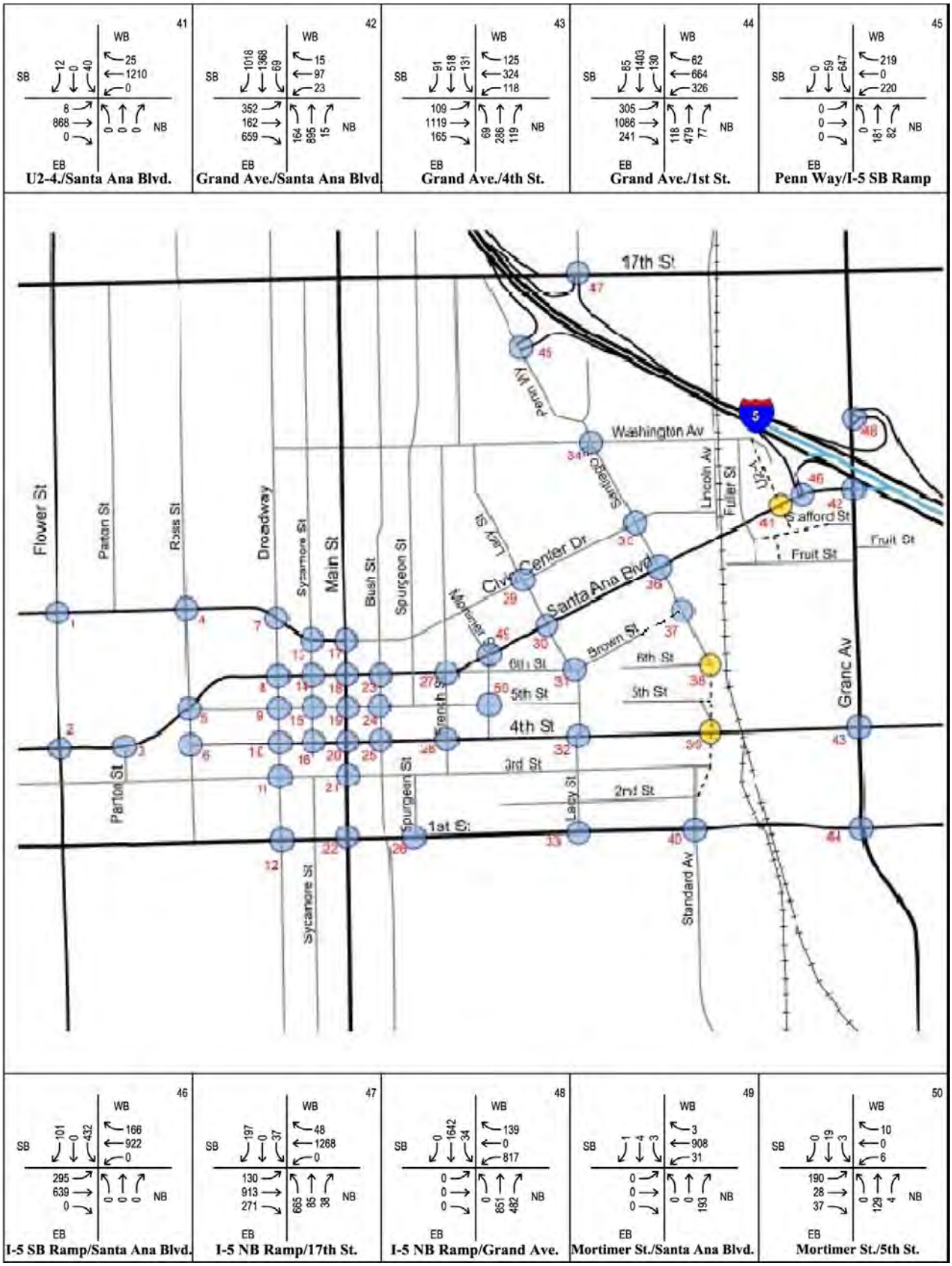
2030 With Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-9D**

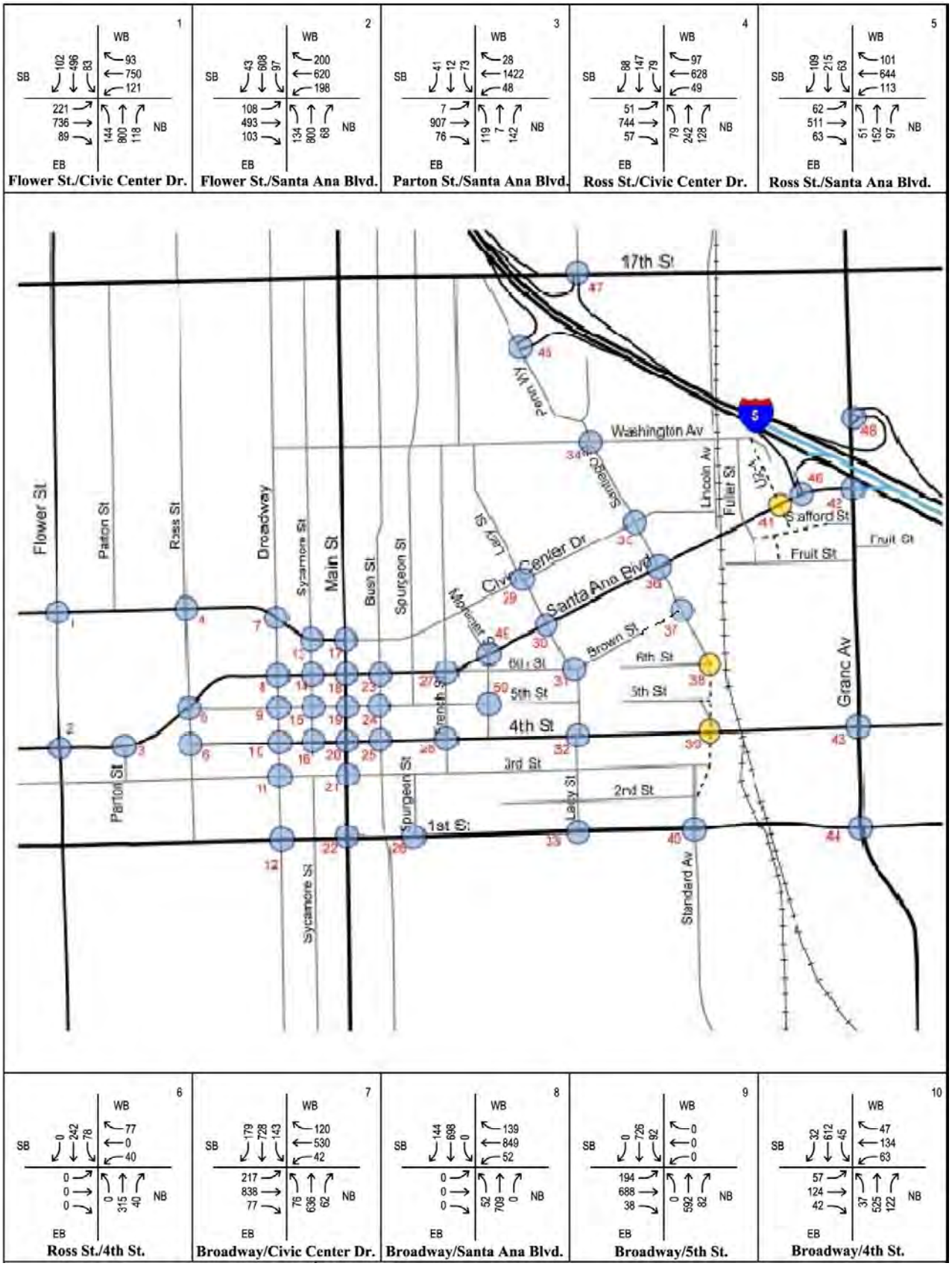
2030 With Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-9E**

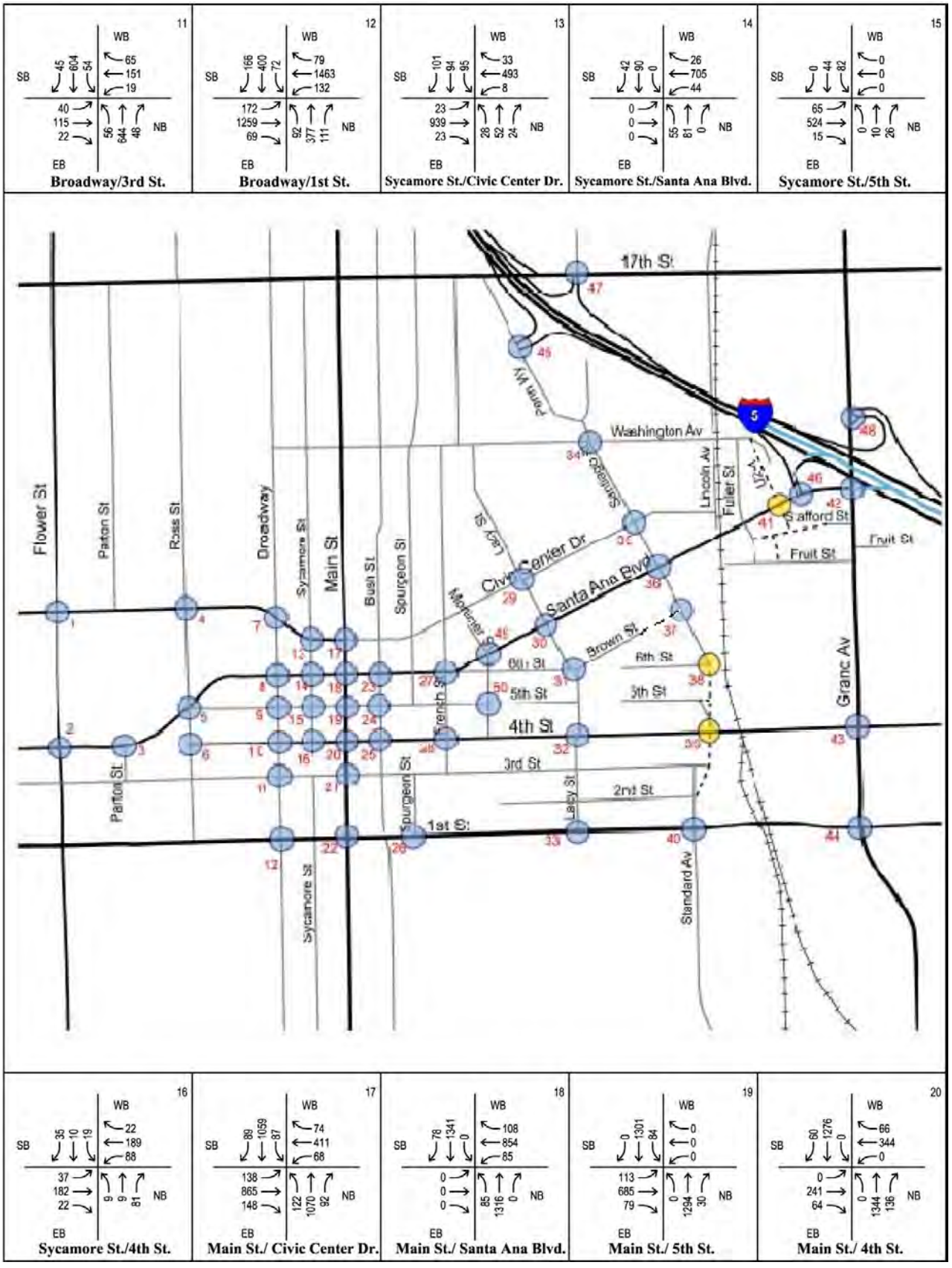
2030 With Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-10A**

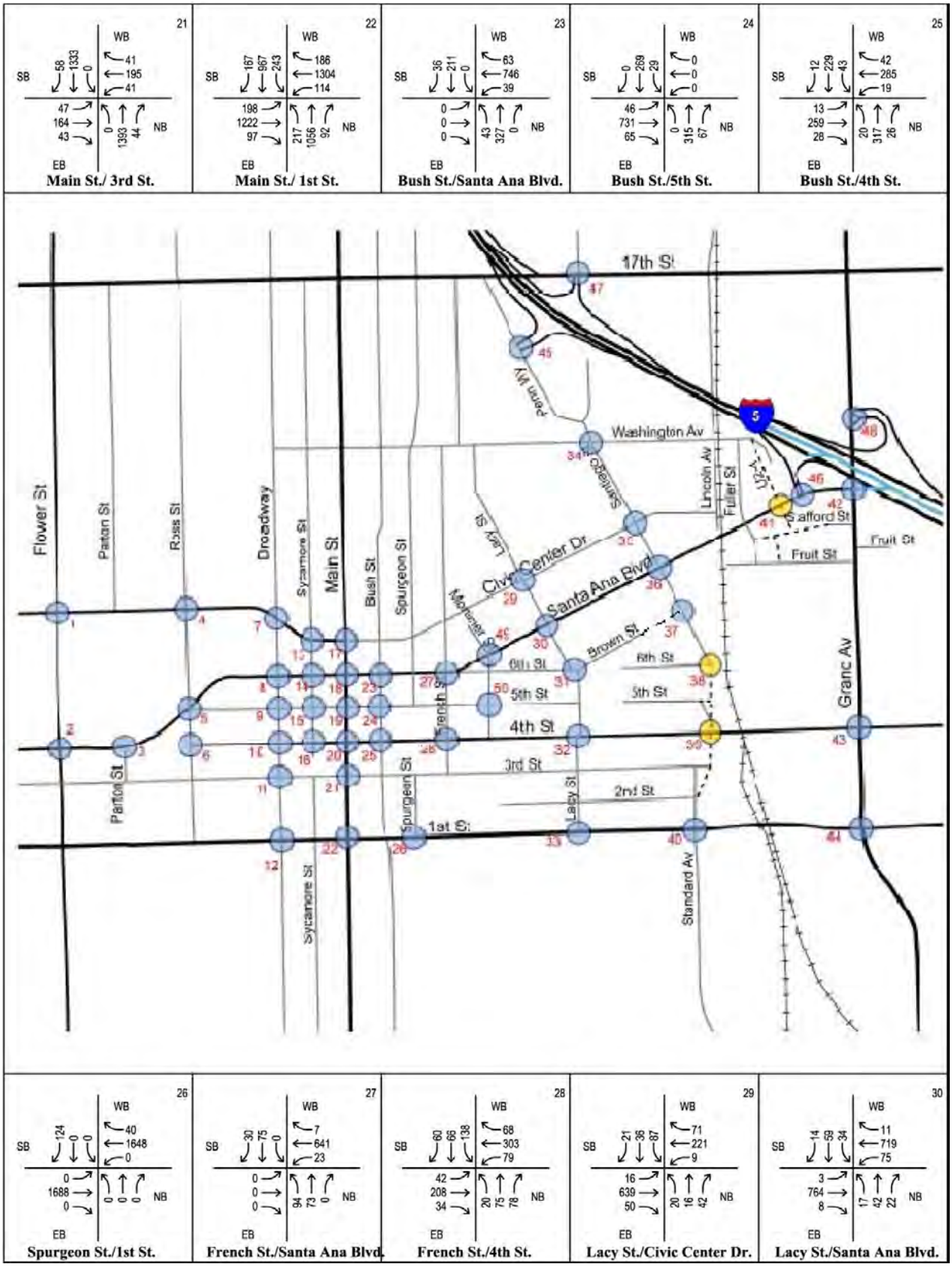
2030 With Project PM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-10B**

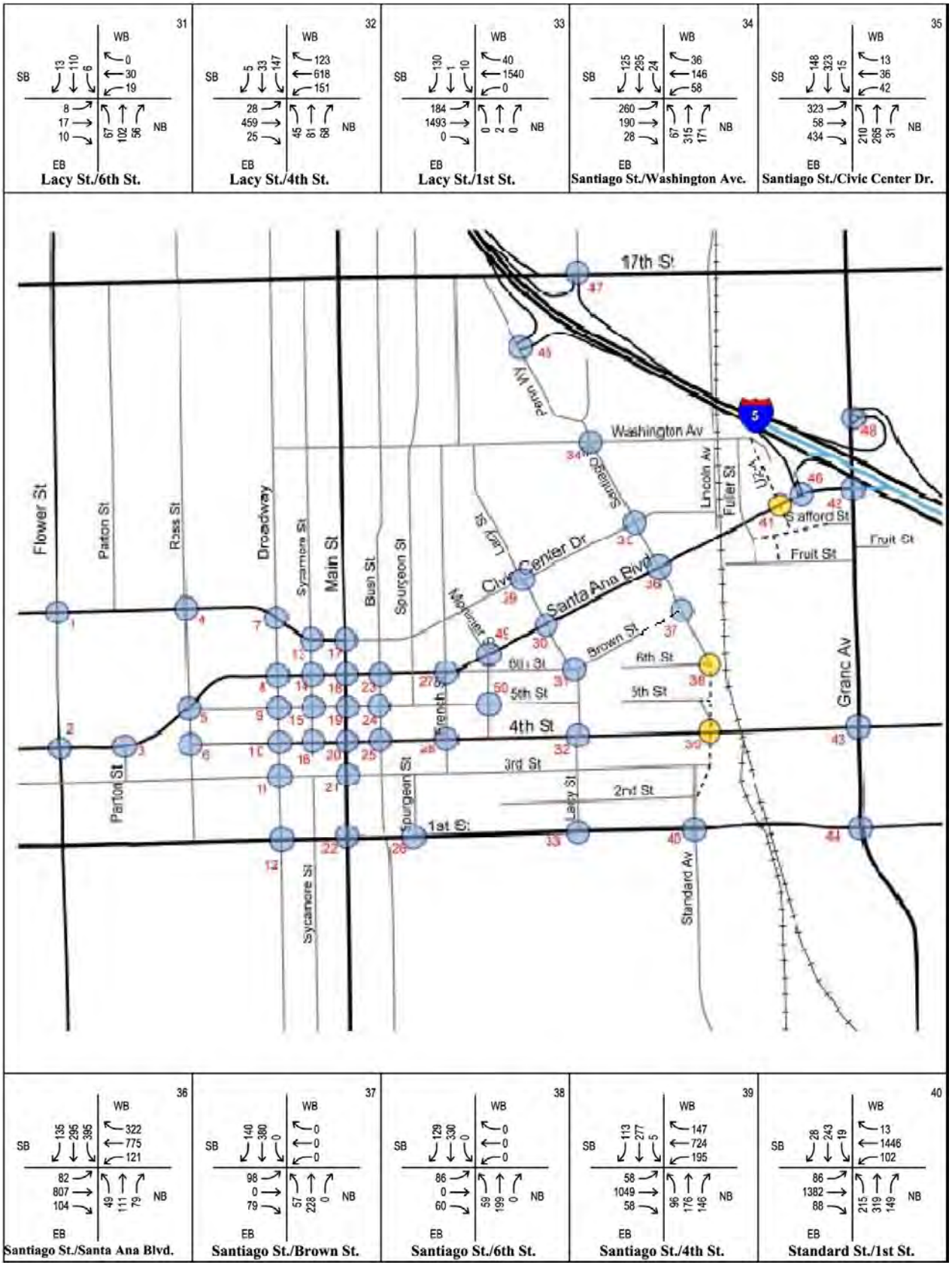
2030 With Project PM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-10C**

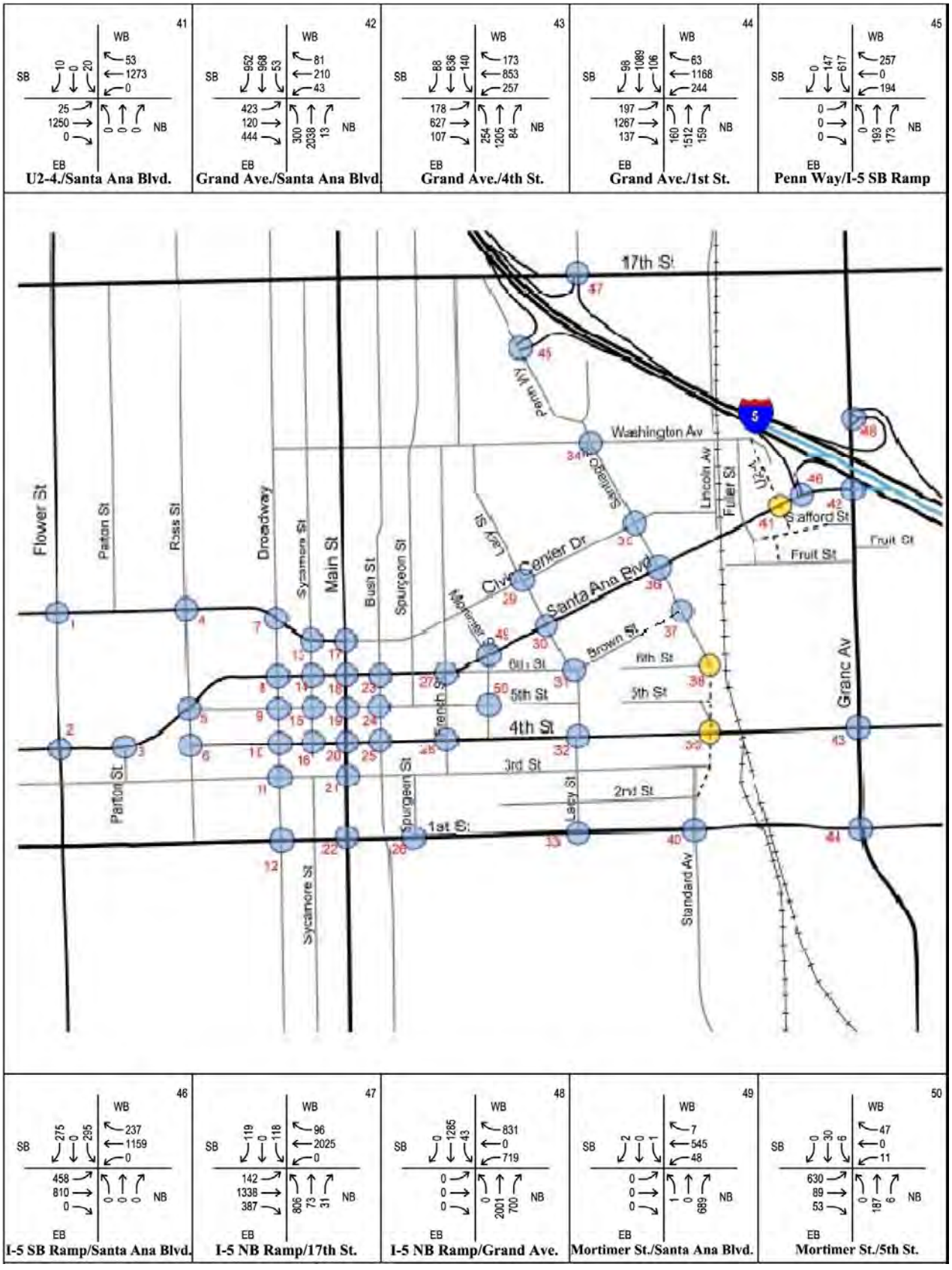
2030 With Project PM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-10D**

2030 With Project PM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-10E**

2030 With Project PM Peak Hour Volumes

Table 4.11-18 2030 With Project Peak Hour Intersection Conditions (ICU Method)

Intersection	AM Peak Hour		PM Peak Hour	
	ICU	LOS	ICU	LOS
Signalized Intersections (Using ICU Method)				
Flower St. at Civic Center Dr.	0.678	B	0.758	C
Flower St. at Santa Ana Blvd.	0.587	A	0.596	A
Parton St. at Santa Ana Blvd.	0.388	A	0.539	A
Ross St. at Civic Center Dr.	0.538	A	0.504	A
Ross St. at Santa Ana Blvd.	0.476	A	0.429	A
Broadway at Civic Center Dr.	0.634	B	0.654	B
Broadway at Santa Ana Blvd.	0.491	A	0.534	A
Broadway at Fifth St.	0.354	A	0.486	A
Broadway at Fourth St.	0.354	A	0.437	A
Broadway at Third St.	0.338	A	0.643	B
Broadway at First St.	0.654	B	0.753	C
Sycamore St. at Civic Center Dr.	0.439	A	0.525	A
Main St. at Civic Center Dr.	0.774	C	0.804	D
Main St. at Santa Ana Blvd.	0.666	B	0.726	C
Main St. at Fifth St.	0.511	A	0.664	B
Main St. at Fourth St.	0.555	A	0.726	C
Main St. at Third St.	0.490	A	0.641	B
Main St. at First St.	0.771	C	0.956	E
Bush St. at Santa Ana Blvd.	0.305	A	0.409	A
Bush St. at Fifth St.	0.242	A	0.458	A
Bush St. at Fourth St.	0.280	A	0.490	A
French St. at Fourth St.	0.308	A	0.488	A
Lacy St. at Fourth St.	0.398	A	0.632	B
Santiago St. at Santa Ana Blvd.	0.544	A	0.960	B
Standard St. at First St.	0.825	D	0.851	D
Grand Ave. at Santa Ana Blvd.	0.877	D	0.987	E
Grand Ave. at Fourth St.	0.664	B	0.767	C
Grand Ave. at First St.	0.724	C	0.816	D

SOURCE: KOA Corporation 2010

Table 4.11-19 2030 with Project Peak Hour Intersection Conditions (HCM Method)

Intersection	AM Peak Hour		PM Peak Hour	
	Average/Worst Case Delay	LOS	Average/Worst Case Delay	LOS
Unsignalized Intersections				
Ross St. at Fourth St.	10.9	B	12.4	B
Sycamore St. at Santa Ana Blvd.	24.0	C	22.9	C
Sycamore St. at Fifth St.	16.0	C	15.4	C
Sycamore St. at Fourth St.	8.1	A	9.7	A
Spurgeon St. at First St.	10.5	B	15.4	C
French St. at Santa Ana Blvd.	19.3	C	20.2	C
Lacy St. at Civic Center Dr.	25.4	D	44.8	E
Lacy St. at Santa Ana Blvd.	31.1	D	375.3	F
Lacy St. at Sixth St.	7.3	A	8.3	A
Lacy St. at First St.	32.5	D	Overflow	F
Santiago St. at Washington Ave.	16.3	C	34.5	D
Santiago St. at Civic Center Dr.	23.5	C	42.6	E
Santiago St. at Brown St.	12.1	B	13.9	B
Santiago St. at Sixth St.	11.3	B	13.0	B
Santiago St. at Fourth St.	Overflow	F	Overflow	F
Mortimer St. at Fifth St.	9.0	A	40.2	E
Mortimer St. at Santa Ana Blvd.	21.8	C	23.5	C
U2-4 at Santa Ana Blvd.	45.7	E	51.2	F
Signalized Intersections (Caltrans, Using HCM)				
Penn Way at I-5 SB	22.7	C	23.8	C
Santa Ana Blvd. at I-5 SB	28.7	C	31.4	C
Seventeenth St. at I-5 NB	33.2	C	40.9	C
Grand Ave at I-5 NB	20.6	C	50.5	D

SOURCE: KOA Corporation 2010

Level of service for unsignalized intersections is for the worst-case approach.

The following six additional intersections operate at unacceptable levels of service in 2030 With Project Conditions:

- Main Street at First Street
- Lacy Street at Civic Center Drive
- U2-4 Street at Santa Ana Boulevard
- Santiago Street at Civic Center Drive
- Santiago Street at Fourth Street
- Mortimer Street at Fifth Street

Intersections warranting a signal under the future without project conditions include Lacy Street at Santa Ana Boulevard, Lacy Street at First Street, and Santiago Street at Fourth Street.

Anticipated Project Buildout (2030) With Project Roadway Segment Conditions

The roadway segment ADT analysis for the 2030 With Project scenario is presented in Table 4.11-20 (2030 With Project Roadway Segment Daily Traffic Conditions). As indicated, a majority of the arterial roadways are operating at acceptable levels. The daily V/C ratio screening analysis indicates that the following locations are potentially experiencing capacity deficiencies under 2030 With Project conditions:

- Civic Center Drive between Lacy Street and Lincoln Avenue (represents two discreet segments in Table 4.11-20)
- Main Street between 1st Street and Washington Avenue (represents six discreet segments in Table 4.11-20)
- Santa Ana Boulevard between French Street and Lacy Street
- Santa Ana Boulevard west of I-5 SB Ramps
- Grand Avenue South of I-5 NB Ramps

The daily volume-to-capacity ratios provide a screening level analysis of daily traffic flows and potential operational problems within the study area. The peak hour analysis for intersections, presented in the previous section, provides a more definitive analysis of the operation of the arterial roadways in the project area. Although a few roadway segments indicate deficiencies, the proposed mitigation should be based on the intersection analysis recommendations. All roadway segments should operate at acceptable level of services under City's General Plan circulation element designations with spot improvements at intersections proposed based on the intersection analysis.

Table 4.11-20 2030 With Project Roadway Segment Daily Traffic Conditions

Road	*Segment*	*2030 WP ADT*	*Number of Lanes**	*LOS E Capacity*	*LOS*	*LOS E OK***
Flower St.	Santa Ana Blvd to Civic Center Dr.	20,656	4D	37,500	A	
Flower St.	Seventeenth St. to Civic Center	19,784	4D	37,500	A	
Civic Center Dr.	West of Flower St.	21,075	4D	37,500	A	
Civic Center Dr.	Flower St. to Ross St.	20,429	4D	37,500	A	
Flower St.	Santa Ana Blvd. to First St.	20,983	4D	37,500	A	
Santa Ana Blvd.	West of Flower St.	12,272	4D	37,500	A	
Santa Ana Blvd.	Parton St. to Flower St.	15,193	4D	37,500	A	
Santa Ana Blvd.	Parton St. to Ross St.	15,193	4D	37,500	A	
Civic Center Dr.	Ross St. to Broadway	18,870	4D	37,500	A	
Broadway	Civic Center Dr. to Santa Ana Blvd.	21,422	4D	37,500	A	
Broadway	Civic Center Dr. to Washington Ave.	27,818	4D	37,500	C	
Civic Center Dr.	Broadway to Sycamore St.	18,484	4D	37,500	A	
Broadway	Santa Ana Blvd. to Fourth St.	18,631	4U	25,000	C	
Santa Ana Blvd.	Broadway to Sycamore St.	12,455	3D	28,150	A	

Table 4.11-20 2030 With Project Roadway Segment Daily Traffic Conditions						
Road	*Segment*	*2030 WP ADT*	*Number of Lanes**	*LOS E Capacity*	*LOS*	*LOS E OK***
Broadway	Fifth St. to Fourth St.	18,547	4D	37,500	A	
Fifth St.	Broadway to Ross St.	9,834	3D	28,150	A	
Fifth St.	Broadway to Main St.	9,756	3D	28,150	A	
Broadway	Third St. to Fourth St.	18,409	4U	25,000	C	
Broadway	Third St. to First St.	18,671	4U	25,000	C	
Broadway	South of First St.	13,880	4U	25,000	A	
First St.	Broadway to Ross St.	46,088	6D	56,300	D	
Civic Center Dr.	Sycamore St. to Main St.	17,546	4D	37,500	A	
Santa Ana Blvd.	Sycamore St. to Main St.	12,125	3D	28,150	A	
Fifth St.	Sycamore St. to Main St.	10,012	3D	28,150	A	
Main St.	Civic Center Dr. to Santa Ana Blvd.	37,084	4D	37,500	E	E ok
Main St.	Civic Center Dr. to Washington Ave.	37,826	4D	37,500	E	E ok
Civic Center Dr.	Main St. to Bush St.	13,976	4D	37,500	A	
Main St.	Santa Ana Blvd. To Fifth St.	38,872	4D	37,500	F	
Santa Ana Blvd.	Main St. to Bush St.	12,022	3D	28,150	A	
Main St.	Fifth St. to Fourth St.	38,907	4U	25,000	F	
Fifth St.	Main St. to Bush St.	7,373	3D	28,150	A	
Main St.	Third St. to Fourth St.	35,539	4U	25,000	F	
Main St.	First St. to Third St.	35,506	4U	25,000	F	
First St.	Main St. to Broadway	47,962	6D	56,300	D	
Santa Ana Blvd.	Bush St. to Spurgeon St.	11,816	3D	28,150	A	
Fifth St.	Bush St. to French St.	7,232	3D	28,150	A	
First St.	Spurgeon St. to Main St.	44,886	6D	56,300	C	
Santa Ana Blvd.	Lacy St. to Standard Ave.	16,213	4D	37,500	A	
Civic Center Dr.	French St to Lacy St.	15,137	4D	37,500	A	
Santa Ana Blvd.	Lacy St. to French St.	18,215	2D	18,750	E	
Santa Ana Blvd.	Lacy St. to Santiago St.	19,431	4D	37,500	A	
Fourth St.	Lacy St. to French St.	13,486	2D	18,750	C	
First St.	Lacy St. to Spurgeon St.	44,892	6D	56,300	C	
First St.	Lacy St. to Standard Ave.	44,892	6D	56,300	C	
Santiago St.	Washington Ave. to Civic Center Dr.	13,005	4D	37,500	A	
Santiago St.	Washington Ave. to Seventeenth St.	12,193	4D	37,500	A	
Santiago St.	Santa Ana Blvd to Civic Center Dr.	12,970	4D	37,500	A	
Civic Center Dr.	Santiago St. to Lacy St.	14,041	2U	12,500	F	
Civic Center Dr.	Lincoln Ave to Santiago St.	13,418	2U	12,500	F	

Table 4.11-20 2030 With Project Roadway Segment Daily Traffic Conditions

Road	Segment	2030 WP ADT	Number of Lanes*	LOS E Capacity	LOS	LOS E OK**
Santiago St.	Santa Ana Blvd. to Brown St.	9,774	4D	37,500	A	
Santa Ana Blvd.	Santiago St. to Lacy St.	19,431	4D	37,500	A	
Santa Ana Blvd.	Santiago St. to U2-4	24,363	6D	56,300	A	
Fourth St.	Santiago St. to Lacy St.	19,855	4D	37,500	A	
Grand Ave.	Santa Ana Blvd to Seventeenth St.	40,394	6D	56,300	C	
Santa Ana Blvd.	East of Grand Ave.	8,998	4D	37,500	A	
Grand Ave.	First St. to Fourth St.	37,502	6D	56,300	B	
Grand Ave.	Fourth St. to Santa Ana Blvd.	42,417	6D	56,300	C	
Fourth St.	Grand Ave to Santiago St.	22,231	4D	37,500	B	
Fourth St.	East of Grand Ave.	23,792	4D	37,500	B	
Grand Ave.	South of First St.	47,852	6D	56,300	D	
Grand Ave.	Third St to First St.	37,110	6D	56,300	B	
First St.	Standard Ave to Grand Ave.	46,427	6D	56,300	D	
First St.	East of Grand Ave.	41,245	6D	56,300	C	
Penn Way	South of I 5 SB Ramps	10,651	2D	18,750	A	
Penn Way	North of I 5 SB Ramps	16,619	4D	37,500	A	
Santa Ana Blvd.	West of I 5 SB Ramps	46,866	4D	37,500	F	
Santa Ana Blvd.	East of I 5 SB Ramps	30,762	4D	37,500	D	
Seventeenth St.	West of I 5 NB Ramps	48,939	6D	56,300	D	
Seventeenth St.	East of I 5 NB Ramps	38,865	6D	56,300	C	
Grand Ave.	South of I 5 NB Ramps	54,445	6D	56,300	E	E ok
Grand Ave.	North of I 5 NB Ramps	48,570	6D	56,300	D	

SOURCE: KOA Corporation 2007

* D corresponds to a divided roadway. U corresponds to an undivided roadway.

** LOS E is considered acceptable within major development areas.

Anticipated Project Buildout (2030) With Project Peak Hour Freeway Ramp Conditions

Existing peak hour ramp analysis results are presented on Table 4.11-21 (2030 With Project Peak Hour Freeway Ramp Analysis). All ramps operate at LOS D or better during the AM and PM peak hour time periods except the northbound off-ramp at the interchange of I-5 at Santa Ana Boulevard during the PM peak hour time period.

Table 4.11-21 2030 With Project Peak Hour Freeway Ramp Analysis

Inter-change	Ramp	Ramp Type Code*	Lanes	Peak Hour Capacity	AM Peak Hour			PM Peak Hour		
					VOL	V/C	LOS	VOL	V/C	LOS
I-5 at Seventeenth St.	SB On	4	2	1,800	729	0.41	A	790	0.44	A

	NB Loop On	4	2	1,800	271	0.15	A	387	0.22	A
	SB Off	5	1	1,500	439	0.29	A	451	0.30	A
	NB Off	5	1	1,500	788	0.53	A	910	0.61	A
I-5 at Santa Ana Blvd.	SB Direct On (HOV)	6	2	2,250	246	0.11	A	186	0.08	A
	SB Loop On	4	2	1,800	461	0.26	A	695	0.39	A
	NB Loop On	4	2	1,800	516	0.29	A	743	0.41	A
	SB Off	5	1	1,500	533	0.36	A	570	0.38	A
	NB Off	5	1	1,500	956	0.64	B	1,550	1.03	F

SOURCE: KOA Corporation 2010

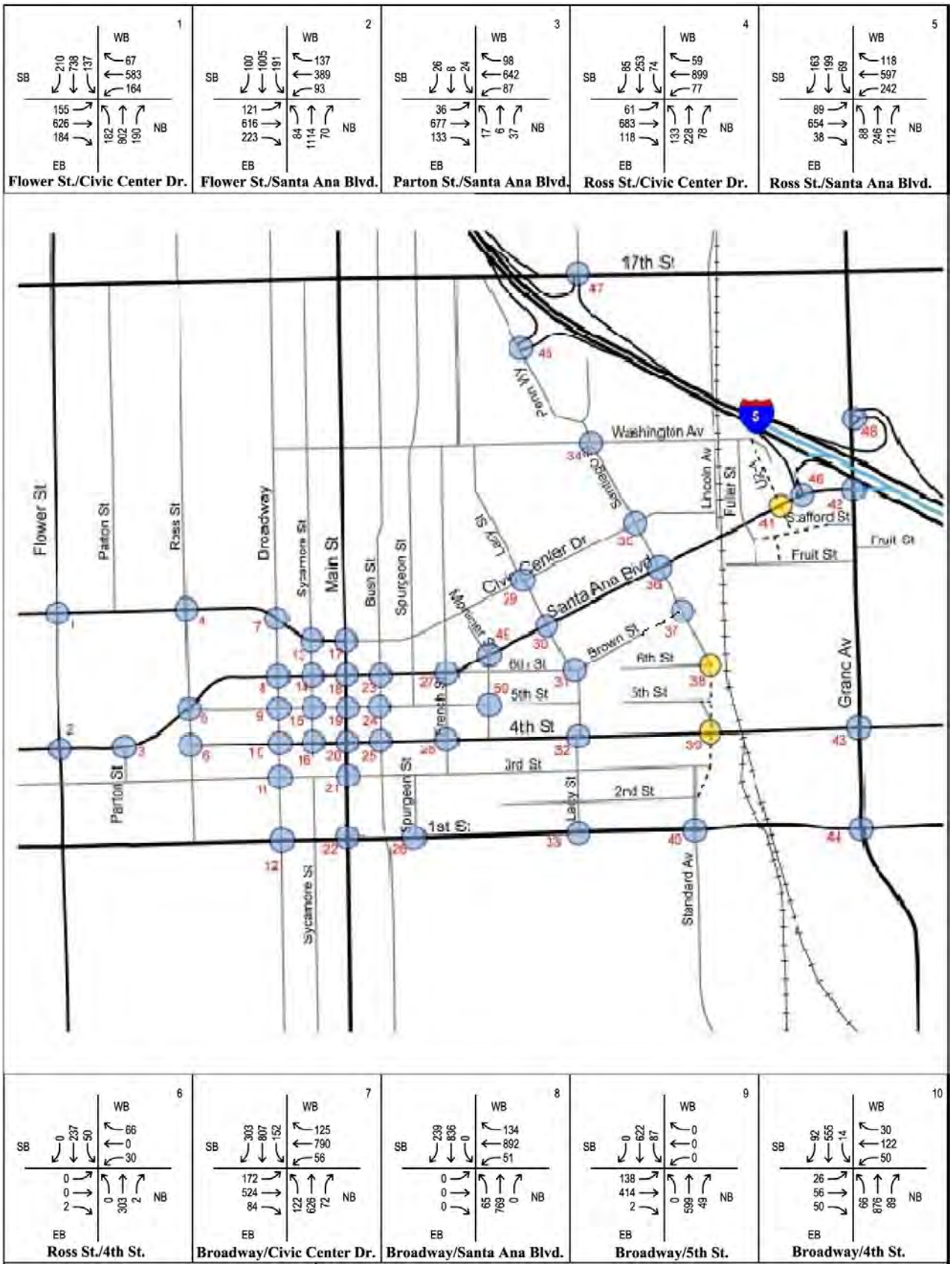
* Ramp Type Code:
4—Two-lane Metered On-Ramp, 2 Mixed Flow Lanes at Meter
5—One-lane Unmetered Ramp
6—Two-lane Unmetered On-Ramp, tapers to one merge lane at or beyond gore point

General Plan (2035) Traffic Conditions With Project

This section documents the future (2035) traffic conditions with the addition of the project-related traffic to the surrounding street system. To forecast the anticipated project buildout traffic conditions for the year 2035, the 2035 Without Project peak hour background traffic volumes shown in Figure 4.11-7A through Figure 4.11-7E and Figure 4.11-8A through Figure 4.11-8E were increased by adding the project-related traffic volumes.

General Plan (2035) With Project Intersection Conditions

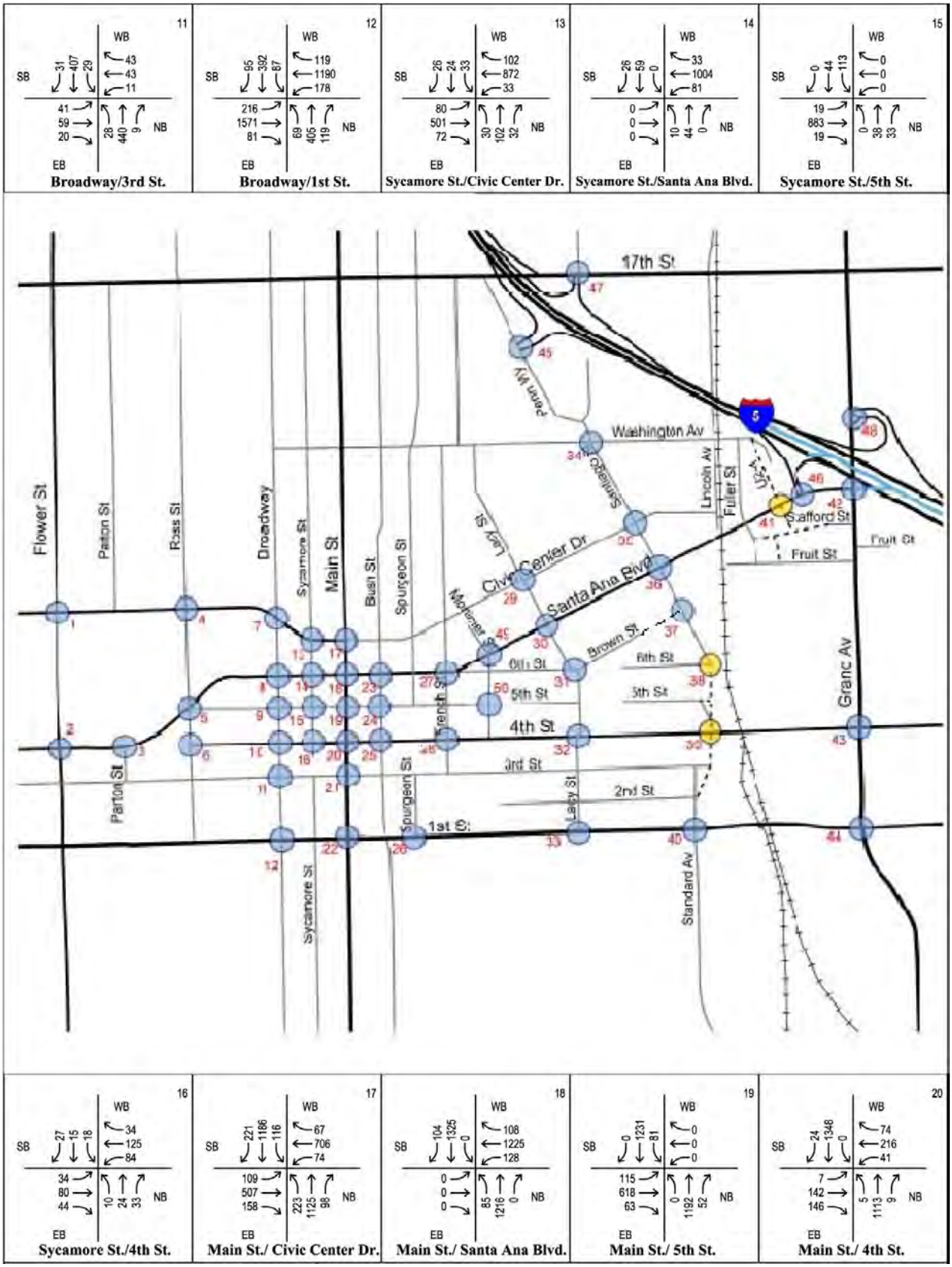
Figure 4.11-11A through Figure 4.11-11E (2035 With Project AM Peak Hour Volumes) illustrate the 2035 With Project AM peak hour traffic volumes while Figure 4.11-12A through Figure 4.11-12E (2035 With Project PM Peak Hour Volumes) illustrate the 2035 With Project PM peak hour traffic volumes for 2035 Without Project conditions. Table 4.11-22 (2035 With Project Peak Hour Intersection Conditions [ICU Method]) and Table 4.11-23 (2035 With Project Peak Hour Intersection Conditions [HCM Method]) illustrate the 2035 with project intersection level of service conditions. As shown in the tables, all intersections are expected to operate at LOS D or better under the 2035 with project condition except for the following eighteen intersections. Appendix G includes the analysis worksheet for all intersections under 2035 With Project conditions.



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-11A**

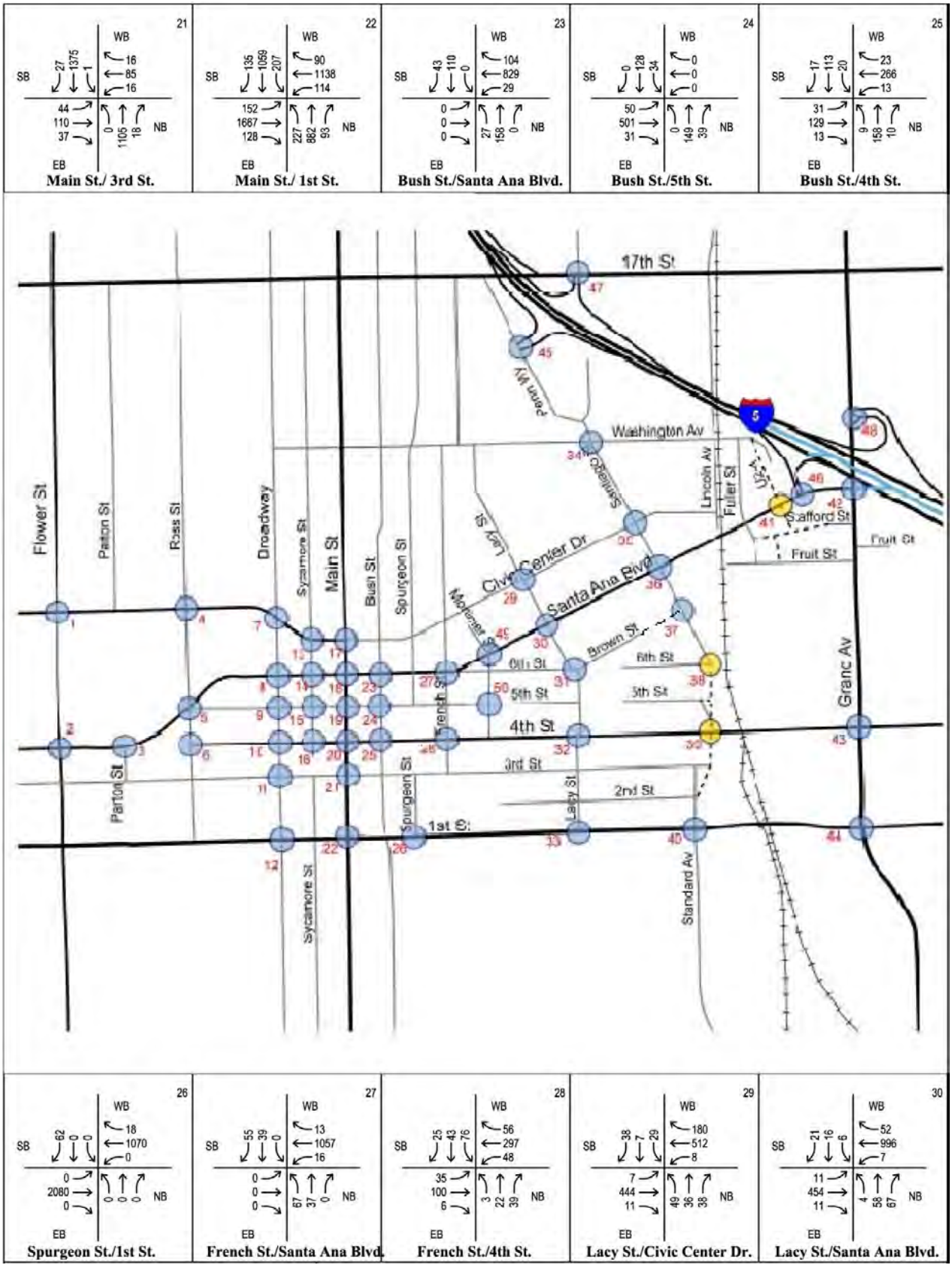
2035 With Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-11B**

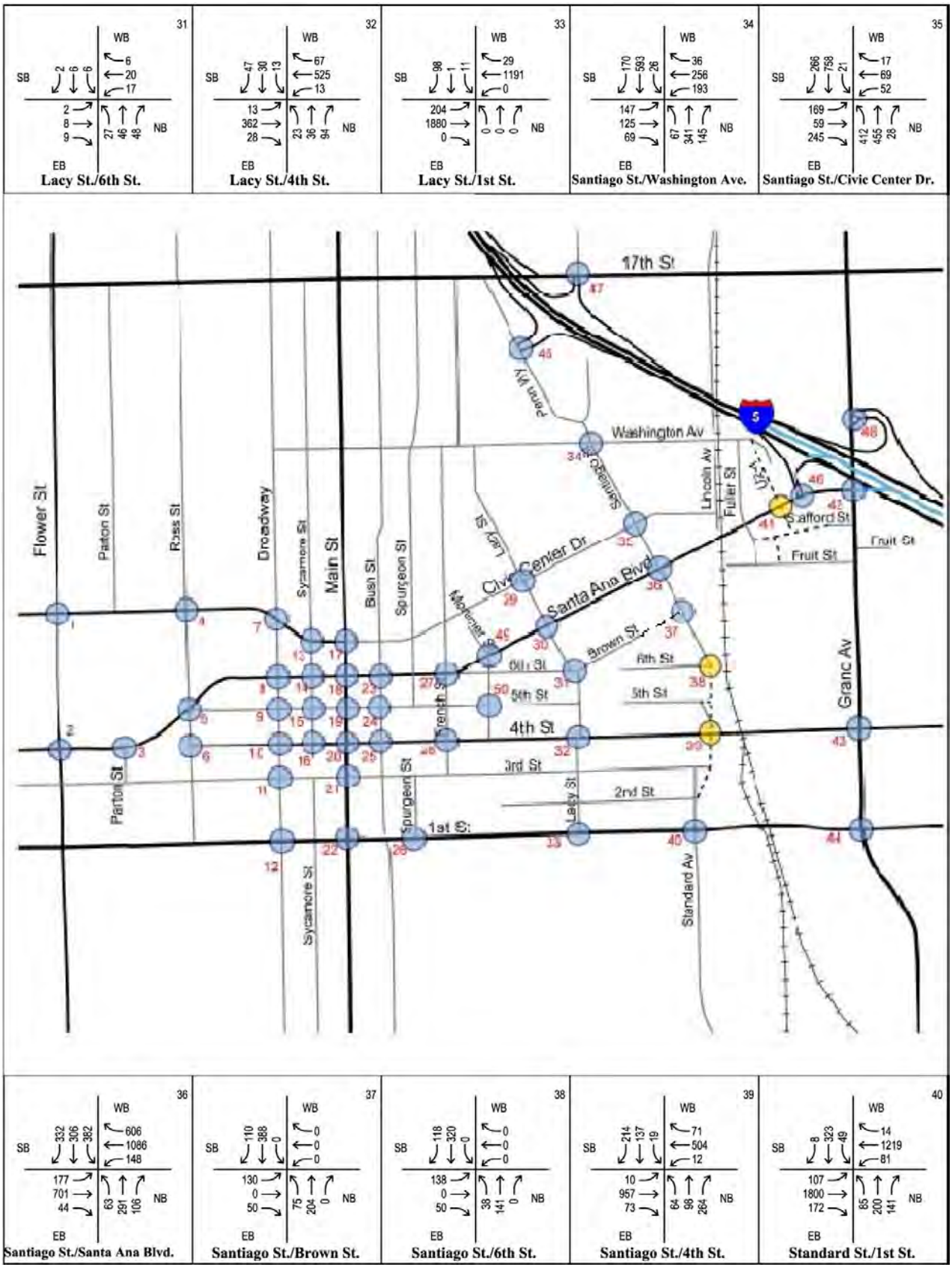
2035 With Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-11C**

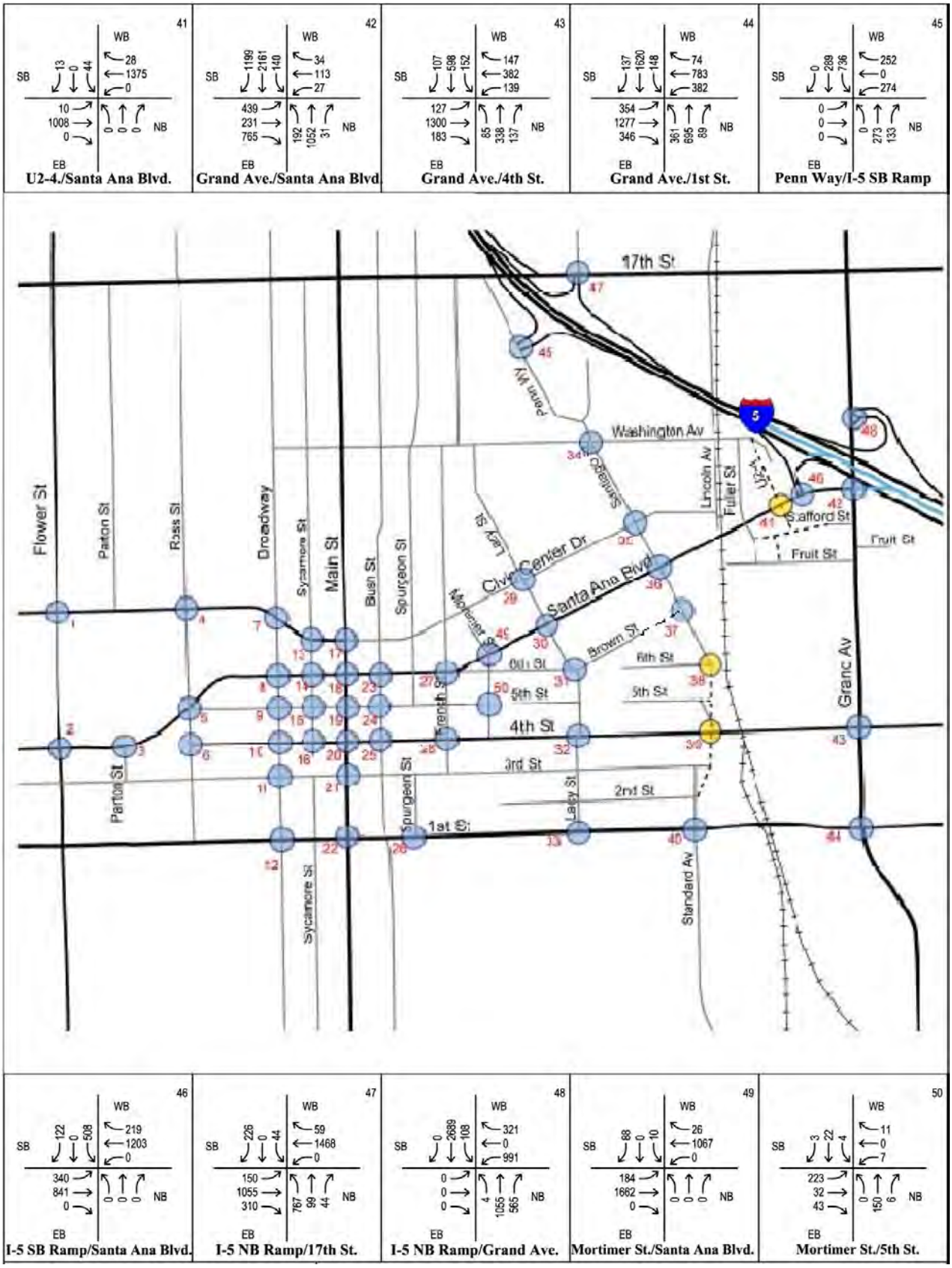
2035 With Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-11D**

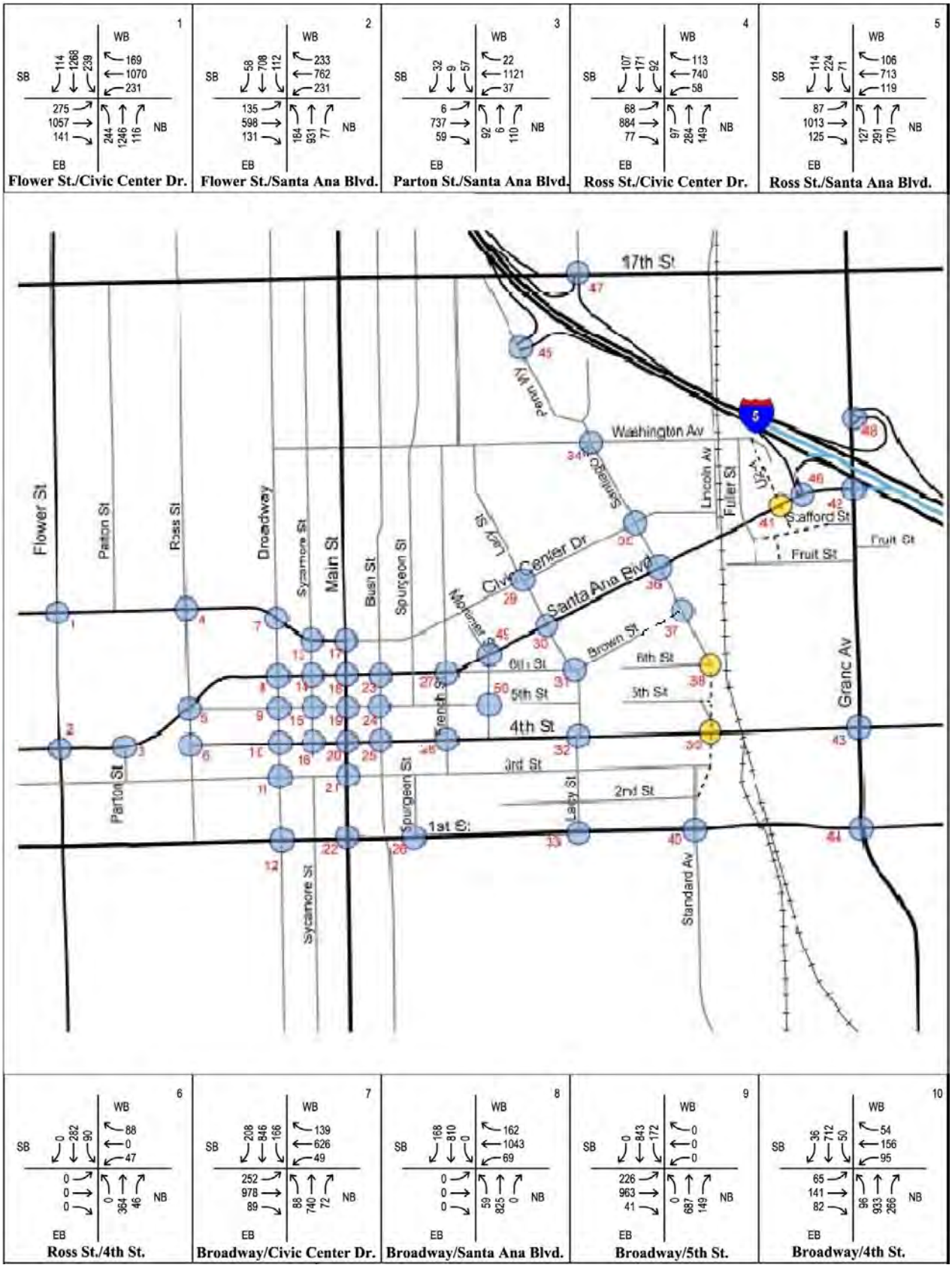
2035 With Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-11E**

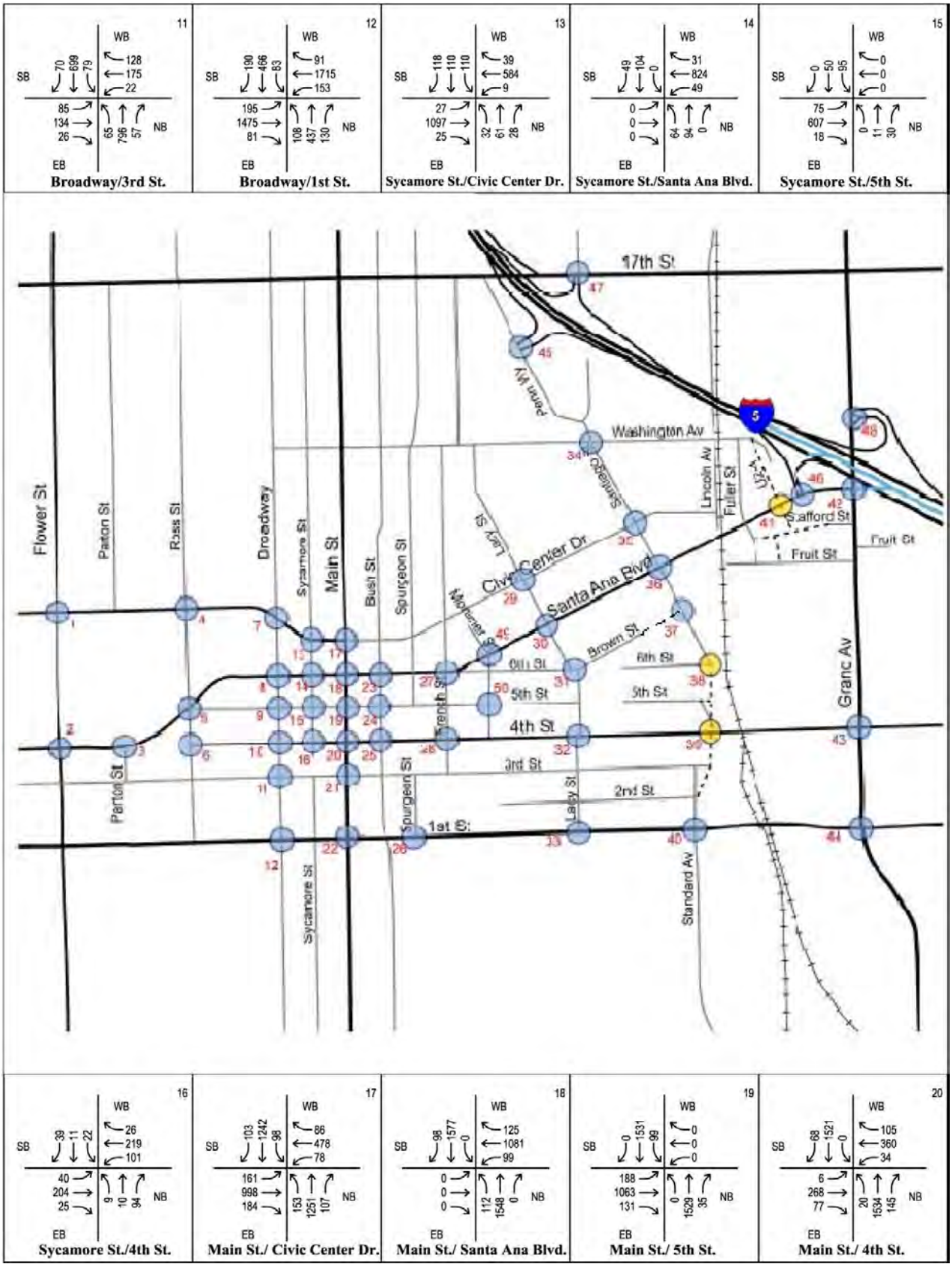
2035 With Project AM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-12A**

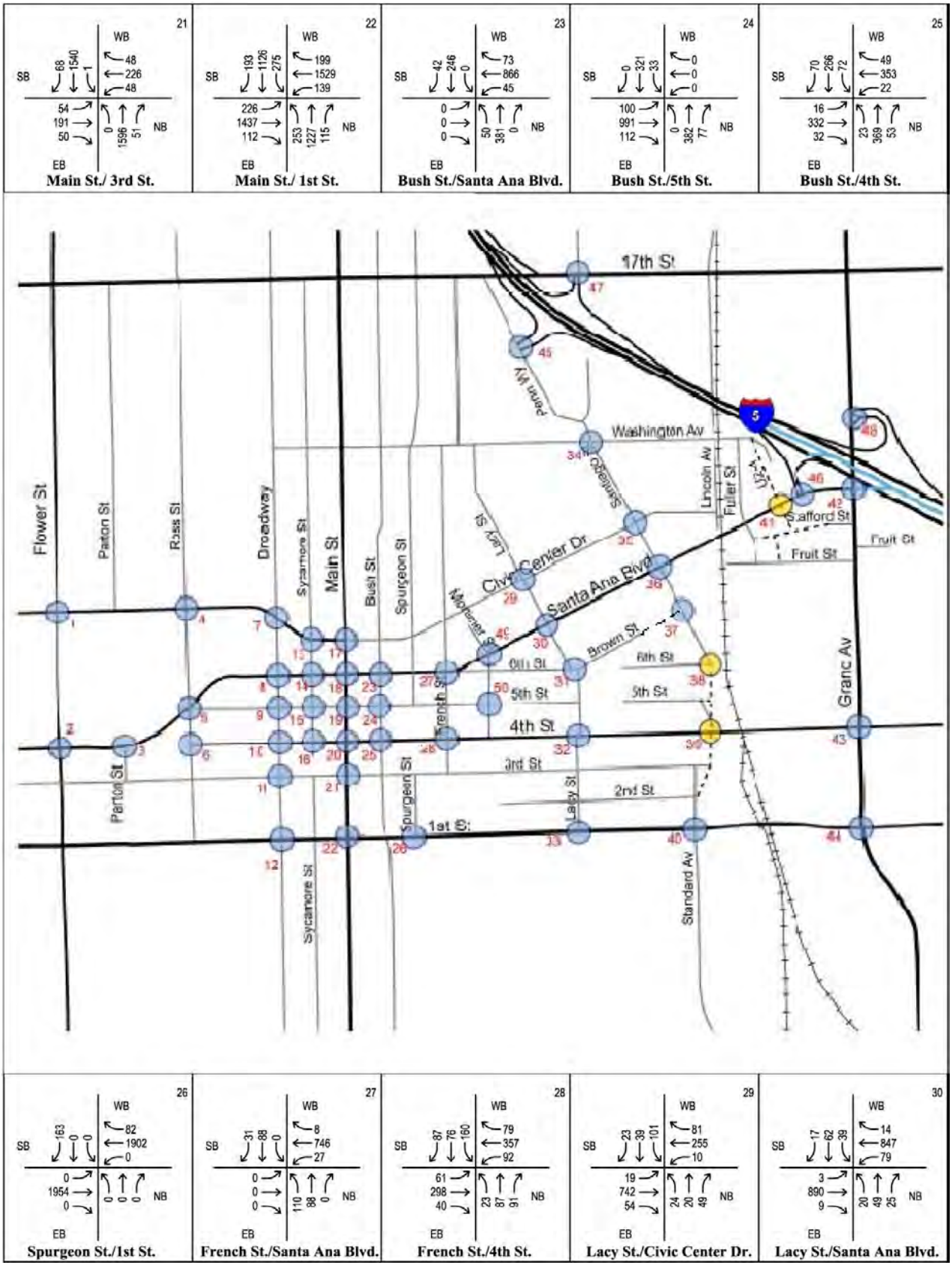
2035 With Project PM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-12B**

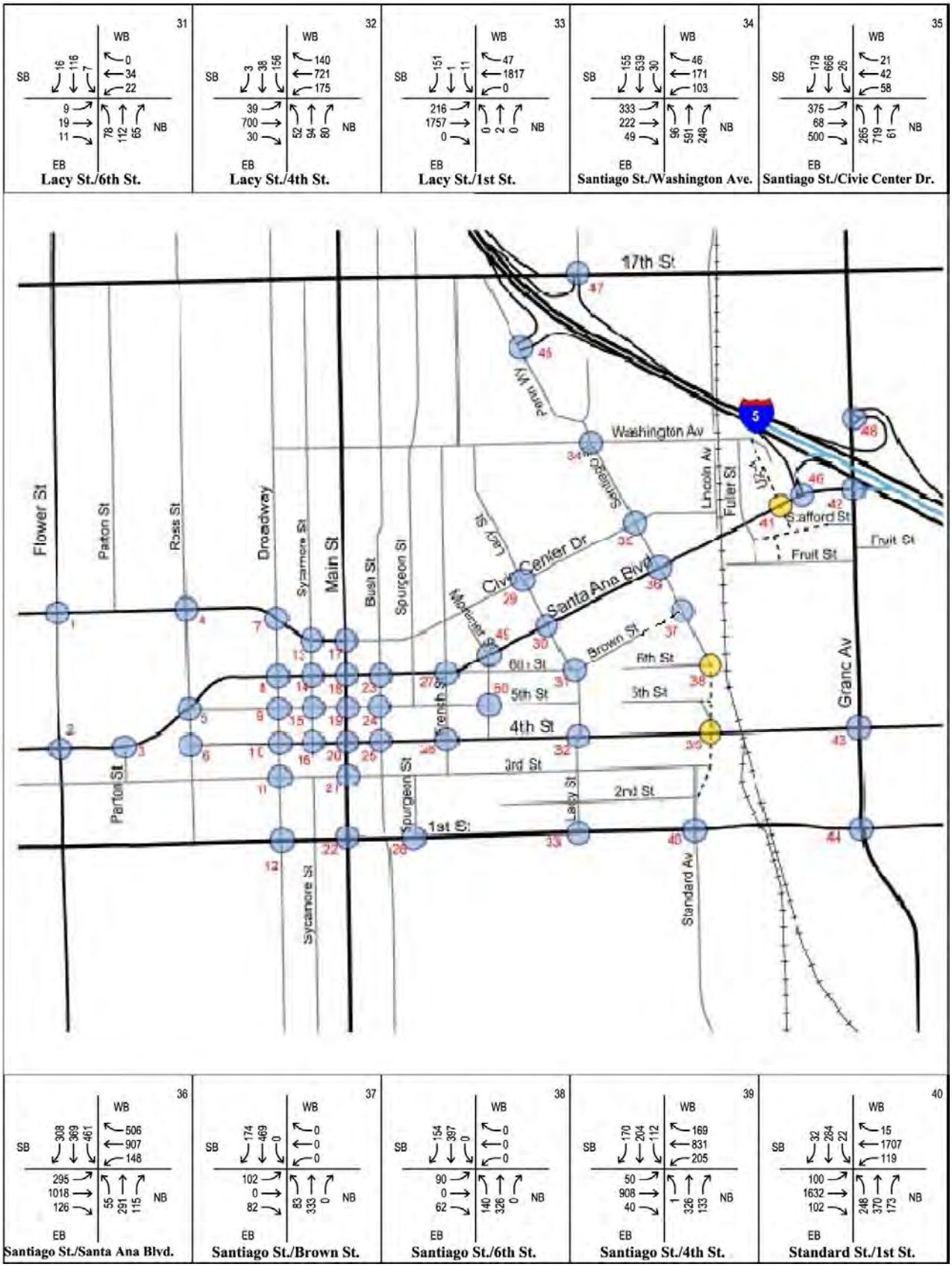
2035 With Project PM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-12C**

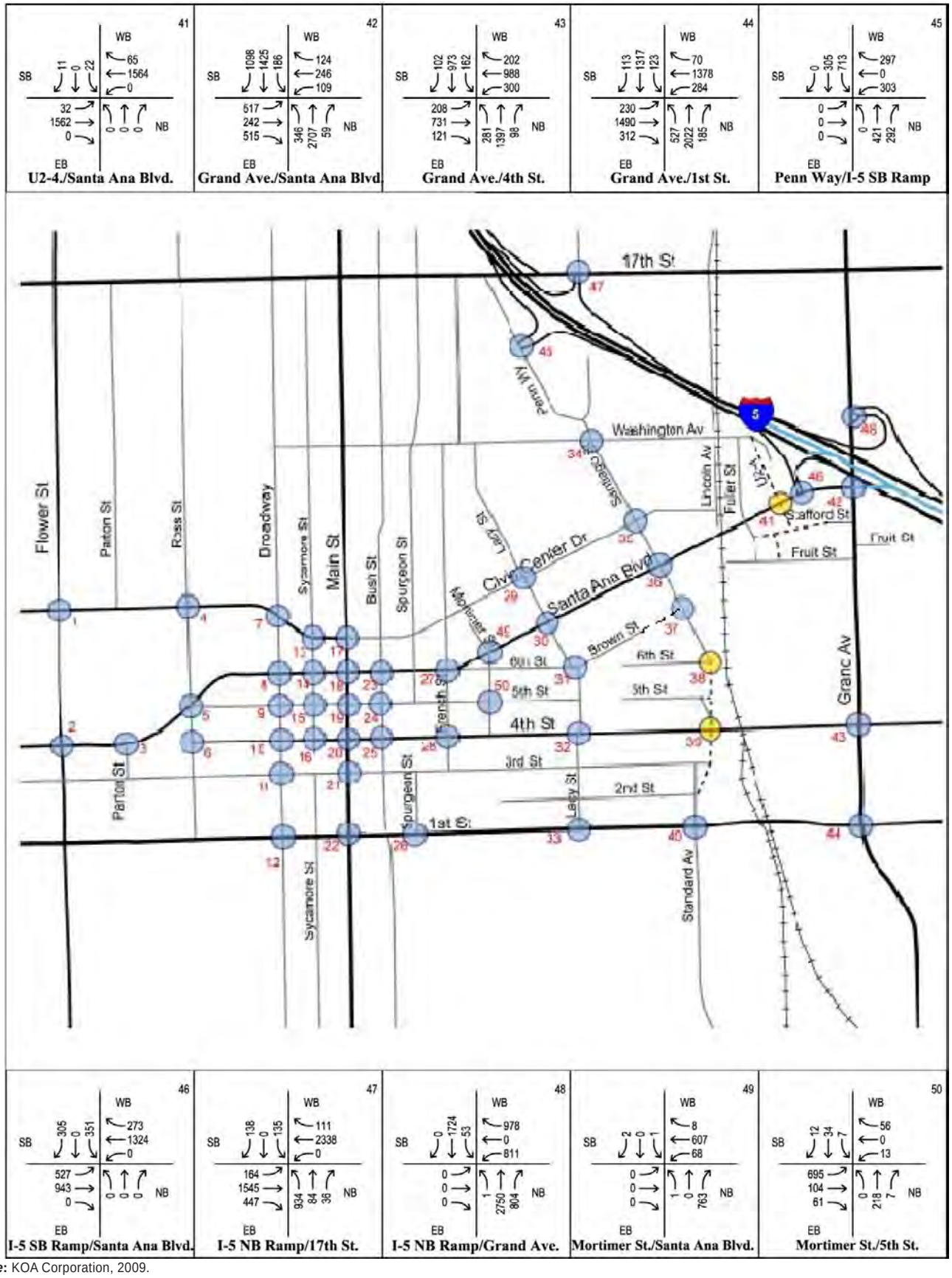
2035 With Project PM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-12D**

2035 With Project PM Peak Hour Volumes



***Source*:** KOA Corporation, 2009.

FIGURE **4.11-12E**

2035 With Project PM Peak Hour Volumes

Table 4.11-22 2035 With Project Peak Hour Intersection Conditions (ICU Method)

Intersection	AM Peak Hour		PM Peak Hour	
	Average/Worst Case Delay	LOS	Average/Worst Case Delay	LOS
Signalized Intersections (Using ICU Method)				
Flower St. at Civic Center Dr.	0.784	C	1.146	F
Flower St. at Santa Ana Blvd.	0.695	B	0.703	C
Parton St. at Santa Ana Blvd.	0.313	A	0.434	A
Ross St. at Civic Center Dr.	0.652	B	0.594	A
Ross St. at Santa Ana Blvd.	0.582	A	0.693	B
Broadway at Civic Center Dr.	0.740	C	0.754	C
Broadway at Santa Ana Blvd.	0.618	B	0.624	B
Broadway at Fifth St.	0.404	A	0.645	B
Broadway at Fourth St.	0.477	A	0.659	B
Broadway at Third St.	0.409	A	0.833	D
Broadway at First St.	0.778	C	0.868	D
Sycamore St. at Civic Center Dr.	0.502	A	0.603	B
Main St. at Civic Center Dr.	0.899	D	0.938	E
Main St. at Santa Ana Blvd.	0.810	D	0.869	D
Main St. at Fifth St.	0.623	B	0.843	D
Main St. at Fourth St.	0.654	B	0.847	D
Main St. at Third St.	0.559	A	0.730	C
Main St. at First St.	0.927	E	1.097	F
Bush St. at Santa Ana Blvd.	0.346	A	0.467	A
Bush St. at Fifth St.	0.296	A	0.577	A
Bush St. at Fourth St.	0.357	A	0.602	B
French St. at Fourth St.	0.359	A	0.568	A
Lacy St. at Fourth St.	0.465	A	0.814	D
Santiago St. at Santa Ana Blvd.	0.865	D	1.011	F
Standard St. at First St.	0.957	E	0.988	E
Grand Ave. at Santa Ana Blvd.	1.188	F	1.314	F
Grand Ave. at Fourth St.	0.754	C	0.875	D
Grand Ave. at First St.	0.918	E	0.998	E

SOURCE: KOA Corporation 2010

Level of service for unsignalized intersections is for the worst-case approach.

Table 4.11-23 2035 With Project Peak Hour Intersection Conditions (HCM Method)

Intersection	AM Peak Hour		PM Peak Hour	
	Average/Worst Case Delay	LOS	Average/Worst Case Delay	LOS
Unsignalized Intersections				
Ross St. at Fourth St.	11.9	B	13.8	B
Sycamore St. at Santa Ana Blvd.	32.4	D	34.5	D
Sycamore St. at Fifth St.	19.7	C	18.1	C
Sycamore St. at Fourth St.	8.6	A	10.5	B
Spurgeon St. at First St.	11.3	B	20.0	C
French St. at Santa Ana Blvd.	26.1	D	29.6	D
Lacy St. at Civic Center Dr.	37.9	E	113.5	F
Lacy St. at Santa Ana Blvd.	55.7	F	Overflow	F
Lacy St. at Sixth St.	7.4	A	8.6	A
Lacy St. at First St.	97.4	F	Overflow	F
Santiago St. at Washington Ave.	112.3	F	164.9	F
Santiago St. at Civic Center Dr.	263.9	F	266.2	F
Santiago St. at Brown St.	16.7	C	19.7	C
Santiago St. at Sixth St.	13.7	B	20.9	C
Santiago St. at Fourth St.	Overflow	F	Overflow	F
Mortimer St. at Fifth St.	9.5	A	64.4	F
Mortimer St. at Santa Ana Blvd.	324.2	F	35.8	E
U2-4 at Santa Ana Blvd.	79.4	F	130.8	F
Signalized Intersections (Caltrans, Using HCM)				
Penn Way at I-5 SB	25.0	C	29.0	C
Santa Ana Blvd. at I-5 SB	30.5	C	33.8	C
Seventeenth St. at I-5 NB	39.7	D	73.3	E
Grand Ave at I-5 NB	79.9	E	182.8	F

SOURCE: KOA Corporation 2010

Level of service for unsignalized intersections is for the worst-case approach.

The following intersections operated at unacceptable LOS during the 2035 Without Project Scenario:

- Flower Street at Civic Center Drive (Signalized)
- Main Street at First Street (Signalized)
- Grand Avenue at Santa Ana Boulevard (Signalized)
- Grand Avenue at I-5 NB Ramp (Signalized)
- Seventeenth Street at I-5 NB Ramp (signalized)
- Lacy Street at Civic Center Drive (Two-way stop control)
- Lacy Street at Santa Ana Boulevard (Two-way stop control)
- Lacy Street at First Street (Two-way stop control)

- Santiago Street at Washington Avenue (All-way stop control)
- Santiago Street at Civic Center Drive (All-way stop control)

The following additional intersections operate at unacceptable level of services under 2035 With Project conditions.

- Main Street at Civic Center Drive (Signalized)
- Santiago Street at Santa Ana Boulevard (Signalized)
- Standard Street (Santiago Street) at First Street (Signalized)
- Grand Avenue at First Street (Signalized)
- Santiago Street at Fourth Street (All-way stop control)
- Mortimer Street at Fifth Street (All-way stop control)
- Mortimer Street at Santa Ana Boulevard (All-way stop control)
- U2-4 at Santa Ana Boulevard (Two-way stop control)

In addition to the intersections indicated in the previous scenarios warranting a traffic signal, Santiago Street at Civic Center Drive warrants a traffic signal under 2035 With Project conditions.

General Plan (2035) With Project Roadway Segment Conditions

The roadway segment ADT analysis for 2030 is presented in Table 4.11-24 (2035 With Project Roadway Segment Daily Traffic Condition). As indicated, a majority of the arterial roadways are operating at acceptable levels. The daily V/C ratio screening analysis indicates that the following locations are potentially experiencing capacity deficiencies under 2035 With Project conditions:

- First Street from Main Street to Spurgeon Street
- First Street from Lacy Street to Standard Avenue
- First Street from Standard Avenue to Grand Avenue
- Main Street from Washington Avenue to First Street
- Civic Center Drive from Lacy Street to Lincoln Avenue
- Santa Ana Boulevard West of I-5 SB Ramps
- Santa Ana Boulevard East of I-5 SB Ramps
- Grand Avenue between Santa Ana Boulevard and Seventeenth Street
- Grand Avenue South of First Street
- Grand Avenue South of I-5 NB Ramps
- Grand Avenue at North of I-5 NB Ramps
- Seventeenth Street West of I-5 NB Ramps

The daily volume-to-capacity ratios provide a screening level analysis of daily traffic flows and potential operational problems within the study area. The peak hour analysis for intersections, presented in the previous section, provides a more definitive analysis of the operation of the arterial roadways in the project area. Although a few roadway segments indicate deficiencies, the proposed mitigation should be based on the intersection analysis recommendations. All roadway segments should operate at acceptable level of services under City's General Plan circulation element designations with spot improvements at intersections proposed based on the intersection analysis.

Table 4.11-24 2035 With Project Roadway Segment Daily Traffic Condition

Road	Segment	2035 WP ADT	Number of Lanes*	LOS E Capacity	LOS	LOS E OK**
Flower St.	Santa Ana Blvd to Civic Center Dr.	23,949	4D	37,500	B	
Flower St.	Seventeenth St to Civic Center Dr.	22,834	4D	37,500	B	
Civic Center Dr.	West of Flower St.	23875	4D	37,500	B	
Civic Center Dr.	Flower St. to Ross St.	23,064	4D	37,500	B	
Flower St.	Santa Ana Blvd. to First St.	26,046	4D	37,500	C	
Santa Ana Blvd.	West of Flower St.	14,268	6D	56,300	A	
Santa Ana Blvd.	Parton St. to Flower St.	17,312	6D	56,300	A	
Santa Ana Blvd.	Parton St. to Ross St.	19,406	6D	56,300	A	
Civic Center Dr.	Ross St. to Broadway	21,259	4D	37,500	A	
Broadway	Civic Center Dr. to Santa Ana Blvd.	23,962	4D	37,500	B	
Broadway	Civic Center Dr. to Washington Ave.	30,429	4D	37,500	D	
Civic Center Dr.	Broadway to Sycamore St.	21,337	4D	37,500	A	
Broadway	Santa Ana Blvd. To Fourth St.	20,854	4D	37,500	A	
Santa Ana Blvd.	Broadway to Sycamore St.	14,508	3D	28,150	A	
Broadway	Fifth St. to Fourth St.	21,002	4D	37,500	A	
Fifth St	Broadway to Ross St.	11,241	3D	28,150	A	
Fifth St	Broadway to Sycamore St.	14,583	3D	28,150	A	
Broadway	Third St. to Fourth St.	20,983	4D	37,500	A	
Broadway	Third St. to First St.	26,728	4D	37,500	C	
Broadway	South of First St.	14,429	4D	37,500	A	
First St.	Broadway to Ross St.	50,535	6D	56,300	D	
First St.	Broadway to Main St.	50,187	6D	56,300	D	
Civic Center Dr.	Sycamore St. to Main St.	20,043	4D	37,500	A	
Santa Ana Blvd.	Sycamore St. to Main St.	13,618	3D	28,150	A	
Fifth St.	Sycamore St to Broadway	11,163	3D	28,150	A	
Fifth St	Sycamore St. to Main St.	11,207	3D	28,150	A	
Main St.	Civic Center Dr. to Santa Ana Blvd.	41,909	4D	37,500	F	
Main St.	Civic Center Dr. to Washington Ave.	42,761	4D	37,500	F	
Civic Center Dr.	Main St. to Bush St.	15,878	4D	37,500	A	
Main St.	Santa Ana Blvd. to Fifth St.	43,981	4U	25,000	F	
Santa Ana Blvd.	Main St. to Bush St.	14,503	3D	28,150	A	
Fifth St.	Main St. to Bush St.	10,266	3D	28,150	A	
Main St.	Third St. to Fourth St.	39,921	4D	37,500	F	

Table 4.11-24 2035 With Project Roadway Segment Daily Traffic Condition

Road	Segment	2035 WP ADT	Number of Lanes*	LOS E Capacity	LOS	LOS E OK**
Main St.	Fourth St. to Third St.	39,921	4D	37,500	F	
Main St.	First St. to Third St.	39,888	4D	37,500	F	
Santa Ana Blvd.	Bush St. to Spurgeon St.	13,579	3D	28,150	A	
Fifth St.	Bush St. to French St.	8,201	3D	28,150	A	
First St.	Spurgeon St. to Main St.	51,695	6D	56,300	E	
Civic Center Dr.	French St to Lacy St.	16,469	4D	37,500	A	
Santa Ana Blvd.	Lacy St. to French St.	20,814	4D	37,500	A	
Fourth St.	Lacy St. to French St.	15,600	4D	37,500	A	
Fourth St.	Lacy St. to Santiago St.	22,966	4D	37,500	B	
First St.	Lacy St. to Spurgeon St.	51,789	6D	56,300	E	
First St.	Lacy St. to Standard Ave.	51,789	6D	56,300	E	
Santiago St.	Washington Ave. to Seventeenth St.	18,366	4D	37,500	A	
Santiago St.	Santa Ana Blvd to Civic Center Dr.	22,615	4D	37,500	B	
Santiago St.	Washington Ave to Civic Center Dr.	21,381	4D	37,500	A	
Civic Center Dr.	Santiago St. to Lacy St.	16,027	2U	12,500	F	
Civic Center Dr.	Lincoln Ave to Santiago St.	14,756	2U	12,500	F	
Santiago St.	Santa Ana Blvd. to Brown St.	10,966	4D	37,500	A	
Santa Ana Blvd.	Santiago St. to Lacy St.	27,854	4D	37,500	C	
Santa Ana Blvd.	Santiago St. to U-24	30,916	6D	56,300	A	
Grand Ave.	Fourth St. to Santa Ana Blvd.	49,112	6D	56,300	D	
Grand Ave.	Santa Ana Blvd to Seventeenth St.	51,315	6D	56,300	E	
Santa Ana Blvd.	East of Grand Ave.	9,869	4D	37,500	A	
Grand Ave.	First St. to Fourth St.	42,283	6D	56,300	C	
Fourth St.	Grand Ave to Santiago St.	24,962	4D	37,500	B	
Fourth St.	East of Grand Ave.	26,560	4D	37,500	C	
Grand Ave.	South of First St.	55,519	6D	56,300	E	
First St.	Standard Ave to Grand Ave	53,605	6D	56,300	E	
First St.	East of Grand Ave.	47,625	6D	56,300	D	
Penn Way	South of I-5 SB Ramps	16,671	2D	18,750	D	
Penn Way	North of I-5 SB Ramps	19,038	4D	37,500	A	
Santa Ana Blvd.	West of I-5 SB Ramps	53,014	6D	56,300	E	
Santa Ana Blvd.	East of I-5 SB Ramps	34,964	4D	37,500	E	
Seventeenth St.	West of I-5 NB Ramps	56,794	6D	56,300	F	

Table 4.11-24 2035 With Project Roadway Segment Daily Traffic Condition

Road	Segment	2035 WP ADT	Number of Lanes*	LOS E Capacity	LOS	LOS E OK**
Seventeenth St.	East of I-5 NB Ramps	45,103	6D	56,300	D	
Grand Ave.	South of I-5 NB Ramps	62,250	6D	56,300	F	
Grand Ave.	North of I-5 NB Ramps	59,734	6D	56,300	F	

SOURCE: KOA Corporation 2007

* D corresponds to a divided roadway. U corresponds to an undivided roadway.

** LOS E is considered acceptable within major development areas.

General Plan (2035) With Project Peak Hour Freeway Ramp Conditions

The 2035 With Project peak hour ramp analysis results are presented on Table 4.11-25 (2035 With Project Peak Hour Freeway Ramp Analysis); all ramps operate at LOS D or better during the AM and PM peak hour time periods except the northbound off ramp at the interchange of I-5 at Santa Ana Boulevard during the PM peak hour time period.

Table 4.11-25 2035 With Project Peak Hour Freeway Ramp Analysis

Interchange	Ramp	Ramp Type Code*	Lanes	Peak Hour Capacity	AM Peak Hour			PM Peak Hour		
					VOL	V/C	LOS	VOL	V/C	LOS
I-5 at Seventeenth St.	SB On	4	2	1,800	869	0.48	A	1,005	0.56	A
	NB Loop On	4	2	1,800	310	0.17	A	447	0.25	A
	SB Off	5	1	1,500	526	0.35	A	600	0.40	A
	NB Off	5	1	1,500	910	0.61	A	1,054	0.70	B
I-5 at Santa Ana Blvd.	SB Direct On (HOV)	6	2	2,250	402	0.18	A	487	0.22	A
	SB Loop On	4	2	1,800	559	0.31	A	800	0.44	A
	NB Loop On	4	2	1,800	673	0.37	A	857	0.48	A
	SB Off	5	1	1,500	630	0.42	A	656	0.44	A
	NB Off	5	1	1,500	1312	0.87	D	1,789	1.19	F

SOURCE: KOA Corporation 2010

* Ramp Type Code:
4—Two-lane Metered On-Ramp, 2 Mixed Flow Lanes at Meter
5—One-lane Unmetered Ramp
6—Two-lane Unmetered On-Ramp, tapers to one merge lane at or beyond gore point

Thresholds of Significance

The following thresholds of significance are based on Appendix G of the 2009 CEQA Guidelines. For purposes of this EIR, long-term cumulative development at full build-out pursuant to the Santa Ana Transit Zoning Code (SD 84A and SD 84B) may have a significant adverse impact on transportation and traffic if it would result in any of the following:

- Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)
- Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)
- Result in inadequate emergency access
- Result in inadequate parking capacity
- Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)

Traffic impacts are identified if the proposed project will result in a significant change in traffic conditions on a roadway or at an intersection. A significant impact is normally defined when project-related traffic would cause level of service to deteriorate to below the minimum acceptable level by a measurable amount. A cumulative impact may also be significant if the location is already below the minimum acceptable level or forecast without the project to be below the minimum acceptable level and project related traffic causes a further decline.

Specifically, for the purposes of this analysis, an impact is deemed significant when the level of service is E or F and the project causes an increase in V/C or delay over the defined threshold. A traffic-related project contribution is considered significant for the City of Santa Ana intersections if the change in ICU is greater than 0.01. Additionally, for unsignalized intersections in either City that are at LOS E or F, the impact is considered significant if the project contribution to average stop delay at the intersection is greater than one second.

The City of Santa Ana considers LOS D as the threshold for an acceptable service level for intersections located outside of Major Development Areas (MDA). The City considers LOS E as the maximum threshold for acceptable service levels for intersections located within an MDA. If the project contribution to the volume/capacity ratio at the intersection is greater than 0.01 and if the location is at LOS D or poorer outside of an MDA or LOS E or poorer within an MDA, then the impact is considered significant.

For those signalized intersections which may not contribute to 0.01 or greater ICU or V/C increases, the City may require a fair share contribution toward the expected cost of improvements at the subject intersection. The fair share is based upon the project's relative contribution toward the total future added traffic, which consists of traffic from the project, other cumulative project traffic, and growth of ambient background traffic.

Unsignalized intersection analysis follows the City's criteria to use the HCM unsignalized analysis methodology. HCM indicates that level of service for unsignalized intersection is based upon the control

delay for the poorest movement of the intersection, which is assessed for those traffic movements that are stopped or must yield to through traffic. Some movements, including cross traffic on the minor street or left turns onto the major street, can be subject to long delays, however through traffic and right turns from the major street will not experience any delays at stopped intersections. When delay for cross traffic is severe (LOS E or F), the intersection should be evaluated further for possible improvement with traffic signals. In some cases, this analysis determines that the delay is being experienced by a very low number of vehicles and traffic signals are not warranted. In other cases, the number of stopped vehicles is substantial and traffic signals may be justified as a mitigation measure.

In terms of impacts to freeway ramps, the CMP standard of an increase of 0.03 or greater of the V/C ratio would apply.

Effects Found to Have No Impact

There are no Effects Found to Have No Impact with respect to transportation and traffic.

Effects Found to Be Less Than Significant

Impact 4.11-1 **Operation of the proposed project could result in impacts related to neighborhood traffic in the adjacent residential areas to the Transit Zoning Code (SD 84A and SD 84B) area. This is considered a potentially significant impact. Compliance with mitigation measures MM4.11-1 would reduce this impact to a *less-than-significant* level.**

The significance of neighborhood intrusion impacts related to excess vehicle traffic is usually determined on a case-by-case basis because each residential street has unique characteristics. The overall intended use of residential streets is to provide access to adjacent properties or properties in very close proximity to a respective street. They are not intended for through traffic. Local streets also vary considerably in terms of street width, multi-family versus single family, density, presence of schools, day care, senior housing, proximity to major streets and other factors. A level of traffic which may be perceived as too much on one residential street may be acceptable on another.

Cut-through or inappropriate traffic can sometimes occur on residential streets due to congested traffic conditions on the arterial highway system that causes motorists to seek alternate routes by cutting through neighborhoods. In some cases, the through vehicles may drive through the neighborhood at speeds that are higher than average, higher than the posted speed limit, or higher than the speeds that residents may drive at. At other times, local residential streets may be found to be the shortest or most direct route between a driver's origin and destination due to the physical layout of the street system. In either case, unwelcome traffic can be found to be highly objectionable to residents. If this type of traffic is expected to increase significantly due to new developments, a significant impact may occur.

Generally the traffic analysis forecasts minimal traffic increases on the local residential streets in the project area. The distribution of land uses and their principle access routes is not conducive to through traffic use of the residential streets located in the study area, most notably in the French Court, French Park, and Logan Neighborhoods. Also, the level of employment within the Transit Zoning Code

(SD 84A and SD 84B) area is reduced slightly by the Transit Zoning Code (SD 84A and SD 84B), which should result in an incremental decrease in traffic pressure upon the arterial street system, thus reducing the inducement to cut into neighborhoods.

Evaluation of the neighborhood traffic impacts and the traffic calming measures that are implemented for this project follow the *City of Santa Ana Procedure for Neighborhood Traffic Management Plans* and other similar type of studies within City of Santa Ana. Three existing neighborhoods' traffic conditions and the existing diversion measures throughout the neighborhood are discussed. The characteristics of the project traffic, as it passes through the neighborhood are described. The recommendations to mitigate project traffic diversion are described.

Existing Neighborhood Traffic Conditions

Neighborhood traffic problems have been diagnosed, studied, and treated in three neighborhoods that are located near the study area. These are:

- French Court Neighborhood, bounded approximately by Washington Avenue, Bush Street, Seventeenth Street, I-5, and Lincoln Street
- French Park Neighborhood, located generally south of French Court and north of Civic Center Drive
- Logan Neighborhood, located generally along Washington Avenue and Lincoln Street

Other streets within the project area are not known to have significant existing neighborhood traffic issues, as represented by significant or regular indications to the City that local traffic conditions are unacceptable. However traffic levels on some streets in the area are approaching the range where residents may express concern if asked about local traffic conditions. As indicated, the current local residential roadways include Spurgeon Street, French Street, Minter Street, Lacy Street, Garfield Street, Poinsettia Street, Logan Street, Lincoln Street, and Washington Avenue.

The existing traffic volumes within the neighborhoods are relatively low, compared with traffic levels on the arterial road system, however traffic volumes on many of these streets are at levels that residents would consider undesirable. The highest volume occurs along Washington Avenue with a maximum of 321 westbound through vehicles during the AM peak hour and 393 eastbound through vehicles during PM peak hour. Other roadways carry less than 100 vehicles during peak hours. The roadways which carry significant through traffic volumes are Main Street, Santiago Street, 17th Street, Civic Center Drive and Santa Ana Boulevard. Historically, the residents' concerns are in regard to the through traffic along Spurgeon Street and French Street within the neighborhood. Concerns also include speeding along Lacy Street.

The existing diversion measures throughout the French Court neighborhood include:

- Raised median on Seventeenth Street across Bush Street and French Street
- Cul-de-sac on Fifteenth Street at Penn Way

The most viable bypass route through the French Park neighborhood is Tenth Street/Minter Street. There are three all-way stop controlled intersections along the Tenth Street/Minter Street route, but

there are no other existing diversion measures in the French Park neighborhood and Logan neighborhood.

Potential Project Impacts

The project area is currently urban and developed with a wide range of civic, commercial, industrial, and residential land uses. The Transit Zoning Code would allow for appropriate mixed-use infill development in the existing neighborhoods or districts, which could include the conversion of properties currently having all industrial or all commercial uses.

As indicated in TIS, minimum trip generation increases are projected for most of the neighborhood area. In fact, TAZ 8, TAZ 9, and TAZ13 show negative ADT increase for the project trips due to the potential conversion of existing industrial and commercial uses.

Generally the traffic analysis forecasts minimal traffic increases on the local residential streets listed above. The distribution of land uses and their principle access routes is not conducive to through traffic use of the streets indicated above. Also, the amount of employment in the larger city center area is could be reduced slightly by the plan if existing commercial and industrial uses convert, which should result in an incremental decrease in traffic pressure upon the arterial street system, thus reducing the inducement to cut into neighborhoods.

Due to the nature and location of the project, no significant negative impact is expected. However the science of forecasting neighborhood traffic is not precise. For example, a diversion level of 0.5% cannot be reliably predicted, yet a new project could result in 1-2 additional vehicles use of an undesirable route. This level of increase may be very difficult to measure or confirm however, since normal daily variation in use by residents can greatly exceed the volume of through traffic increase that may occur due to a project. For this reason, there is a potential for an incremental impact resulting from trace increases in usage of impacted streets.

Under a full build-out scenario implementation of the Transit Zoning Code is expected to increase traffic volumes on some of the internal roadways within the project area. Although the increase may not be significant there may be opportunities to mitigate the negative effects of increased traffic through incorporation of measures into the design of the local street system. Features that are regularly incorporated in the neighborhood traffic calming programs may be appropriate for systematic inclusion into the proposed project. This could include systematic uses of traffic calming treatments such as curb extensions at local intersections, short medians at entries to wide streets, or traffic circles at oversized intersections. These measures can be further enhanced with landscaping, monuments, neighborhood identity features, or other elements. When used properly these features can reduce traffic speeds to acceptable ranges and can discourage some of the cut though traffic due to convenience and speed reduction.

Many of the streets in the study area appear to have severely distressed pavement, potentially requiring complete reconstruction of the pavement. The cost of implementing traffic calming measures as noted above can be quite nominal when done in conjunction with needed street reconstruction. It is suggested that systematic application of traffic calming features be considered particularly in conjunction with street

reconstruction, improvements adjacent to properties that change use, or at locations where traffic problems become evident in the future. It is also suggested that funds need to be reserved for implementing traffic calming for the neighborhood roadways. If residents find concern over traffic increase that are related to the project, the city process of developing and implementing neighborhood traffic management plans can be applied.

Features that are regularly incorporated in the neighborhood traffic calming programs may be appropriate for systematic inclusion into the proposed project. These features' measures can be further enhanced with landscaping, monuments, neighborhood identity features or other elements, and, when used properly, can reduce traffic speeds to acceptable ranges and discourage some of the cut though traffic due to convenience and speed reduction. As such, the following mitigation measure would be implemented as part of the proposed project.

MM4.11-1 *The City of Santa Ana shall, during any roadway improvement within the Transit Zoning Code boundaries, evaluate, consider, and implement as appropriate the traffic calming measure(s), including but not limited to the following:*

- *Curb extensions at local intersections*
- *Short medians at entries to wide streets*
- *Traffic circles at oversized intersections*
- *Speed humps*
- *Turn restrictions*

With the implementation of MM4.11-1, the potential for neighborhood traffic impacts is anticipated to be ***less than significant***.

Threshold	Would the proposed project exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

Impact 4.11-2 **Long-term cumulative development pursuant to the implementation of the Transit Zoning Code would exceed standards established by the Orange County Transportation Authority within the study area. This impact is considered to be *less than significant*.**

The Orange County Transportation Authority is designated as the Congestion Management Agency (CMA) to oversee the Orange County CMP. The following six intersections are the only CMP intersections within the study area:

- Broadway at First Street
- Main Street at First Street
- Standard Street at First Street
- Grand Avenue at First Street
- Spurgeon Street at First Street
- Lacy Street at First Street

All six CMP intersections are signalized. As discussed above in the Thresholds of Significance, a traffic-related project contribution is considered significant for the City of Santa Ana intersections if the change in ICU is greater than 0.01, which is more stringent than the CMP criteria.

As shown in Table 4.11-18 and Table 4.11-22, two of the CMP intersections under 2030 with Project (Main Street at First Street and Lacy Street at First Street), four of the CMP intersections under 2035 with Project (Main Street at First Street, Standard Street at First Street, Grand Avenue at First Street, and Lacy Street at First Street), would experience poor levels of service due to the proposed project. Implementation of the improvement measures identified under Impact 4.11-8 for these four intersections would improve the level of service, to acceptable operating conditions (LOS D). Therefore, with implementation of mitigation measures described under Impact 4.11-8, impacts to these intersections would be ***less than significant***.

Threshold	Would the proposed project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

Impact 4.11-3 Development projects constructed pursuant to the standards contained within the Transit Zoning Code would not result in a change in air traffic patterns. This impact is considered to be *less than significant*

As discussed in Impact 4.5-6 (Hazards and Hazardous Materials), the Transit Zoning Code area is located approximately six miles north of John Wayne Airport (SNA) and is located outside of the Airport Planning Area for JWA. However, because the Transit Zoning Code standards could result in the development of structures that are more than 200 feet above ground level at a project site, filing with the Federal Aviation Administration (FAA) would be required. As required by mitigation measure MM 4.5-4, any future projects within the Transit Zoning Code (SD 84A and SD 84B)area that would exceed 200 feet in height (from ground level at the project site) would be required to file a Notice of Proposed Construction or Alteration (FAA Form 7460-1). Therefore, compliance with recommendations or guidelines from the FAA would ensure that future development would not result in any change to air traffic patterns. This impact would be ***less than significant***.

Threshold	Would the proposed project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Impact 4.11-4 Development projects constructed pursuant to the Transit Zoning Code would not increase hazards due to a design future or incompatible uses. Impacts would be *less than significant*.

The Transit Zoning Code (SD 84A and SD 84B) encourages infill projects that would be suitably designed to use the existing network of regional and local roadways located within the vicinity of the study area. Additional proposed changes to road design within the study area as a part of the proposed Transit Zoning Code (SD 84A and SD 84B) could include potential improvement measures, as discussed below in Impact 4.11-8. Most of the identified improvements include the addition of a turn lane at

intersections under 2030 and 2035 conditions, the addition of shared through lanes, and installation of traffic signals, and would not represent an increase in hazards associated with a design feature. Rather, these recommended improvements are designed to reduce potential hazards due to congestion. As such, this impact would be ***less than significant***.

Threshold	Would the project result in inadequate emergency access?

Impact 4.11-5 **Development projects constructed pursuant to the Transit Zoning Code could result in inadequate emergency access; however, adherence to mitigation measures would ensure impacts remain *less than significant*.**

Proposed projects under the Transit Zoning Code would be required to meet all applicable local and State regulatory standards for adequate emergency access. Emergency access within the proposed Transit Zoning Code (SD 84A and SD 84B) area is addressed under Impact 4.5-7, in Section 4.5 (Hazards and Hazardous Materials) of this EIR. Adherence to applicable local and state regulatory standards and mitigation measures identified within Impact 4.6-8 would ensure that this impact remains ***less than significant***.

Threshold	Would the proposed project result in inadequate parking capacity?

Impact 4.11-6 **Long-term cumulative development under the implementation of the Transit Zoning Code would not result in inadequate parking capacity. This impact is considered to be *less than significant.***

The proposed Transit Zoning Code (SD 84A and SD 84B) would result in the net development of approximately 4,075 residential units and 387,000 sf of retail space, with the potential for a corresponding decrease in industrial, uses should those properties convert under the provisions of the Industrial Overlay Zone, as well as approximately 35 acres of surface parking lots. As mentioned in Chapter 2, the purpose of the Transit Zoning Code (SD 84A and SD 84B) is to facilitate the development of transit-supportive infill, and to improve the pedestrian streetscape in order to reduce parking demand. The uses in each zone determine the amount of parking required. Current parking requirements within the City of Santa Ana are provided in Chapter 41 of the City of Santa Ana Municipal Code. However, within the Transit Zoning Code (SD 84A and SD 84B) boundaries, the Transit Zoning Code (SD 84A and SD 84B) includes a separate set of parking requirements. Since the exact uses that would be developed under the proposed project are not known at this time, the precise amount of parking required is not known. Based on the overall types of uses that are anticipated, the following change in parking allotted (Transit Zoning Code (SD 84A and SD 84B) v. Zoning Code) is anticipated for the net increase in development of the Transit Zoning Code (SD 84A and SD 84B).

Table 4.11-26 Parking Requirement Comparison

Anticipated Use	Amount Anticipated	Transit Zoning Code		Zoning Code		Difference (Transit Zoning Code—Zoning Code)
		Number of Spaces Required*	Spaces to be Provided	Number of Spaces Required**	Spaces to be Provided	
Single-family residential	294 units	2.15 spaces per unit	632	4 spaces per unit	1,176	-544
Multi-family residential (includes multi-family and high-rise)	3,781units	2.15 spaces per unit	8,129	2.78 spaces per unit	10,511	-2,382
Retail	387,000 sf	2.5 spaces per 1,000 sf	968	5 spaces per 1,000 sf	1,755	-787

SOURCE: City of Santa Ana Municipal Code. Article XV.

* The number of spaces to be provided is an average of the data shown in Table 3-2 because the actual number of spaces to be provided would vary depending on the zone in which a use would be located. 2.15 was assumed to be the average number of spaces required for the purposes of this analysis.

** The assumptions used to determine the number of spaces required are based on the level/type of development anticipated under the proposed Transit Zoning Code. For multi-family uses, it was assumed that the average number of spaces required for the proposed project would be 2.78. This was derived from current parking requirements under the Zoning Code for approximately 3.25 spaces per unit in all areas but the Downtown District, which requires 1.0 space per unit for live/work units (the only currently permitted residential units within Downtown).

As shown above, the City's current Zoning Code would provide approximately 3,713 more parking spaces than the proposed Transit Zoning Code. Sixty-five percent of the difference in parking requirements between the Transit Zoning Code (SD 84A and SD 84B) and the Zoning Code within the Transit Zoning Code (SD 84A and SD 84B) area can be attributed to residential uses.

However, as stated previously, one of the primary components of the Transit Zoning Code (SD 84A and SD 84B) is to improve the level of alternative modes of transportation within the Transit Zoning Code (SD 84A and SD 84B) area. The Urban Land Institute (ULI), in recognition of developments/plans of this type, published parking ratios in their *Shared Parking*, Second Edition, 2005. These ratios were developed due to the fact that city zoning code parking ratios do not account for the synergy between the project components (i.e., internal capture), as well as the anticipated walk-in patronage from other surrounding commercial buildings to the proposed retail component of the Transit Zoning Code (SD 84A and SD 84B). Application of the zoning code parking ratios would result in an overestimation of required parking for the proposed project. Further, zoning code parking requirements represent the sum of peak parking requirements for individual land uses and do not take into account the hourly variation in parking demand generated by different land uses. In addition, zoning code parking requirements do not account for the shared parking demands of residential guests and commercial patrons. Table 4.11-27 identifies the level of parking demand that would be reasonably anticipated using ULI parking demand rates in comparison with the proposed project.

Table 4.11-27 Anticipated Parking Demand Versus Provided

Anticipated Use	Amount Anticipated	Transit Zoning Code (SD 84A and SD 84B)		ULI Shared Parking	Difference (Transit Zoning Code—ULI Shared Parking Demand)
		Number of Spaces Required*	Spaces to be Provided	Number of Spaces Required	
Single-family residential	294 units	2.15 spaces per unit	632	615**	17
Multi-family residential (includes multi-family and high-rise)	3,781 units	2.15 spaces per unit	8129	7,902**	227
Retail	387,000 sf	2.5 spaces per 1,000 sf	968	843***	124

SOURCE: ULI, *Shared Parking, Second Edition*, 2005; KOA Corporation, 2008.

* The number of spaces to be provided is an average of the data shown in Table 3-2 because the actual number of spaces to be provided would vary depending on the zone in which a use would be located. 2.15 was assumed to be the average number of spaces required for the purposes of this analysis.

** The residential component assumes a split of 10 percent residents and 90 percent guests.

*** The commercial component assumes a split of 20 percent employees and 80 percent patrons.

As shown above, the Transit Zoning Code (SD 84A and SD 84B) is anticipated to provide parking in excess of the anticipated level of demand.

In addition, in a study funded by Caltrans, 26 residential transit-oriented developments, similar to those anticipated/planned under the Transit Zoning Code (SD 84A and SD 84B) and located across California in San Jose, Sacramento, Los Angeles, San Diego, and San Francisco, were surveyed for their level of parking capacity (Lund et al. n.d.). The current level of parking availability at these developments ranges from 0.96 to 2.5 parking spaces per unit with an average level of parking availability of 1.42 spaces per residential unit. Therefore, due to the historic requirements of other transit-oriented residential development in the State and the anticipated level of parking demand, the level of parking required under the proposed Transit Zoning Code (SD 84A and SD 84B) is anticipated to be adequate.

It should also be noted that, during the preparation of the Transit Zoning Code's parking requirements, an analysis of parking availability was performed for the Transit Zoning Code (SD 84A and SD 84B), focusing on the two districts (Downtown and Rail Station) that are anticipated to undergo the highest level of development. This analysis identified a high level of current parking availability within the Transit Zoning Code (SD 84A and SD 84B) area. The Downtown District was found to have approximately 945 available on-street parking spaces. The Transit Village District was found to have approximately 140 on-street parking spaces available. Therefore, because the Transit Village and Downtown Districts are anticipated to account for 62 percent of the increase in residential development and 77 percent of the retail establishments within the Transit Zoning Code (SD 84A and SD 84B), it is anticipated that the current surplus of on-street parking spaces would further ensure that adequate parking capacity is provided with implementation of the proposed project.

As such, and in conjunction with the policies of the Transit Zoning Code (SD 84A and SD 84B) identified above, it is anticipated that the level of parking availability within the Transit Zoning Code (SD 84A and SD 84B) area would be adequate, and impacts would be ***less than significant***.

Threshold	Would the proposed project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

Impact 4.11-7 **The Transit Zoning Code would not conflict with adopted policies, plans, or programs supporting alternative transportation. This impact is considered to be *less than significant*.**

The Transit Zoning Code (SD 84A and SD 84B) would not conflict with adopted policies, plans, or programs supporting alternative transportation. The proposed project would comply with City of Santa Ana Municipal Code requirements and would provide bicycle racks, parking spaces for carpool/vanpool vehicles, and display rideshare information. In addition, the proposed project is intended to provide a live-work community that would reduce daily vehicle trips, thereby encouraging alternative transportation via pedestrian and bicycle traffic. The project is also near the SARTC which offers commuter rail service and will allow residents of the project to use public transit to access other parts of the region. At the time of this writing, plans are being studied for the Santa Ana Fixed-Guideway project that would offer transit service extending from the SARTC west through the Downtown and Civic Center areas and eventually linking with the City of Garden Grove. All of the conceptual potential alignments are within the project area.

After analyzing public transit within two miles of the Transit Zoning Code (SD 84A and SD 84B), the following facilities and/or programs could be incorporated into the project to help encourage public transit patronage for program-related trips. Note that the implementation responsibility for some of these facilities and programs would fall on agencies other than Santa Ana, the lead agency for this project. Thus, coordination between the City of Santa Ana, local and regional transit providers, and the project developer would be required on several of these items. The following mitigation measure shall be implemented, as required by applicable local, state, or federal laws or regulations:

MM4.11-2 *As part of the project, the City of Santa Ana and the project sponsors shall work with the transit providers to implement various transit-related measures to improve and expand bus system service within the Transit Zoning Code (SD 84A and SD 84B) area. These measures may include, but are not limited to, the following:*

- *Adding bus stops to the Transit Zoning Code (SD 84A and SD 84B) area along existing roadways*
- *Changing bus service headways to respond to increased demand*
- *Changing bus service destinations to respond to changing demand*
- *Adding local shuttle service for employees and patrons of the Transit Zoning Code (SD 84A and SD 84B) area*

The details of bus service improvements shall be determined in coordination with OCTA. The following recommendations would help encourage public transit patronage for project-related trips:

- Bus Stop Locations—*Relocation of existing bus stops and the provision of additional bus stops should be considered to accommodate transit users at convenient locations.*
- Days of Operation—*The City should work with OCTA to consider changes to route times to serve nighttime and weekend project visitors and employees.*

- Headway—*The City should work with OCTA to review route headways to determine if it would be appropriate to reduce them to accommodate transit riders within the Transit Zoning Code (SD 84A and SD 84B) area.*

As the proposed Transit Zoning Code (SD 84A and SD 84B) would be consistent with the City's goals and policies pertaining to expanding alternative transportation, and because the proposed project is designed to facilitate alternative transportation, this impact would be ***less than significant***.

Threshold	Would the proposed project cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

Impact 4.11-8 **Long-term cumulative development under implementation of the Transit Zoning Code would cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system. Implementation of mitigation measures would reduce this impact to a *less-than-significant* level.**

Forty-five intersections under "2030 Without Project" and "2035 Without Project" conditions, and fifty intersections under "2030 With Project" and "2035 With Project" conditions, were analyzed. As identified in Table 4.11-8 through Table 4.11-15 above, conditions in the study area would remain at LOS D or better at forty-two intersections under "2030 Without Project," and conditions in the study area would remain at LOS D or better at thirty-five intersections under "2035 Without Project." Conditions in the study area would remain at LOS D or better at forty-one intersections under "2030 With Project," and conditions in the study area would remain at LOS D or better at thirty-two intersections under "2035 With Project."

2030 Intersection Analysis

AM Peak Hour

Table 4.11-28 (LOS Analysis/Determination of Impacts for 2030 Peak Hour [ICU]) and Table 4.11-29 (Determination of Impacts for 2030 Peak Hour [HCM]) provides a comparison of the levels of service and volume/capacity ratios or delay of all study scenarios for the buildout condition in the AM peak hour in 2030.

As shown in Table 4.11-28, under a full build-out scenario, the project would contribute to unacceptable levels of service at two of the intersections evaluated in the AM peak hour: Santiago at Fourth St. and U2-4 at Santa Ana Boulevard. The project impact at these intersections is considered significant based on City criteria.

PM Peak Hour

Table 4.11-28 and Table 4.11-29 provide a comparison a comparison of the levels of service and volume/capacity ratios or delay of all study intersections in the PM peak hour in 2030.

As shown in Table 4.11-28 and Table 4.11-29, under a full build-out scenario, the proposed project would contribute to unacceptable levels of service at eight intersections evaluated in the 2030 PM peak hour:

- Grand Avenue at Santa Ana Boulevard
- Lacy St. at Civic Center Dr.
- Lacy St. at Santa Ana Boulevard
- Lacy at First Street
- Santiago St. at Civic Center Dr.
- Santiago St at Fourth St.
- Mortimer St. at Fifth St.
- U2-4 at Santa Ana Boulevard

The project impact at these intersections is considered significant based on City criteria, with the exception of the intersections of Mortimer at Fifth Street and Lacy Street at Civic Center Drive. As described previously, the unacceptable LOS at these intersections are determined by the control delay for the poorest movement of each intersection, which is the minor street turn volume that is stopped or must yield to through traffic. Since each of these two intersections do not warrant a traffic signal and the major road movements operate at acceptable LOS, the intersections of Mortimer at Fifth Street and Lacy Street at Civic Center Drive are not considered to be significantly impacted.

Table 4.11-28 LOS Analysis/Determination of Impacts for 2030 Peak Hour (ICU)

	AM Peak Hour				PM Peak Hour			
Intersection	*2030 NP (ICU/LOS)*	*2030 WP (ICU/LOS)*	*Increase/ Decrease*	*Significant Impact?*	*2030 NP (ICU/LOS)*	*2030 WP (ICU/LOS)*	*Increase/ Decrease*	*Significant Impact?*
Signalized Intersections (Using ICU Method)								
Flower St. at Civic Center Dr.	0.683 / B	0.678 / B	-0.005	No	0.734 / C	0.758 / C	0.024	No
Flower St. at Santa Ana Blvd.	0.572 / A	0.587 / A	0.015	No	0.587 / A	0.596 / A	0.009	No
Parton St. at Santa Ana Blvd.	0.278 / A	0.274 / A	-0.004	No	0.372 / A	0.377 / A	0.005	No
Ross St. at Civic Center Dr.	0.517 / A	0.538 / A	0.021	No	0.474 / A	0.504 / A	0.030	No
Ross St. at Santa Ana Blvd.	0.475 / A	0.476 / A	0.001	No	0.395 / A	0.429 / A	0.034	No
Broadway at Civic Center Dr.	0.614 / B	0.634 / B	0.020	No	0.643 / B	0.654 / B	0.011	No
Broadway at Santa Ana Blvd.	0.468 / A	0.491 / A	0.023	No	0.522 / A	0.534 / A	0.012	No
Broadway at 5th St.	0.349 / A	0.354 / A	0.005	No	0.462 / A	0.486 / A	0.024	No
Broadway at 4th St.	0.298 / A	0.354 / A	0.056	No	0.409 / A	0.437 / A	0.028	No
Broadway at 3rd St.	0.336 / A	0.338 / A	0.002	No	0.613 / B	0.643 / B	0.030	No
Broadway at 1st St.	0.651 / B	0.654 / B	0.003	No	0.729 / C	0.753 / C	0.024	No
Sycamore St. at Civic Center Dr.	0.420 / A	0.439 / A	0.019	No	0.495 / A	0.525 / A	0.030	No
Main St. at Civic Center Dr.	0.751 / C	0.774 / C	0.023	No	0.750 / C	0.804 / D	0.054	No
Main St. at Santa Ana Blvd.	0.654 / B	0.666 / B	0.012	No	0.693 / B	0.726 / C	0.033	No
Main St. at 5th St.	0.499 / A	0.511 / A	0.012	No	0.633 / B	0.664 / B	0.031	No

Table 4.11-28 LOS Analysis/Determination of Impacts for 2030 Peak Hour (ICU)

Intersection	AM Peak Hour				PM Peak Hour			
	2030 NP (ICU/LOS)	2030 WP (ICU/LOS)	Increase/ Decrease	Significant Impact?	2030 NP (ICU/LOS)	2030 WP (ICU/LOS)	Increase/ Decrease	Significant Impact?
Main St. at 4th St.	0.508 / A	0.555 / A	0.047	No	0.654 / B	0.726 / C	0.072	No
Main St. at 3rd St.	0.464 / A	0.490 / A	0.026	No	0.603 / B	0.641 / B	0.038	No
Main St. at 1st St.	0.773 / C	0.771 / C	-0.002	No	0.872 / D	0.956 / E	0.084	No
Bush St. at Santa Ana Blvd.	0.295 / A	0.305 / A	0.010	No	0.403 / A	0.409 / A	0.006	No
Bush St. at 5th St.	0.242 / A	0.242 / A	0.000	No	0.442 / A	0.458 / A	0.016	No
Bush St. at 4th St.	0.270 / A	0.280 / A	0.010	No	0.464 / A	0.490 / A	0.026	No
French St. at 4th St.	0.291 / A	0.308 / A	0.017	No	0.462 / A	0.488 / A	0.026	No
Lacy St. at 4th St.	0.407 / A	0.398 / A	-0.009	No	0.567 / A	0.632 / B	0.065	No
Signalized Intersections (Using ICU Method)								
Santiago St. at Santa Ana Blvd.	0.541 / A	0.544 / A	0.003	No	0.677 / B	0.690 / B	0.283	No
Standard St. at 1st St.	0.808 / D	0.825 / D	0.017	No	0.833 / D	0.851 / D	0.018	No
Grand Ave. at Santa Ana Blvd.	0.866 / D	0.877 / D	0.011	No	0.972 / E	0.987 / E	0.015	**Yes**
Grand Ave. at 4th St.	0.646 / B	0.664 / B	0.018	No	0.728 / C	0.767 / C	0.039	No
Grand Ave. at 1st St.	0.700 / C	0.724 / C	0.024	No	0.777 / C	0.816 / D	0.039	No

ICU = Intersection capacity utilization

Table 4.11-29 Determination of Impacts for 2030 Peak Hour (HCM)

Intersection	AM Peak Hour			PM Peak Hour		
	2030 NP (Average/Worst Case Delay)/LOS	2030 WP (Average/Worst Case Delay)/LOS	Significant Impact?	2030 NP (Average/Worst Case Delay)/LOS	2030 WP (Average/Worst Case Delay)/LOS	Significant Impact?
Unsignalized Intersections						
Ross St. at 4th St.	10.8 / B	10.9 / B	No	12.3 / B	12.4 / B	No
Sycamore St. at Santa Ana Blvd.	21.8 / C	24.0 / C	No	20.8 / B	22.9 / C	No
Sycamore St. at 5th St.	15.7 / C	16.0 / C	No	13.7 / B	15.4 / C	No
Sycamore St. at 4th St.	7.9 / A	8.1 / A	No	9.1 / A	9.7 / A	No
Spurgeon St. at 1st St.	10.5 / B	10.5 / B	No	14.6 / B	15.4 / C	No
French St. at Santa Ana Blvd.	19.7 / C	19.3 / C	No	17.7 / C	20.2 / C	No
Lacy St. at Civic Center Dr.	20.3 / C	25.4 / D	No	33.2 / D	44.8 / E	Need eval
Lacy St. at Santa Ana Blvd.	34.2 / D	31.1 / D	No	51.6 / F	375.3 / F	Need eval
Lacy St. at 6th St.	7.2 / A	7.3 / A	No	7.9 / A	8.3 / A	No
Lacy St. at 1st St.	23.3 / C	32.5 / D	No	57.2 / F	OVRFL / F	Need eval

Table 4.11-29 Determination of Impacts for 2030 Peak Hour (HCM)						
	AM Peak Hour			PM Peak Hour		
Intersection	2030 NP (Average/Worst Case Delay)/LOS	2030 WP (Average/Worst Case Delay)/LOS	Significant Impact?	2030 NP (Average/Worst Case Delay)/LOS	2030 WP (Average/Worst Case Delay)/LOS	Significant Impact?
Santiago St. at Washington Ave.	17.1 / B	16.3 / C	No	26.9 / D	34.5 / D	No
Santiago St. at Civic Center Dr.	26.2 / D	23.5 / C	No	26.3 / D	42.6 / E	Need eval
Santiago St. at Brown St.	N/A	12.1 / B	No	N/A	13.9 / B	No
Santiago St. at 6th St.	N/A	11.3 / B	No	N/A	13.0 / B	No
Santiago St. at 4th St.	N/A	OVRFL / F	Need eval	N/A	OVRFL / F	Need eval
Mortimer St. at 5th St	20.3 / C	9.0 / A	No	17.8 / C	40.2 / E	Need eval
Mortimer St. at Santa Ana Blvd.	9.0 / A	21.8 / C	No	21.4 / C	23.5 / C	No
U2-4 at Santa Ana Blvd.	N/A	45.7 / E	Need eval	N/A	51.2 / F	Need eval
Signalized Intersections (Caltrans, Using HCM)						
Penn Way at I-5 SB	0.462 / C	0.439 / C	No	0.458 / C	0.473 / C	No
Santa Ana Blvd. at I-5 SB	0.499 / C	0.524 / C	No	0.520 / C	0.685 / C	No
17th St. at I-5 NB	0.782 / C	0.780 / C	No	0.958 / D	0.960 / D	No
Grand Ave at I-5 NB	0.648 / C	0.625 / C	No	1.042 / D	1.050 / D	No

Delay = Seconds per vehicle average, poorest movement

LOS = Level of service

Need Eval = Need evaluation to see if the intersection warrants a traffic signal

2035 Intersection Analysis

AM Peak Hour

Table 4.11-30 (LOS Analysis/Determination of Impacts for 2035 Peak Hour [ICU]) and Table 4.11-31 (LOS Analysis/Determination of Impacts for 2035 Peak Hour [HCM]) provides a comparison of the levels of service and volume/capacity ratios or delay of all study scenarios for the buildout condition in the AM and peak hour in 2035.

As shown in Table 4.11-30 and Table 4.11-31, under a full build-out scenario, the project would contribute to unacceptable levels of service at five intersections (in addition to those with impacts in 2030) evaluated in the AM peak hour:

- Standard at First St.
- Grand Ave at First St.
- Lacy St. at Washington Ave. Exiting
- Mortimer St. at Santa Ana Boulevard
- Grand Ave. at I-5 NB

Table 4.11-30 Determination of Impacts for 2035 Peak Hour (ICU)

Intersection	AM Peak Hour				PM Peak Hour			
	2035 NP (ICU/LOS)	2035 WP (ICU/LOS)	Increase/ Decrease	Significant Impact?	2035 NP (ICU/LOS)	2035 WP (ICU/LOS)	Increase/ Decrease	Significant Impact?
Signalized Intersections (Using ICU Method)								
Flower St. at Civic Center Dr.	0.789 / C	0.784 / C	-0.005	No	1.138 / F	1.146 / F	0.008	No
Flower St. at Santa Ana Blvd.	0.685 / B	0.695 / B	0.010	No	0.694 / B	0.703 / C	0.009	No
Parton St. at Santa Ana Blvd.	0.316 / A	0.313 / A	-0.003	No	0.428 / A	0.434 / A	0.006	No
Ross St. at Civic Center Dr.	0.634 / B	0.652 / B	0.018	No	0.564 / A	0.594 / A	0.030	No
Ross St. at Santa Ana Blvd.	0.581 / A	0.582 / A	0.001	No	0.668 / B	0.693 / B	0.025	No
Broadway at Civic Center Dr.	0.721 / C	0.740 / C	0.019	No	0.743 / C	0.754 / C	0.011	No
Broadway at Santa Ana Blvd.	0.595 / A	0.618 / B	0.023	No	0.612 / B	0.624 / B	0.012	No
Broadway at 5th St.	0.399 / A	0.404 / A	0.005	No	0.620 / B	0.645 / B	0.025	No
Broadway at 4th St.	0.449 / A	0.477 / A	0.028	No	0.610 / B	0.659 / B	0.049	No
Broadway at 3rd St.	0.406 / A	0.409 / A	0.003	No	0.803 / D	0.833 / D	0.030	No
Broadway at 1st St.	0.779 / C	0.778 / C	-0.001	No	0.844 / D	0.868 / D	0.024	No
Sycamore St. at Civic Center Dr.	0.484 / A	0.502 / A	0.018	No	0.573 / A	0.603 / B	0.030	No
Main St. at Civic Center Dr.	0.875 / D	0.899 / D	0.024	No	0.883 / D	0.938 / E	0.055	No
Main St. at Santa Ana Blvd.	0.799 / C	0.81 / D	0.011	No	0.836 / D	0.869 / D	0.033	No
Main St. at 5th St.	0.611 / B	0.623 / B	0.012	No	0.812 / D	0.843 / D	0.031	No
Main St. at 4th St.	0.613 / B	0.654 / B	0.041	No	0.776 / C	0.847 / D	0.071	No
Main St. at 3rd St.	0.533 / A	0.559 / A	0.026	No	0.694 / B	0.730 / C	0.036	No
Main St. at 1st St.	0.918 / E	0.927 / E	0.009	No	1.013 / F	1.097 / F	0.084	**Yes**
Bush St. at Santa Ana Blvd.	0.335 / A	0.346 / A	0.011	No	0.462 / A	0.467 / A	0.005	No
Bush St. at 5th St.	0.297 / A	0.296 / A	-0.001	No	0.560 / A	0.577 / A	0.017	No
Bush St. at 4th St.	0.347 / A	0.357 / A	0.010	No	0.576 / A	0.602 / B	0.026	No
French St. at 4th St.	0.342 / A	0.359 / A	0.017	No	0.543 / A	0.568 / A	0.025	No
Lacy St. at 4th St.	0.508 / A	0.465 / A	-0.043	No	0.751 / C	0.814 / D	0.063	No
Signalized Intersections (Using ICU Method)								
Santiago St. at Santa Ana Blvd.	0.904 / E	0.865 / D	-0.039	No	0.993 / E	1.011 / F	0.018	**Yes**
Standard St. at 1st St.	0.940 / E	0.957 / E	0.017	**Yes**	0.970 / E	0.988 / E	0.018	**Yes**
Grand Ave. at Santa Ana Blvd.	1.178 / F	1.188 / F	0.010	**Yes**	1.312 / F	1.314 / F	0.002	No
Grand Ave. at 4th St.	0.747 / C	0.754 / C	0.007	No	0.841 / D	0.875 / D	0.034	No
Grand Ave. at 1st St.	0.894 / D	0.918 / E	0.024	**Yes**	0.960 / E	0.998 / E	0.038	**Yes**

ICU = Intersection capacity utilization

Table 4.11-31 Determination of Impacts for 2035 Peak Hour (HCM)

Intersection	AM Peak Hour			PM Peak Hour		
	2035 NP (Average/Worst Case Delay)/LOS	2035 WP (Average/Worst Case Delay)/LOS	Significant Impact?	2035 NP (Average/Worst Case Delay)/LOS	2035 WP (Average/Worst Case Delay)/LOS	Significant Impact?
Unsignalized Intersections						
Ross St. at 4th St.	11.7 / B	11.9 / B	No	13.6 / B	13.8 / B	No
Sycamore St. at Santa Ana Blvd.	28.7 / D	32.4 / D	No	29.8 / D	34.5 / D	No
Sycamore St. at 5th St.	19.2 / C	19.7 / C	No	15.7 / C	18.1 / C	No
Sycamore St. at 4th St.	8.4 / A	8.6 / A	No	9.8 / A	10.5 / B	No
Spurgeon St. at 1st St.	11.3 / B	11.3 / B	No	18.7 / C	20.0 / C	No
French St. at Santa Ana Blvd.	24.5 / C	26.1 / D	No	24.0 / C	29.6 / D	No
Lacy St. at Civic Center Dr.	28.6 / D	37.9 / E	Need eval	69.9 / F	113.5 / F	Need eval
Lacy St. at Santa Ana Blvd.	122.1 / F	55.7 / F	Need eval	179.1 / F	OVRFL / F	Need eval
Lacy St. at 6th St.	7.3 / A	7.4 / A	No	8.1 / A	8.6 / A	No
Lacy St. at 1st St.	45.3 / E	97.4 / F	Need eval	410.8 / F	OVRFL / F	Need eval
Santiago St. at Washington Ave.	126.8 / F	112.3 / F	Need eval	143.1 / F	164.9 / F	Need eval
Santiago St. at Civic Center Dr.	280.0 / F	263.9 / F	Need eval	221.7 / F	266.2 / F	Need eval
Santiago St. at Brown St.	N/A	16.7 / C	No	N/A	19.7 / C	No
Santiago St. at 6th St.	N/A	13.7 / B	No	N/A	20.9 / C	No
Santiago St. at 4th St.	N/A	OVRFL / F	Need eval	N/A	OVRFL / F	Need eval
Mortimer St. at 5th St	9.5 / A	9.5 / A	No	33.5 / D	64.4 / F	Need eval
Mortimer St. at Santa Ana Blvd.	23.1 / A	324.2 / F	Need eval	23.0 / C	35.8 / E	Need eval
U2-4 at Santa Ana Blvd.	N/A	79.4 / F	Need eval	N/A	130.8 / F	Need eval
Signalized Intersections (Caltrans, Using HCM)						
Penn Way at I 5 SB	0.569 / C	0.546 / C	No	0.658 / C	0.672 / C	No
Santa Ana Blvd. at I 5 SB	0.643 / C	0.668 / C	No	0.615 / C	0.780 / C	No
17t St. at I 5 NB	0.903 / D	0.901 / D	No	1.108 / E	1.110 / E	**Yes**
Grand Ave at I 5 NB	0.934 / C	1.143 / E	**Yes**	1.316 / F	1.669 / F	**Yes**

Delay = Seconds per vehicle average, poorest movement

LOS = Level of service

Need Eval = Need evaluation to see if the intersection warrants a traffic signal

PM Peak Hour

Table 4.11-30 (LOS Analysis/Determination of Impacts for 2035 Peak Hour [ICU]) and Table 4.11-31 (LOS Analysis/Determination of Impacts for 2035 Peak Hour [HCM]) provide a comparison of the levels of service and volume/capacity ratios or delay of all study intersections in the PM peak hour in 2035.

As shown in Tables 4.11-30 and 4.11-31, under a full build-out scenario, the proposed project would contribute to unacceptable levels of service at eight intersections (in addition to those with impacts in 2030) evaluated in the 2035 PM peak hour:

- Main St. at First St.
- Santiago St. at Santa Ana Boulevard
- Standard at First St.
- Grand Ave at First St.
- Lacy St. at Washington Ave. Exiting
- Santiago St. at Washington Ave.
- Mortimer St. at Santa Ana Boulevard
- Grand Ave. at I-5 NB

Table 4.11-28 through Table 4.11-31 indicate the comparison of With and Without Project conditions in order to determine the project impact. As indicated, the signalized intersections which may have unacceptable level of service and project impacts under 2030 conditions per ICU (V/C) calculations include the following (ICU difference > 0.01):

- Grand Avenue at Santa Ana Boulevard

For 2035 conditions, the following additional signalized intersections have potential project impacts (ICU difference > 0.01):

- Main Street at 1st Street
- Santiago Street at Santa Ana Boulevard
- Standard Street (Santiago Street) at 1st Street
- Grand Avenue at Santa Ana boulevard
- Grand Avenue at 1st Street

The intersection of Grand Avenue at I-5 NB Ramps and Seventeenth Street at I-5 NB Ramps will operate at LOS E or F under future conditions but the project does not impose a 0.01 V/C increase for the With Project scenario. However, it may contribute to cumulative future conditions.

For unsignalized intersections, the following two intersections warrant traffic signals under existing conditions and therefore traffic signals are assumed for future improvement scenarios:

- Santiago Street at Washington Avenue
- Santiago Street at Civic Center Drive

In addition, the following unsignalized intersections warrant signals under 2030 conditions. It is considered a cumulative impact.

- Lacy Street at 1st Street
- Lacy Street at Santa Ana Boulevard
- Santiago Street at 4th Street

The following unsignalized intersections do not warrant traffic signals but operate at LOS F for the worst movement, which is due to cross traffic on the minor street or left turns onto the major street subject to long delays. Through traffic and right turns from the major street will not experience any delays at stopped intersections, however.

- Lacy Street at Civic Center Drive
- Mortimer Street at 5th Street
- U2-4 at Santa Ana Boulevard (Future Intersection)

For the intersection of U2-4 at Santa Ana Boulevard, since it is a new intersection and closely spaced with the I-5 interchange, it is suggested to be designed as right-in and right-out access only.

The intersection improvements described below are expected to fully mitigate all project traffic impacts to an acceptable level of service (LOS D or better).

MM4.11-3 *The City of Santa Ana Public Works Agency shall monitor the traffic signals within the Transit Zoning Code study area once every five years to ensure that traffic signal timing is optimized.*

MM4.11-4 *The City of Santa Ana shall institute a program for systematic mitigation of impacts as development proceeds within the Transit Zoning Code to ensure mitigation of the individual improvements. The program shall prescribe the method of participation in the mitigation program by individual projects and guide the timely implementation of the mitigation measures. The program shall include the following elements:*

- *A funding and improvement program should be established to identify financial resources adequate to construct all identified mitigation measures in a timely basis.*
- *All properties that redevelop within the Transit Zoning Code should participate in the program on a fair share per new development trip basis. The fair share should be based upon the total cost of all identified mitigation measures, divided by the peak hour trip generation increase forecast. This rate per peak hour trip should be imposed upon the incremental traffic growth for any new development within the Transit Zoning Code.*
- *The program should raise funds from full development of the Transit Zoning Code to fund all identified mitigation measures.*
- *The program should monitor phasing development of the Transit Zoning Code and defer or eliminate improvements if the densities permitted in the Transit Zoning Code are not occurring.*
- *Program phasing should be monitored through preparation of specific project traffic impact studies for any project that is expected to include more than 100 dwelling units or 100,000 sf of non-residential development. Traffic impact studies should use traffic generation rates that are deemed to be most appropriate for the actual development proposed.*
- *Properties within Santa Ana and within one-half mile of the Transit Zoning Code that redevelop to result in higher traffic generation should also participate in the program to insure equity.*

- *The City may elect to implement appropriate mitigation measures as a condition of approval of the proposed developments, where appropriate. All or part of the costs of these improvements may be considered to be a negotiated credit toward the program, however the program must be administered in a manner that assures that it can fund necessary improvements to maintain adequate level of service at all intersections within this study. If funding of priority improvements cannot be assured, credit for construction of lower priority improvements may not be assured or may be postponed until more program funds are available.*

The following mitigation measure would be implemented in conformance with mitigation measure MM4.11-4, above.

MM4.11-5 Main Street at First Street—*Install a second northbound and southbound left-turn lanes and a dedicated northbound right-turn lane for 2030 and 2035 conditions.*

MM4.11-6 Lacy Street at Santa Ana Boulevard—*Install a traffic signal and provide exclusive left-turn lane for both northbound and southbound directions for both 2030 and 2035 conditions.*

MM4.11-7 Lacy Street at First Street—*Install a traffic signal for both 2030 and 2035 conditions, a traffic signal, and provide exclusive left-turn lane for both northbound and southbound directions for both 2030 and 2035 conditions.*

MM4.11-8 Santiago Street at Washington Avenue—*Install a traffic signal and provide one exclusive left-turn lane for both eastbound and westbound traffic for 2035 conditions only.*

MM4.11-9 Santiago Street at Civic Center Drive—*Install a traffic signal and provide: one exclusive left-turn lane, one through lane, and one shared through and right-turn lane on northbound and southbound approaches; and one exclusive left-turn lane and one shared through and right lane on eastbound and westbound approaches. The improvement is only needed for 2035 conditions.*

MM4.11-10 Santiago Street at Santa Ana Drive—*Construct a second southbound left-turn lane for 2035 conditions. The improvement is only needed for 2035 conditions.*

MM4.11-11 Santiago Street a Fourth Street—*Install a traffic signal. The lane configuration for the signal is recommended as 1 Left, 1 Through, 1 Through+ Right for all approaches.*

MM4.11-12 Standard Street at First Street—*Construct third eastbound and westbound shared through-right lanes for 2035 conditions. The improvement is only needed for 2035 conditions.*

MM4.11-13 Grand Avenue at Santa Ana Boulevard—*Construct a third southbound through lane and eastbound right-turn overlap signal phasing.*

MM4.11-14 Grand Avenue at First Street—*Construct a third eastbound shared through/right-turn lane, a third westbound shared through/right-turn lane, and a third northbound through lane with dedicated northbound right-turn lane for 2035 conditions. The improvement is only needed for 2035 conditions.*

MM4.11-15 Grand Avenue at I-5 Northbound Ramps—*Construct a second westbound right-turn lane and for the I-5 northbound off ramp under both 2030 and 2035 conditions.*

The following three unsignalized intersections do not warrant traffic signals and will operate at LOS F for the worst movement due to cross traffic on the minor street or left turns onto the major street subject to long delays. For the intersection of U2-4 at Santa Ana Boulevard, since it is a new intersection for the project access, closely spaced with the I-5 interchange, it is suggested to be designed as right-in and right-out only access, which will operate at LOS B or better for all scenarios. For the other two unsignalized intersections, KOA Corporation recommends providing roundabout traffic controls or monitoring the traffic volumes and installing a traffic signal when it is warranted.

- Lacy Street at Civic Center Drive
- Mortimer Street at 5th Street
- U2-4 at Santa Ana Boulevard

The intersection improvements described above are illustrated on Figure 4.11-13 (Study Intersection Mitigation Measures). The ICU and level of service calculation with implementation of roadway improvements as described under mitigation measures MM4.11-5 through MM4.11-15 are summarized in Table 4.11-32 (Level of Service Analysis of Mitigation for 2030 AM Peak Hour Conditions) through Table 4.11-35 (Level of Service Analysis of Mitigation for 2035 PM Peak Hour Conditions).

For freeway ramps, the I-5 at Santa Ana Boulevard Northbound Off ramp is recommended to add the second ramp lane in order to mitigate the project impact. With two ramp lanes, the ramp will operate at LOS C or better for all scenarios.

Table 4.11-32 Level of Service Analysis of Mitigation for 2030 AM Peak Hour Conditions

Intersection	*Existing ICU (Delay)/LOS*	*2030 Without Project ICU (Delay)/LOS*	*2030 With Project ICU (Delay)/LOS*	*Mitigation With Project ICU (Delay)/LOS*	*Significant Impact?*
Main Street at 1st Street	0.693/B	0.773/C	0.771/C	0.782/C	No
Grand Avenue at Santa Ana Boulevard	0.792/C	0.807/D	0.793/C	0.832/D	No

Delay shown in seconds (") for unsignalized intersections and Caltrans' intersections

Table 4.11-33 Level of Service Analysis of Mitigation for 2030 PM Peak Hour Conditions

Intersection	*Existing ICU (Delay)/LOS*	*2030 Without Project ICU (Delay)/LOS*	*2030 With Project ICU (Delay)/LOS*	*Mitigation With Project ICU (Delay)/LOS*	*Significant Impact?*
Main Street at 1st Street	0.765/C	0.872/D	0.956/E	0.886/D	No
Grand Avenue at Santa Ana Boulevard	0.888/D	0.902/E	0.987/E	0.887/D	No

Delay shown in seconds (") for unsignalized intersections and Caltrans' intersections

Table 4.11-34 Level of Service Analysis of Mitigation for 2035 AM Peak Hour Conditions

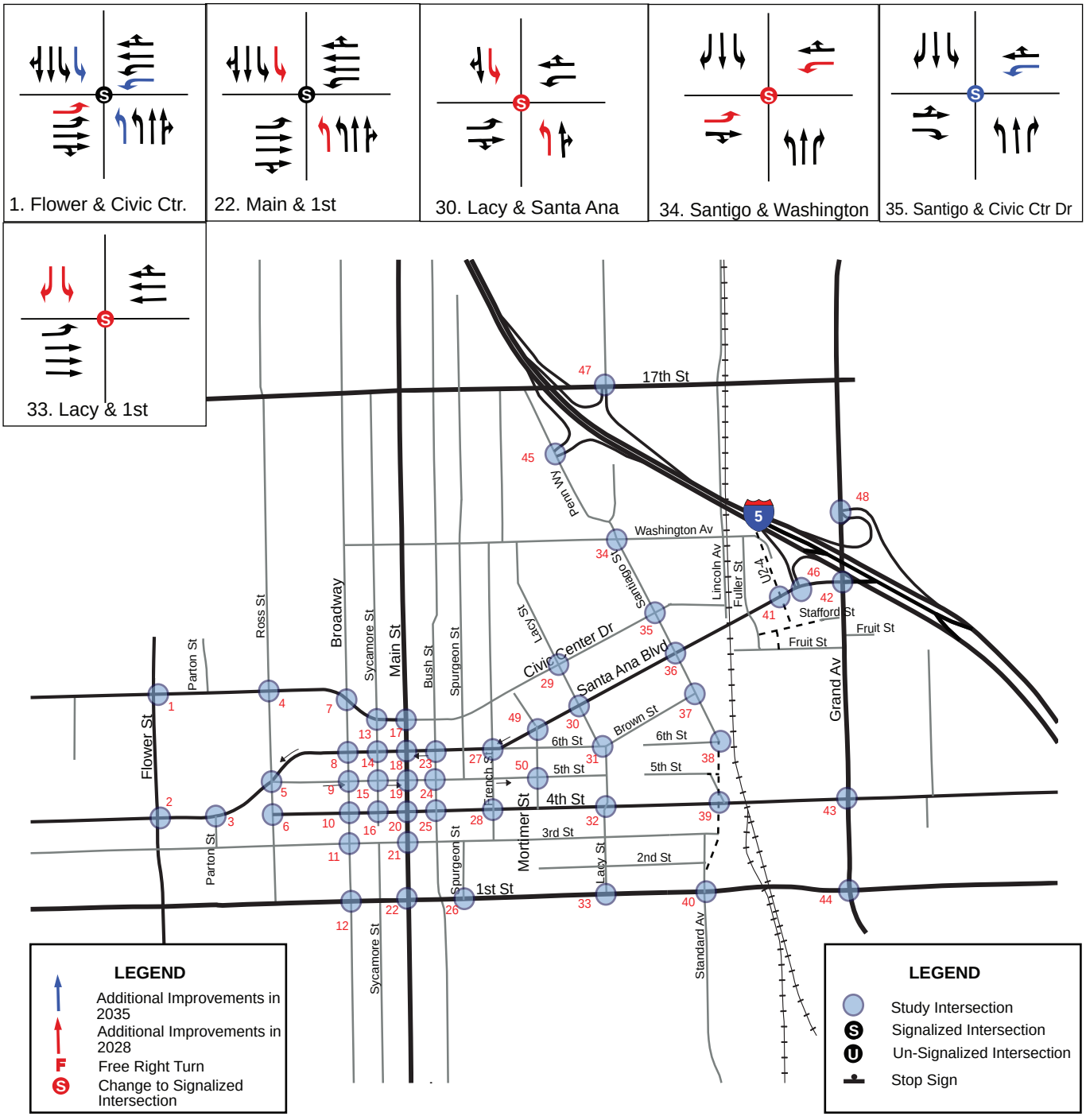
Intersection	Existing ICU (Delay)/LOS	2035 Without Project ICU (Delay)/LOS	2035 With Project ICU (Delay)/LOS	Mitigation With Project ICU (Delay)/LOS	Significant Impact?
Main Street at 1st Street	0.693/B	0.918/E	0.927/E	0.856/D	No
Santiago Street at Santa Ana Boulevard	0.481/A	0.904/E	0.865/D	0.831/D	No
Grand Avenue at 1st Street	0.764/C	0.894/D	0.918/E	0.851/D	No
Standard Street (Santiago Street) at 1st Street	0.723/C	0.940/E	0.957/E	0.764/C	No
Grand Avenue at I-5 NB Ramps	(19.8)/B	(30.2)/C	(79.9)/E	(27.1)/C	No
Unsignalized Intersections, to be Signalized					
Santiago Street at Washington Avenue	(12.7)/B	(126.8)/F	(112.3)/F	0.813/D	No
Santiago Street at Civic Center Drive	(14.5)/B	(280.0)/F	(263.9)/F	0.820/D	No
Santiago St at 4th St	N/A	N/A	OVRFL/F	0.538/A	No
Lacy Street at Santa Ana Boulevard	(25.3)/D	(122.1)/F	(55.7)/F	0.753/C	No
Lacy St at 1st St	(16.6)C	(45.3)/E	(97.4)/F	0.482/A	No

Delay shown in seconds (") for unsignalized intersections and Caltrans' intersections

Table 4.11-35 Level of Service Analysis of Mitigation for 2035 PM Peak Hour Conditions

Intersection	Existing ICU (Delay)/LOS	2035 Without Project ICU (Delay)/LOS	2035 With Project ICU (Delay)/LOS	Mitigation With Project ICU (Delay)/LOS	Significant Impact?
Main Street at 1st Street	0.765/C	1.013/F	1.097/F	0.977/E	No
Santiago Street at Santa Ana Boulevard	0.579/A	0.993/E	1.011/F	0.867/D	No
Grand Avenue at 1st Street	0.808/D	0.960/E	0.998/E	0.866/D	No
Standard Street (Santiago Street) at 1st St	0.719/C	0.970/E	0.988/E	0.818/D	No
Grand Avenue at I-5 NB Ramps	(62.3)/E	(119.9)/F	(182.8)/F	(35.7)/D	No
Unsignalized Intersections, to be Signalized					
Santiago Street at Washington Avenue	(18.1)/C	(143.1)/F	(164.9)/F	0.843/D	No
Santiago Street at Civic Center Drive	(17.4)/C	(221.7)/F	(266.2)/F	0.835/D	No
Santiago St at 4th St	N/A	N/A	Overflow/F	0.662/B	No
Lacy Street at Santa Ana Boulevard	(33.4)/D	(179.1)/F	Overflow/F	0.706/C	No
Lacy St at 1st St	(23.2)/C	(410.8)/F	Overflow/F	0.647/B	No

Delay shown in seconds (") for unsignalized intersections



***Source*:** KOA Corporation, 2007.

FIGURE **4.11-13**

Study Intersection Mitigation Measures

As shown in Table 4.11-32 through Table 4.11-35, all study area intersections would operate at acceptable levels with mitigation under the 2030 and 2035 AM and PM peak hours. As a result, impacts are considered ***less than significant***.

Effects Found to Be Significant

Impact 4.11-9 **Long-term cumulative development under implementation of the Transit Zoning Code could result in impacts related to freeway ramps in the vicinity of the Transit Zoning Code area. With implementation of mitigation, this impact would be reduced to less-than-significant levels. However, because the mitigation requires the approval of a public agency other than the City of Santa Ana, this impact would be considered *significant and unavoidable*.**

As shown above in Table 4.11-21 and Table 4.11-25, future conditions at freeway on- and off-ramps would operate at LOS C or better under a full build-out scenario, with the exception of the northbound off-ramp at the I-5 Santa Ana Boulevard interchange. As stated previously, an increase of 0.03 V/C would be considered potentially significant for the purposes of this analysis, consistent with the CMP criteria. As such, the impact of the proposed project would be considered potentially significant during the PM peak hour.

However, the northbound off-ramp is currently restricted to one lane of traffic. With implementation of the following mitigation measure, the LOS under future conditions would be improved from LOS F to LOS C.

MM4.11-16 I-5 at Santa Ana Blvd.—Northbound Off-Ramp—*The City of Santa Ana Department of Public Works shall coordinate with Caltrans for the installation of a second ramp lane for the I-5 northbound off ramp. The improvement shall be implemented to mitigate 2035 conditions.*

It should be noted that the City's contribution to the improvement of the off-ramp would be determined and funded by the program established as part of mitigation measure MM4.11-18, above. With implementation of mitigation measure MM4.11-18, the presence of two ramp lanes would improve the level of service of the northbound off-ramp to LOS C or better and result in a less than significant impact. However, the City, as the lead agency for this project, has no control over major freeway improvements. Therefore, in order to be implemented, the mitigation measure for the off-ramp must be permitted by a jurisdiction other than the City of Santa Ana, specifically Caltrans. If such permission is not given, the potentially significant traffic impact addressed by mitigation measure MM4.11-18 would remain unmitigated, and the impact of a full build-out scenario under the Transit Zoning Code would, therefore, be ***significant and unavoidable***.

4.11.4 Cumulative Impacts

The traffic analysis provided in this section considers trips generated by cumulative projects in its development of future baseline conditions. Therefore, the cumulative impact analysis is incorporated into

the Year 2030 and the Year 2035 analyses presented in Section 4.11.3. As identified in Impact 4.11-8, because implementation of the proposed project would contribute to significant impacts at the study area intersections, and because implementation of the potential improvement measures cannot be guaranteed, the long-term cumulative development pursuant to the Transit Zoning Code would have a considerable contribution to cumulative impacts. Therefore, cumulative impacts would be ***significant and unavoidable***.

4.11.5 References

KOA Corporation. 2010. *Santa Ana Renaissance Specific Plan Traffic Study*, January.

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Santa Ana, City of. 1998. Circulation Element. *Santa Ana General Plan.* Adopted February 2, 1998.

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