NORTH PARK | MID-CITY BIKEWAYS

ORANGE BIKEWAY

Traffic and Safety Impact Assessment

JUNE 2019

Lead Agency:

San Diego Association of Governments (SANDAG)

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EXECUTIVE SUMMARY

This Traffic and Safety Impact Assessment (TSIA) has been prepared to determine potential traffic impacts associated with the proposed Orange Bikeway project on the surrounding roadway network and to evaluate safety impacts of the project design for people who walk and bike in the project area. Preparation of this assessment is required before the San Diego Association of Governments (SANDAG), the project's lead agency, can make a determination whether the proposed project is exempt from the California Environmental Quality Act (CEQA) under Public Resources Code Section 21080.20.5. This executive summary highlights the findings of the assessment; further detail and explanations can be found in the report following this section.

Project Information

The proposed Orange Bikeway will make it easier and safer for people of all ages and abilities to walk and bike in the San Diego community of City Heights, a vibrant neighborhood in the City's urban core. The Orange Bikeway will be 2.1 miles and will run along Orange Avenue between 32nd Street and Estrella Avenue. The proposed bikeway will also provide important connections to several regional bikeways including Howard Bikeway to the west, University Bikeway to the east, and Central Avenue Bikeway in the center.

Orange Avenue currently operates as a two-lane collector roadway with a two-way left-turn lane and is a designated Class III bike route. Average daily traffic (ADT) volumes on Orange Avenue currently range between 6,000 and 11,300 vehicles per day. The City of San Diego's Bicycle Master Plan classifies Orange Avenue as a future bicycle boulevard. Bicycle boulevards are streets designed to give priority to non-motorized users, like people riding bikes and walking, and discourage cut-through traffic by motor vehicles originating from and destined for areas outside of the immediate neighborhood.

The Orange Bikeway project proposes Class II buffered bike lanes on Orange Avenue between Boundary Street / 32nd Street and Estrella Avenue, enabled through the removal of the center turn lane and left turn pockets. The project will also include traffic calming and volume reduction design features to create a low-stress bicycle facility and enhance safety for all road users along Orange Avenue. These design features include neighborhood traffic circles, curb extensions, pedestrian-actuated crossings, bicycle boxes, leading pedestrian intervals, raised crosswalks, high-visibility crosswalks, and channelizer medians (also referred to as median island traffic diverters).

While the project is not anticipated to generate new vehicle trips, the proposed channelizer medians will reduce cut-through traffic on Orange Avenue. This cut-through traffic is expected to be redistributed to parallel routes such as El Cajon Boulevard and University Avenue. This report analyzes the operations of the existing network with the redistributed vehicle traffic on these parallel roadways. The anticipated trip assignment to parallel routes was calculated based on Streetlight GPS data and existing turning movement counts and was approved by the City of San Diego in December 2018.

Analysis Scenarios

Four scenarios were analyzed as part of this study, listed below:

- Existing (2019) Conditions
- Existing (2019) Conditions Plus Project
- Near Term (2022) Baseline Conditions
- Near Term (2022) Baseline Conditions Plus Project

The study area included 32 intersections along Orange Avenue, El Cajon Boulevard, University Avenue, and Polk Avenue.

Project Traffic Impacts

Vehicle traffic conditions were assessed for the analysis scenarios listed in the section above using the "level of service" (LOS) methodology, which categorizes traffic conditions for intersections and roadway segments from LOS A to LOS F. Free-flowing traffic conditions are represented by LOS A, whereas LOS F represents the highest level of traffic congestion. This report uses the City of San Diego's adopted criteria for evaluating vehicular traffic conditions at intersections and on roadway segments. LOS A through LOS D meet the City's operational criteria. Additionally, the *City of San Diego Significance Thresholds for Traffic Impacts* notes that if the study area operates below the City's standard both with and without the proposed project, and additional criteria is met, the project is not considered to create a vehicular traffic impact.

The proposed project is expected to reduce vehicular traffic volumes on Orange Avenue from between 6,000 and 11,300 vehicles per day to between 2,000 and 5,000 vehicles per day. The displaced traffic is anticipated to use parallel routes such as El Cajon Boulevard and University Avenue. Under existing plus project conditions, all intersections and roadway segments would operate at LOS D or better except for the following:

- Intersection: El Cajon Boulevard and Fairmount Avenue (LOS E – AM Peak)
- Roadway Segment: University Avenue – Swift Avenue to 35th Street (LOS F)
- Roadway Segment: University Avenue – 35th Street to Wilson Avenue (LOS F)
- Roadway Segment: University Avenue – 43rd Street to Fairmount Avenue (LOS E)
- Roadway Segment: University Avenue – Fairmount Avenue to 44th Street (LOS E)
- Roadway Segment: University Avenue – 48th Street to Estrella Avenue (LOS E)
- Roadway Segment: 33rd Street – El Cajon Boulevard to Orange Avenue (LOS E) *
- Roadway Segment: Euclid Avenue - El Cajon Boulevard to Orange Avenue (LOS F) *
- Roadway Segment: Euclid Avenue – Orange Avenue to Polk Avenue (LOS F) *

  * Indicates that the roadway segment operates at the stated LOS in both with and without project conditions.

Project Safety Impacts

The proposed safety enhancement features on Orange Avenue will improve the environment for people walking and decrease the level of traffic stress for people biking along the corridor. Enhancements to the walking environment include reduced crossing distances, increased visibility of people walking, and pedestrian-actuated crossings. The level of traffic stress for people biking will be reduced by providing buffered bike lanes, reducing vehicle travel speeds, and reducing vehicle traffic volumes.

The bicycle level of traffic stress (BLTS) was evaluated on Orange Avenue, El Cajon Boulevard, and University Avenue within the study area. BLTS is a methodology which categorizes the comfort of a roadway for people biking from 1 to 4. LTS 1 represents a street that is comfortable for people of almost all ages and abilities to bike, while LTS 4 represents a street that only the most experienced riders are likely to be comfortable using. Orange Avenue currently provides LTS 2 bicycle facilities, while El Cajon Boulevard and University Avenue provide LTS 3 and LTS 4 facilities. The Orange Bikeway Project will improve the comfort of people biking on the corridor to LTS 1, a level of traffic stress considered to be suitable for almost all ages and abilities.

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1 INTRODUCTION

This Traffic and Safety Impact Assessment (TSIA) has been prepared to determine the potential traffic and safety impacts associated with the proposed Orange Bikeway Project, previously part of the Howard-Orange Bikeway Project. Preparation of this assessment is required before the San Diego Association of Governments (SANDAG), the project's lead agency, can make a determination whether the proposed project is exempt from the California Environmental Quality Act (CEQA) under Public Resources Code Section 21080.20.5.

1.1 PROJECT DESCRIPTION

The proposed project includes the construction of approximately 2 miles of bikeway along Orange Avenue from 32nd Street to Estrella Avenue. The proposed Orange Bikeway Project includes Class II buffered bike lanes with various traffic calming and volume reduction elements, including neighborhood traffic circles, curb extensions, pedestrian-actuated crossings, bicycle boxes, leading pedestrian intervals, raised crosswalks, high visibility crosswalks, and channelizer medians. The current concepts showing the proposed project are provided in **Appendix A**.

In July 2017, a draft Traffic and Safety Impact Assessment was developed for the Howard-Orange Bikeway Project which included the 3.25-mile corridor of Howard Avenue and Orange Avenue from Park Boulevard to Estrella Avenue. Since the draft was submitted, two significant changes to the project have occurred:

1. Project Limits – The Howard Avenue and Orange Avenue segments of the bikeway project have been separated into two projects. This document considers only the portion of the project now known as the Orange Bikeway, defined as the portion of Orange Avenue between 32nd Street and Estrella Avenue.

2. Channelizer Medians (Median Island Traffic Diverters) – A traffic calming element has been added to the project in order to reduce vehicular traffic volumes by minimizing cut-through traffic using Orange Avenue. The proposed channelizer medians will require drivers to turn right, rather than driving through an intersection, while allowing people walking and biking to travel through the intersection. They are designed to reduce cut-through traffic and create a safer and more comfortable experience for people biking and walking by lowering traffic volumes and speeds. Three channelizer medians are proposed for the Orange Bikeway Project at 35th Street, Fairmount Avenue, and Euclid Avenue. This document considers the expected vehicular traffic diversion resulting from the implementation of these channelizer medians. Exhibits showing the anticipated traffic volumes shifts are provided in **Appendix B**.

In addition to the features listed above and shown in the concepts, the project may include other treatments to help facilitate the safe and comfortable movement of people walking, biking, and driving along the corridor. Physical improvements that may be installed as part of the proposed project could include painted crossings at intersections or at mid-block, rapid rectangular crossing beacons (RRFBs), advanced signal phases for people walking and biking, new traffic signal equipment, new raised medians, curb extensions, accessible curb ramps, sidewalks, pedestrian refuge islands, modifications to existing curbs, gutters and drainage inlets, colored concrete and/or colored pavement, intersection crossing (or "conflict") markings, bike lane markings, shared lane markings, new signage, lane striping, new trees or landscaping, landscaping or other measures to treat storm water, relocating existing above or below ground utilities, new lighting at priority locations, and similar minor physical improvements.

1.2 PROJECT OBJECTIVES

The Orange Bikeway is one of seven segments planned as part of the North Park | Mid-City Bikeways, which will add approximately 13 miles of bike facilities and connect the North Park and Mid-City neighborhoods. The 2-mile Orange Bikeway Project proposes to close gaps within the regional bike network and improve the comfort and safety of people who bike in the project area, as well as make Orange Avenue more pleasant for everyone – people who walk, bike, work, and live there.

The proposed project will help make biking a viable transportation choice for people of all ages and abilities through the implementation of buffered bike lanes and traffic calming features that reduce vehicle speeds and volumes to enhance the safety and comfort of the street. Proposed traffic calming features include neighborhood traffic circles, curb extensions, pedestrian-actuated crossings, bicycle boxes, leading pedestrian intervals, raised crosswalks, high-visibility crosswalks, and channelizer medians. These facilities provide varying degrees of perceived and actual safety desired by people who are interested in biking for transportation, but who are concerned about the safety of riding on streets with higher levels of traffic stress.

The proposed bikeway will also provide important connections to several regional bikeways including Howard Bikeway to the west, University Bikeway to the east, and Central Avenue Bikeway in the center. These planned regional bikeways connect to and through the following neighborhoods: University Heights, North Park, City Heights, and Eastern Area.

Analysis of ninety large American cities confirmed a positive correlation between how many people ride bikes and the supply of bike paths and lanes, even when controlling for other factors such as city size, climate, topography, vehicle ownership, income, and student population (Buehler, 2012). Building facilities for people that walk and bike enhances safety for all roadway users, especially for women, senior citizens, and people who do not have experience riding bikes (FHWA 2015). A major reason existing ridership levels in the region are not higher is because of the high levels of perceived and actual risks associated with riding a bike on the street (SANDAG 2010). Based on case studies nationwide, a large percentage of the population currently “interested in biking, but concerned about safety,” is expected to begin to ride and to ride, more often, when served by a network of safe bikeways and low stress streets (NITC 2014).

1.3 CONSISTENCY WITH REGIONAL PLANNING DOCUMENTS

The proposed project is part of the San Diego Association of Governments (SANDAG) Regional Bike Plan Early Action Program (Bike EAP), a 10-year effort to expand the regional bike network and complete the high-priority projects approved in *Riding to 2050: The San Diego Regional Bike Plan* (Regional Bike Plan) (SANDAG 2010). The Regional Bike Plan and Bike EAP are part of larger goals for the region to increase transportation choices and to make riding a bike a viable, attractive transportation choice.

Based on factors such as its high-density development, mixed land use patterns, population characteristics, facility gaps, incidence of collisions, and public comments, the Howard – Orange corridor was identified by SANDAG as an area where investments in bikeway infrastructure would yield substantial benefits. As a result, the proposed project is ranked as a “high-priority project” in the Regional Bike Plan (SANDAG 2010).

The project is also part of the City of San Diego’s Bicycle Master Plan and the Mid-City Communities Plan, which identify Orange Avenue as a bicycle boulevard. Bicycle boulevards are low-stress routes that give priority to non-motorized users and are designed to reduce vehicular speeds and volumes, creating a safe and comfortable environment for people walking and biking.

There is clear and consistent policy direction at the local, regional, and state levels to enhance safety, provide connected infrastructure that supports biking and walking as viable choices for everyday trips, and reduce greenhouse gas and other air pollutant emissions. The following plans and policies align with the goals and objectives of this project:

- The City of San Diego Bicycle Master Plan (2013)
- The City of San Diego Climate Action Plan (2015)
- The SANDAG Regional Bike Plan (2010)
- San Diego Forward: The Regional Plan (2015)
- The SANDAG Climate Action Strategy (2010)
- The Mid-City Communities Plan (1998)

1.4 ANALYSIS SCENARIOS

Four scenarios were analyzed as part of this study, listed below:

- ***Existing (2019) Conditions****:* Represents the traffic conditions of the existing street network in place in early-2019.
- ***Existing (2019) Conditions Plus Project:*** Represents the traffic conditions on the existing street network with the redistribution of vehicle traffic on the roadway network as a result of the proposed channelizer medians on Orange Avenue. Comparison of this scenario to the Existing Conditions scenario helps to determine direct project impacts associated with the project.
- ***Near Term (2022) Baseline Conditions:*** Represents the traffic conditions of the street network assumed in year 2022, the projected opening year of the project. This scenario does not include projected traffic associated with the proposed project.
- ***Near Term (2022) Plus Project:*** Represents the traffic conditions under Near Term (2022) with the addition of the proposed project. Comparison of this scenario to the Near Term (2022) Baseline Conditions Scenario helps to determine direct project impacts associated with the project.

The Existing Conditions Plus Project and the Near Term Plus Project scenarios were analyzed considering the impacts of the three channelizer medians on Orange Avenue and the surrounding roadway network. The methodology for developing the diversion trends from Orange Avenue to El Cajon Boulevard, Polk Avenue, and University Avenue are discussed in the December 2018 document called Estimation of Vehicular Volume Changes from Implementation of Channelizer Medians on Orange Avenue, included in **Appendix B**.

2 METHODOLOGY

The following section describes the methodology used to determine study intersections, analyze study area conditions, and determine significant traffic impacts.

2.1 STUDY AREA

The study area for evaluation was selected based on the following criteria:

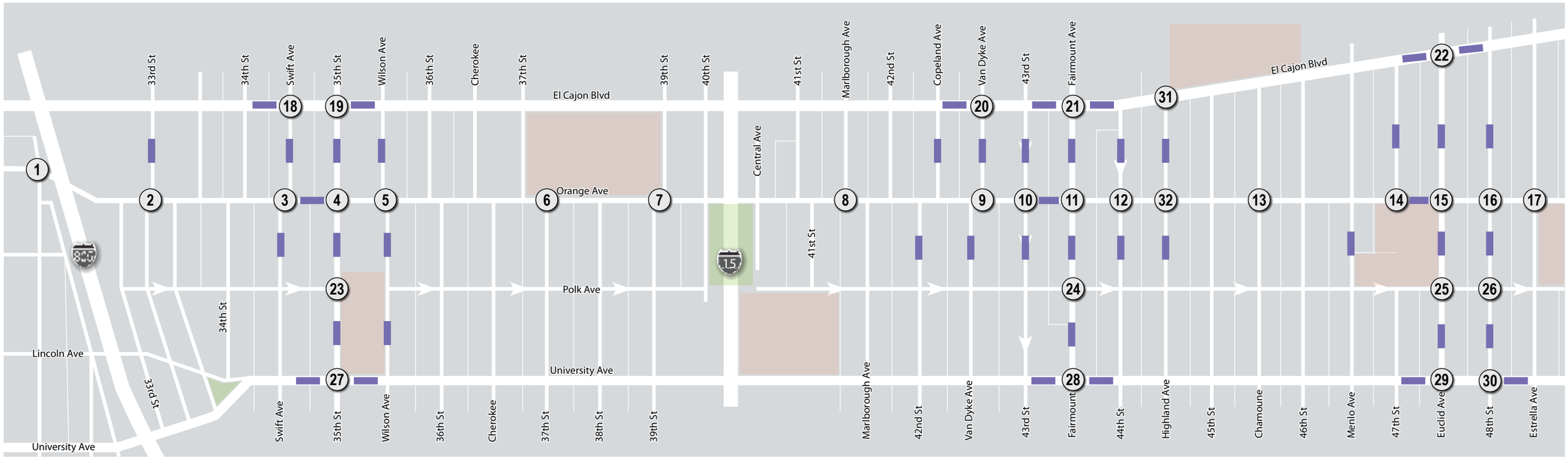
- All signalized intersections along Orange Avenue within the limits of the project.
- A representative sample of unsignalized intersections.
- All intersections where the proposed channelizer medians are estimated to add 50 or more additional peak hour directional trips along El Cajon Boulevard, Polk Avenue and University Avenue.
- All intersections within one block of a proposed channelizer median.
- Representative roadway segments of Orange Avenue, El Cajon Boulevard and University Avenue.
- All roadway segments on cross streets within one block of a proposed channelizer median.
- All roadway segments where the proposed channelizer medians are estimated to add 200 or more vehicle trips per day.

Table 2-1 illustrates the intersections included in the study area showing the existing control type. **Figure 2-1** illustrates the study area for the project showing both intersections and roadway segments included for evaluation.

Table 2-1 Study Intersections

Intersection		Existing Traffic Control (a)
1	Howard Ave & 32nd St/Boundary St	TWSC
2	Orange Ave & 33rd St (North)	Signal
3	Orange Ave & Swift Ave	TWSC
4	Orange Ave & 35th St	Signal
5	Orange Ave & Wilson Ave	TWSC
6	Orange Ave & 37th St (North)	TWSC
7	Orange Ave & 39th St	TWSC
8	Orange Ave & Marlborough Ave (South)	Signal
9	Orange Ave & Van Dyke Ave	TWSC
10	Orange Ave & 43rd St	Signal
11	Orange Ave & Fairmount Ave	Signal
12	Orange Ave & 44th St	TWSC
13	Orange Ave & Chamoune Ave	AWSC
14	Orange Ave & 47th St	TWSC w/ RRFB
15	Orange Ave & Euclid Ave	Signal
16	Orange Ave & 48th St	TWSC
17	Orange Ave & Estrella Ave	AWSC
18	El Cajon Blvd & Swift Ave	TWSC
19	El Cajon Blvd & 35th St	Signal
20	El Cajon Blvd & Van Dyke Ave	TWSC
21	El Cajon Blvd & Fairmount Ave	Signal
22	El Cajon Blvd & Euclid Ave	Signal
23	Polk Ave & 35th St	AWSC
24	Polk Ave & Fairmount Ave	TWSC w/ RRFB
25	Polk Ave & Euclid Ave	Signal
26	Polk Ave & 48th St	TWSC
27	University Ave & 35th St	Signal
28	University Ave & Fairmount Ave	Signal
29	University Ave & Euclid Ave	Signal
30	University Ave & 48th St	TWSC
31	El Cajon Blvd & Highland Ave	Signal
32	Orange Ave & Highland Ave	AWSC

(a) Signal = Traffic Signal;
AWSC = All-Way Stop Control;
TWSC = Two-Way Stop Control or One-Way Stop Control
RRFB = Rectangular Rapid Flashing Beacon (Pedestrian-actuated crossing)



LEGEND

(#) Study Intersection

Study Roadway Segment

Figure 2-1
Study Area

2.2 CAPACITY ANALYSIS PROCESS

The *City of San Diego Traffic Impact Study (TIS) Manual* provides guidelines for preparing traffic impact studies. The analysis process includes evaluating the operations at the intersections for the AM and PM peak periods, and the operations along the roadway segments based on Average Daily Traffic (ADT). Intersection analyses were measured and quantified using the Synchro traffic analysis software package. Roadway segments were measured and quantified by the applicable roadway classification planning-level capacities and ADT volumes. Analysis results are compared to the City threshold standards for significance to determine if the project has any significant impacts.

2.2.1 ANALYSIS SOFTWARE

Synchro 10 (Trafficware), using the methodologies outlined in the 6th Edition of the *Highway Capacity Manual (HCM),* was used for the operational analysis of signalized and unsignalized intersections, as well as the proposed neighborhood traffic circle.

2.2.2 SIGNALIZED AND UNSIGNALIZED INTERSCTIONS

The Highway Capacity Manual (*HCM)* published by the Transportation Research Board establishes procedures to evaluate roadway facilities and rate their ability to process traffic volumes. The terminology "level of service" is used to provide a qualitative evaluation based on certain quantitative calculations, which are related to empirical values. The criteria for the various levels of service designations for intersections are given in **Table 2-2**.

Level of service (LOS) for signalized intersections analyzes the intersection operation based on average control delay per vehicle for the peak 15-minute period within the hour analyzed. The average control delay includes initial deceleration delay, queue move-up time, final acceleration time, and stop delay.

LOS for unsignalized intersections is determined by the computed or measured control delay and is defined for each movement. At an all-way stop control intersection, the delay reported is the worst control delay of all approaches at the intersection. At a one-way or two-way stop-controlled intersection, delay is reported for each stop-controlled movement.

The following list contains the assumptions used for the intersection analyses:

- HCM 6th Edition methodology
- Peak-hour factor (PHF) = Measured in field PHFs were used for all scenarios
- Percent of heavy vehicle (PHV) = 2 percent

The City threshold for intersection operations is not met if implementation of the proposed project causes one of the following criteria to be met:

1. An intersection operating at LOS D or better under existing or future conditions without the project worsens to LOS E or F with the proposed project, or
2. The delay at an intersection operating at LOS E or F without the proposed project increases by more than 2.0 or 1.0 seconds, respectively, because of the proposed project.

Table 2-2 LOS Criteria for Intersections

LOS	Control Delay (sec/veh)		Description
	Signalized Intersections (a)	Unsignalized Intersections (b)	
A	≤10.0	≤10.0	Operations with very low delay occurring with favorable progression and/or short cycle lengths.
B	>10.0 and ≤20.0	>10.0 and ≤15.0	Operations with low delay occurring with good progression and/or short cycle lengths.
C	>20.0 and ≤35.0	>15.0 and ≤25.0	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures are noticeable.
D	>35.0 and ≤55.0	>25.0 and ≤35.0	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high v/c ratios. Many vehicles stop and individual cycle failures are noticeable.
E	>55.0 and ≤80.0	>35.0 and ≤50.0	Operations with high delay values indicating poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.
F	>80.0	>50.0	Operations with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.

Notes:

(a) Highway Capacity Manual 6th Edition, Chapter 19, Page 16, Exhibit 19-8

(b) Highway Capacity Manual 6th Edition, Chapter 20, Page 6, Exhibit 20-2

2.2.4 ROADWAY SEGMENTS

The roadway segment capacity analysis identifies the LOS scores for each study roadway segment using capacity thresholds and associated LOS documented in the *City of San Diego Traffic Impact Study Manual* and shown in **Table 2-3**. The existing and future ADT values are compared to the design capacity of the roadway, as determined by City of San Diego planning documents, to determine the volume-to-capacity (V/C) ratio for each segment. This V/C analysis is then used to determine a LOS score for each roadway segment based on the City of San Diego criteria.

The V/C analysis is performed to determine whether the proposed project will result in:

- Traffic conditions on any roadway segment worsen from LOS D or better without the proposed project to LOS E or LOS F with the proposed project.
- A V/C ratio increase of more than 0.02 for LOS E roadway segments or 0.01 for LOS F roadway segments.

If a proposed project does not result in one of the above scenarios, then traffic conditions on that roadway meet the City of San Diego thresholds.

Table 2-3 City of San Diego Roadway Segment Capacity and LOS

Road		Level of Service (LOS)				
Class	**Lanes**	**A**	**B**	**C**	**D**	**E**
Freeway	8	60,000	84,000	120,000	140,000	150,000
Freeway	6	45,000	63,000	90,000	110,000	120,000
Freeway	4	30,000	42,000	60,000	70,000	80,000
Expressway	6	30,000	42,000	60,000	70,000	80,000
Prime Arterial	6	25,000	35,000	50,000	55,000	60,000
Major Arterial	6	20,000	28,000	40,000	45,000	50,000
Major Arterial	4	15,000	21,000	30,000	35,000	40,000
Collector	4	10,000	14,000	20,000	25,000	30,000
Collector (No center lane) (Two-way left-turn lane)	4 2	5,000	7,000	10,000	13,000	15,000
Collector (No fronting property)	2	4,000	5,500	7,500	9,000	10,000
Collector (Commercial/Industrial fronting)	2	2,500	3,500	5,000	6,500	8,000
Collector (Multi-family)	2	2,500	3,500	5,000	6,500	8,000
Sub-Collector (Single family)	2	---	---	2,200	---	---

Notes:
The volumes and the average daily level of service listed above are only intended as a general planning guideline.
Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic.
Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.
Cross Section: Curb to Curb width (feet)/Right-of-way width (feet)
Sources:
City of San Diego Traffic Impact Study Manual, Table 2, Page 8, July 1998.

2.3 SAFETY ANALYSIS PROCESS

The safety assessment for the Orange Bikeway Project includes a historical crash data analysis, a level of traffic stress analysis for existing and proposed bicycle facilities, and an evaluation of the safety impacts of the proposed project on people walking and biking.

2.3.1 CRASH DATA ANALYSIS

Collisions involving people walking and biking were assessed as a part of the analysis of the Existing Conditions Without the Project scenario. Collision data was collected from the Statewide Integrated Traffic Records System (SWITRS) of the State of California, maintained by the California Highway Patrol. Collision data was assessed using data from 2013 to 2017 for Orange Avenue, El Cajon Boulevard, and University Avenue within the study area. This data was evaluated with a focus on collisions resulting in fatalities or injuries.

2.3.2 LEVEL OF TRAFFIC STRESS ANALYSIS

The Mineta Transportation Institute (MTI) published a Low-Stress Bicycling and Network Connectivity analysis, which establishes a methodology for evaluating the level of traffic stress for people biking on a designated bicycle facility. The approach outlined in the MTI report uses roadway network data, including posted speed limit, number of travel lanes, and presence and character of bicycle lanes, as a proxy for the comfort level of people who bike. For this analysis, roadway segments, intersection crossings, and intersection approaches (for people riding bikes) are classified into one of four levels of traffic stress (LTS 1-4) to characterize the actual and perceived safety of roadways for people biking. The lowest level of traffic stress, LTS 1, is assigned to roads that will be tolerable for most children to ride, as well as multi-use trails or physically separated bicycle facilities that are restricted for vehicle traffic use. LTS 2 roads are those that could be comfortably ridden by the mainstream adult population. The higher levels of traffic stress, LTS 3 and 4, correspond to roads typically only used voluntarily by types of cyclists who will tolerate higher vehicle traffic volumes and speeds (Geller 2005). LTS 3 is the level assigned to roads that will be acceptable for current “enthused and confident” cyclists and LTS 4 is assigned to segments that are only acceptable to “strong and fearless” people who bike. To support use of regional bikeways by people of all ages and abilities, including the Orange Bikeway, the SANDAG bikeway program strives to achieve LTS 1 and LTS 2 with its projects wherever possible.

Table 2-4 identifies the LTS criteria for roadway segments with bikeways or bike lanes. **Table 2-5** identifies the LTS criteria for roadway segments without bikeways or bike lanes. **Table 2-6** and **Table 2-7** identify the LTS criteria for intersection crossings at unsignalized intersections with and without a median, respectively. To evaluate the LTS for people biking along roadway segments in the study area, the LTS analysis considers several factors, such as the presence or absence of bike facilities, number of travel lanes, and the posted speed limit.

2.3.3 SAFETY FEATURES EVALUATION

The Orange Bikeway Project proposes several treatments to facilitate the safe and comfortable movement of people walking, biking, and driving along the corridor. Each of these treatments was evaluated to determine the safety impacts along the Orange Avenue corridor, as well as the impacts on the parallel corridors where traffic will be diverted to as a result of this project.

Table 2-4 Level of Traffic Stress Criteria for Roadway Segments with Bikeways or Bike Lanes

Criteria	LTS ≥ 1	LTS ≥ 2	LTS ≥ 3	LTS ≥ 4
Physically Separated Bikeway[1]				
Physical Separation Present	Yes	N/A	N/A	N/A
Bike Lanes Alongside Parking Lanes				
Through Lanes Per Direction	1	N/A	2+	N/A
Bike & Parking Lane Combined Width (feet)	≥ 15	14 to 14.5	≤ 13	N/A
Speed Limit (mph)	≤ 25	30	35	≥ 40
Bike Lane Blockage	Rare	N/A	Frequent	N/A
Bike Lanes Not Alongside Parking Lanes				
Through Lanes Per Direction	1	2 with median	≥ 2, 2 without median	N/A
Bike Lane Width (feet)	≥ 6	≤ 5.5	N/A	N/A

Source: Mekuria, 2012
Note:

1. Physically separated bikeways (Class I or Class IV) automatically receive an LTS score of 1, regardless of other conditions. Since the LTS methodology does not distinguish between physical separation and striped separation, a striped buffer of greater than 2 feet in width is considered physical separation for the LTS analyses.

Table 2-5 Level of Traffic Stress Criteria for Roadway Segments without Bikeways or Bike Lanes

Speed Limit (mph)	2-3 Lanes	4-5 Lanes	≥ 6 Lanes
≤ 25	LTS 1 or 2[1]	LTS 3	LTS 4
30	LTS 2 or 3[1]	LTS 4	LTS 4
≥ 35	LTS 4	LTS 4	LTS 4

Source: Mekuria, 2012
Notes:

1. The lower LTS values are assigned to residential streets with no centerline striping.

Table 2-6 Level of Traffic Stress Criteria for Unsignalized Intersection Crossings Without a Median Refuge Island

Speed Limit (mph) (Street Crossed)	2-3 Lanes	4-5 Lanes	≥ 6 Lanes
≤ 25	LTS 1	LTS 2	LTS 4
30	LTS 1	LTS 2	LTS 4
≥ 35	LTS 2	LTS 3	LTS 4
≥ 40	LTS 4	LTS 4	LTS 4

Source: Mekuria, 2012
Notes:

Table 2-7 Level of Traffic Stress Criteria for Unsignalized Intersection Crossings With a Median Refuge Island

Speed Limit (mph) (Street Crossed)	2-3 Lanes	4-5 Lanes	≥ 6 Lanes
≤ 25	LTS 1	LTS 1	LTS 2
30	LTS 1	LTS 2	LTS 3
≥ 35	LTS 2	LTS 3	LTS 4
≥ 40	LTS 3	LTS 4	LTS 4

Source: Mekuria, 2012
Notes:

3 EXISTING CONDITIONS

This section summarizes the existing roadway circulation network, daily and peak-hour traffic volumes, and operations at the study intersections and roadway segments.

3.1 ROAD NETWORK

The following provides a description of the existing street system within the vicinity of the project area, as of March 2019.

Orange Avenue is an east-west roadway that currently functions as a two-lane collector with center-left-turn-lane between Interstate 805 (I-805) and Colts Way. Orange Avenue is a mostly residential street with direct access to some schools and parks, including Teralta Park, Euclid Elementary School, Ibarra Elementary School, Arroyo Paseo Charter High School, and Wilson Middle School. Orange Avenue contains existing curbs, sidewalks, and intermittent landscaped parkway strips and street trees along the roadway. Parallel parking is allowed on both sides of Orange Avenue. The posted speed limit is 25 mph and the street currently functions as a Class III bike route.

El Cajon Boulevard provides east-west connectivity across the North Park and Mid-City communities and currently functions as a six-lane major arterial west of 43rd Street, and a four-lane major arterial east of 43rd Street. El Cajon Boulevard runs parallel to the project corridor to the north and provides direct access to a number of local destinations including Arroyo Paseo Charter High School, Wilson Middle School, and commercial areas. El Cajon Boulevard contains existing curbs, sidewalks, and a raised landscaped median for a majority of the corridor. Parallel parking is allowed on both sides of El Cajon Boulevard. The posted speed limit is 35 mph.

Polk Avenue is a one-lane, one-way, local roadway traveling in the eastbound direction parallel to Orange Avenue. The roadway does not connect across the community due to schools and parks creating barriers for cut-through traffic. Polk Avenue provides direct access to a number of local destinations including Edison Elementary School, Teralta Park, Our Lady of the Sacred Heart School, Euclid Elementary School, and Ibarra Elementary School. Polk Avenue has existing curbs, sidewalks and street trees line both sides of the roadway. Parallel parking exists on both sides of the roadway. The posted speed limit is 25 mph.

University Avenue provides east-west connectivity across the Hillcrest, North Park, Mid-City communities and into the City of La Mesa, and generally functions as a two-lane collector with a two-way left-turn lane within the study area. University Avenue runs parallel to Orange Avenue to the south, providing direct access to a number of local destinations such as Edison Elementary School, Central Elementary School, and City Heights Retail Village. University Avenue contains existing curbs, sidewalks, and street trees along both sides of the roadway, and parallel parking is allowed along most segments of University Avenue. The posted speed limit is 30 mph.

35th Street is a north-south roadway classified as a two-lane local collector road extending from Wilshire Drive to Swift Avenue. Adjacent to the project corridor, 35th Street provides existing bike lane coverage northbound to Monroe Avenue and southbound to Edison Elementary and University Avenue. 35th Street contains existing curbs, sidewalks, and street trees along the roadway. Parallel parking is allowed in most sections of 35th Street, but angled parking is provided in the segment next to Edison elementary school. The posted speed limit is 30 mph and it includes existing Class II bike lanes.

37th Street is a two-lane north-south local road that extends from Madison Avenue to Myrtle Avenue. Directly north of the project corridor, 37th Street provides access to Arroyo Paseo Charter High School and El Cajon Boulevard. 37th Street has existing curbs, sidewalks, and street trees on both sides. Parallel and angled parking exists on both sides of the roadway. The posted speed limit is 30 mph.

39th Street is a north-south roadway that functions as a two-lane local road extending from Circle Drive to Landis Street. Directly north of the project corridor, 39th Street provides access to Wilson Middle School and El Cajon Boulevard. 39th Street has existing curbs, sidewalks, and intermittent landscaped parkway strips on both sides. Driveways exist along the roadway with both parallel and perpendicular parking allowed in sections along 39th Street. The posted speed limit is 30 mph.

40th Street is a north-south roadway classified as a one- to two-lane major arterial that extending from Adams Avenue to Landis Street. Directly south of the project corridor, 40th Street provides access to Teralta Park. 40th Street contains existing curbs, sidewalks, and street trees along the roadway. Parallel parking is allowed in most sections of 40th Street with angled parking allowed in the section next to Teralta Park. The posted speed limit is 25 mph.

Marlborough Drive is a north-south roadway that functions as a two-lane local road extending from Palisades Road to Thorn Street. Near the project corridor, Marlborough Drive provides access to Our Lady of the Sacred Heart Church as well as other residential and commercial facilities in the southbound direction north of University Avenue. Marlborough Drive contains existing curbs, sidewalks, and intermittent landscaped strips on both sides. Driveways exist along the roadway with primarily angled parking allowed on both sides of the roadway. The posted speed limit is 25 mph.

43rd Street functions as a southbound two- to three-lane major arterial extending from Meade Avenue to Fairmont Avenue. Directly north of the project corridor, 43rd Street provides access to a mix of commercial and residential developments. 43rd Street has existing curbs, sidewalks, and street trees on both sides. Driveways exist along the roadway with primarily parallel and angled parking along most sections of 43rd Street. The posted speed limit is 30 mph.

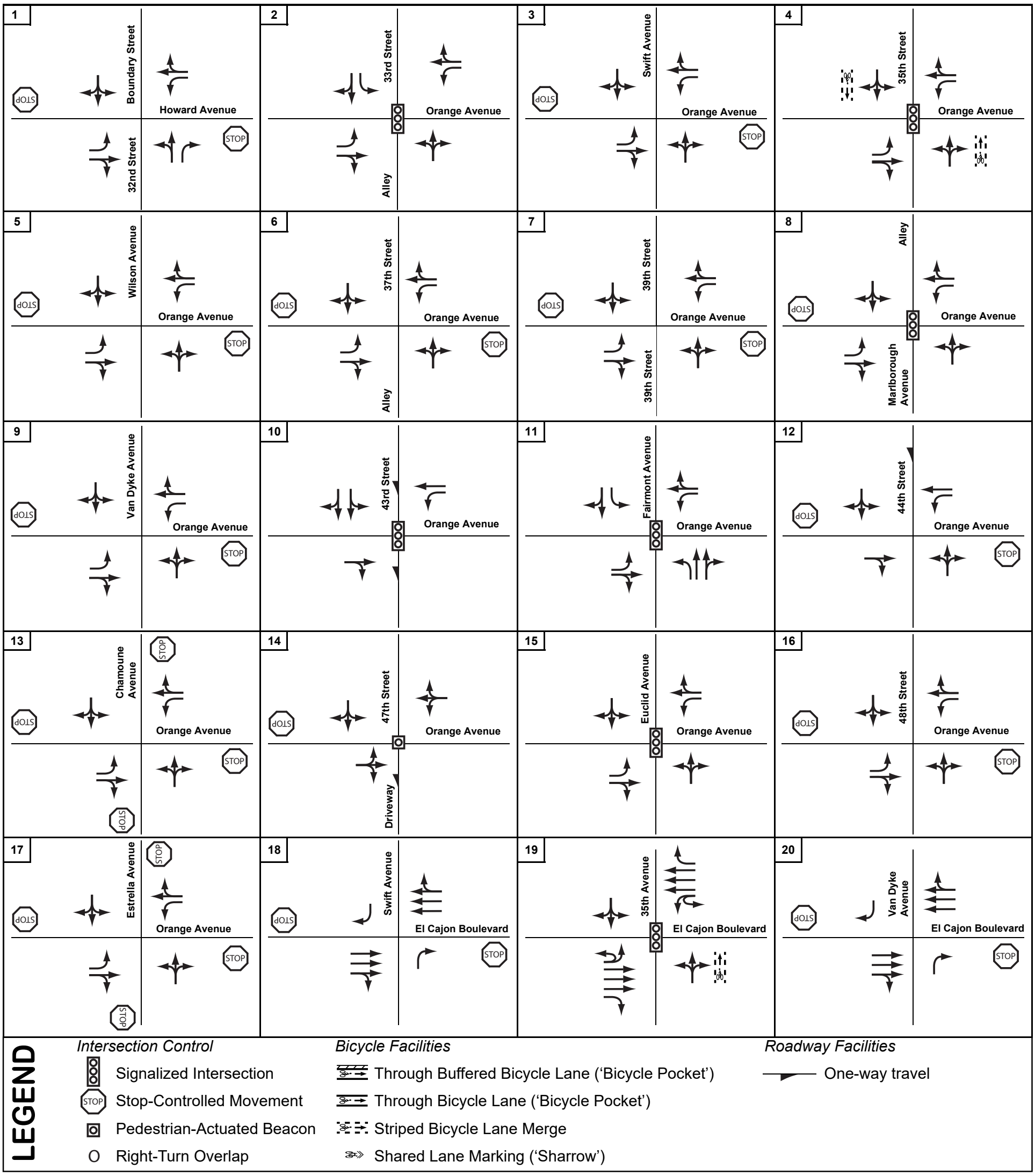
Fairmount Avenue is a north-south roadway classified as a three-lane major arterial extending from I-8 to 47th Street. Near the project corridor, Fairmount Avenue provides access to a dense area of commercial, retail, and residential developments in both the northbound and southbound directions. Fairmount Avenue contains curbs and sidewalks on both sides of the roadway. Parallel parking is allowed in most sections of Fairmount Avenue. The posted speed limit is 30 mph.

Chamoune Avenue functions as a two-lane local roadway that extends from El Cajon Boulevard to Redwood Street. Near the project corridor, Chamoune Avenue provides access to a mix of residential properties in both the northbound and southbound directions. Chamoune Avenue contains landscaped parkway strips, trees, curbs, and sidewalks on both sides. Driveway access exist along the roadway with parallel parking along most sections of Chamoune Avenue. The posted speed limit is 30 mph.

Euclid Avenue is a north-south roadway classified as a two-lane collector that extends from Adams Avenue to Sweetwater Road. Directly south of the project corridor, Euclid Avenue provides access to Euclid Elementary school and a residential development. North of the Orange Bikeway, Euclid Avenue provides access to single and multi-family residential properties. Euclid Avenue contains curbs, crosswalks, and sidewalks on both sides of the roadway. Parallel parking is allowed in most sections of Euclid Avenue. The posted speed limit is 25 mph.

Estrella Avenue is a north-south local roadway that extends from Adams Avenue to University Avenue. Directly south of the project corridor, Estrella Avenue provides access to Ibarra Elementary school and a residential development. North of the Orange Bikeway, Euclid Avenue provides access to single and multi-family residential properties. Estrella Avenue has existing curbs, sidewalks, and street trees on both sides. Driveways exist along the roadway with parallel parking allowed along most sections of the roadway.

Figure 3-1 shows the existing geometrics of the study intersections and roadways within the study area.



LEGEND

Intersection Control

- Signalized Intersection
- Stop-Controlled Movement
- Pedestrian-Actuated Beacon
- Right-Turn Overlap

Bicycle Facilities

- Through Buffered Bicycle Lane (‘Bicycle Pocket’)
- Through Bicycle Lane (‘Bicycle Pocket’)
- Striped Bicycle Lane Merge
- Shared Lane Marking (‘Sharrow’)

Roadway Facilities

- One-way travel

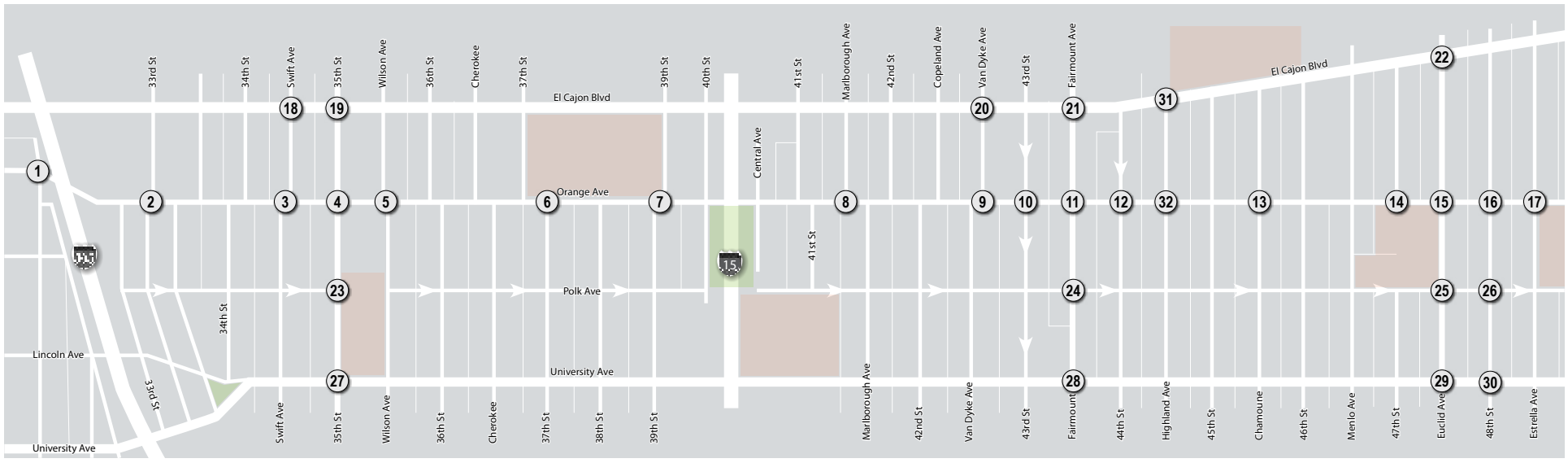
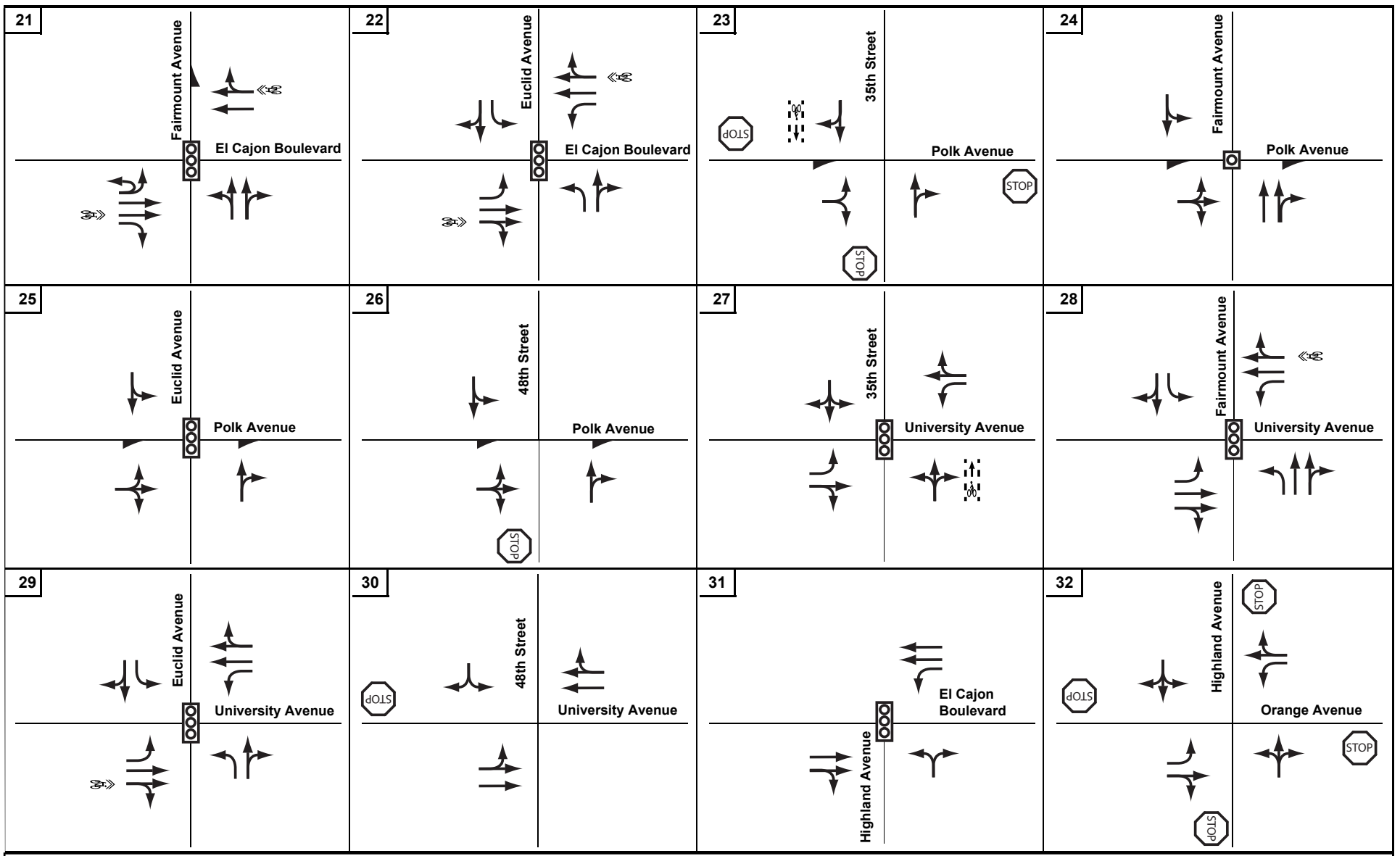


Figure 3-1
Existing Intersection Lane Configurations



LEGEND

Intersection Control

- Signalized Intersection
- Stop-Controlled Movement
- Pedestrian-Actuated Beacon
- Right-Turn Overlap

Bicycle Facilities

- Through Buffered Bicycle Lane ('Bicycle Pocket')
- Through Bicycle Lane ('Bicycle Pocket')
- Striped Bicycle Lane Merge
- Shared Lane Marking ('Sharrow')

Roadway Facilities

- One-way travel

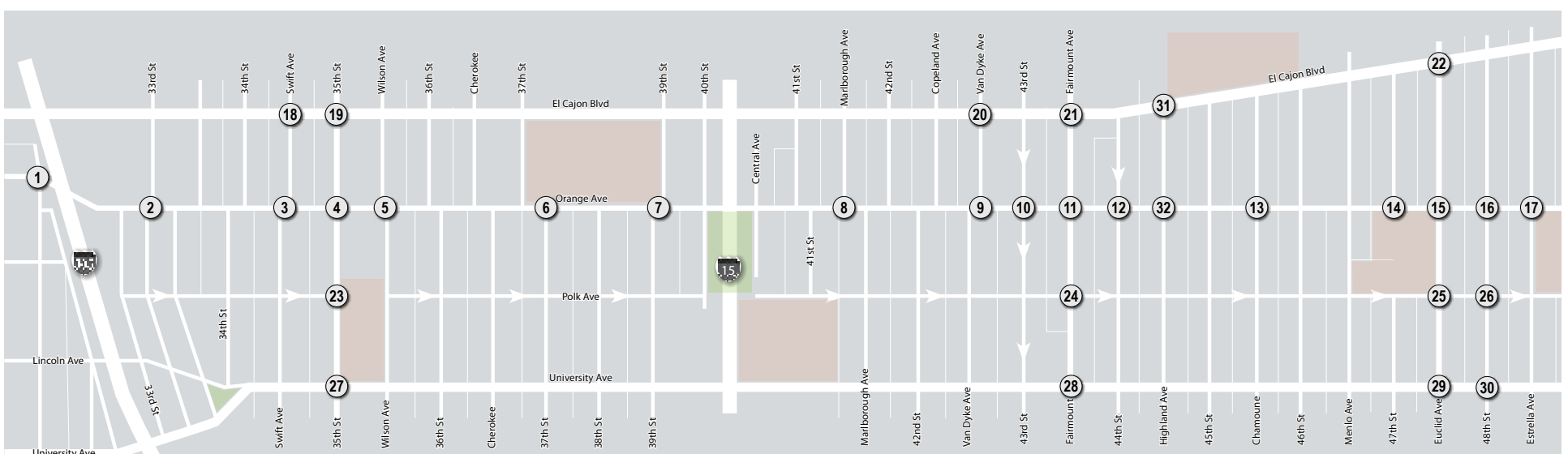


Figure 3-1
Existing Intersection Lane Configurations (Continued)

3.2 TRAFFIC VOLUMES

Peak-hour intersection turning movement counts were collected by National Data and Surveying Services (NDS) on February 26, 2019 and February 27, 2019 for the intersections along El Cajon Boulevard, Polk Avenue and University Avenue. Peak-hour counts along Orange Avenue were collected prior to 2017 and extracted from previous studies. Counts were performed during the AM peak between 7:00 and 9:00 AM, and during the PM between 4:00 and 6:00 PM.

24-Hour roadway segment data for the study roadway segments was collected by NDS on a Tuesday, Wednesday, or Thursday between February 26, 2019 and March 6, 2019. Additional roadway counts were obtained from the 2017 traffic analysis.

For volumes obtained prior to 2019, an annual growth factor of two percent was applied to increase volumes to Existing Year 2019.

Appendix C contains the existing traffic volume data at the study intersections and the existing ADT volume data for the roadway segments.

Figure 3-2 illustrates the existing traffic volumes at the study intersections and ADT volumes along the roadway segments.

3.3 INTERSECTION ANALYSIS

Table 3-1 displays the intersection analysis for the study intersections under Existing (2019) Conditions. As shown in the table, all intersections currently operate at LOS D or better during both peak periods except for the following intersection:

- Orange Avenue and Van Dyke Avenue – (LOS E – AM Peak)

The project is expected to decrease traffic volumes on Orange Avenue as a result of the channelizer medians, which will improve traffic operations along the Orange Avenue corridor including at the Orange Avenue and Van Dyke Avenue intersection. Appendix D contains the intersections LOS calculation worksheets.

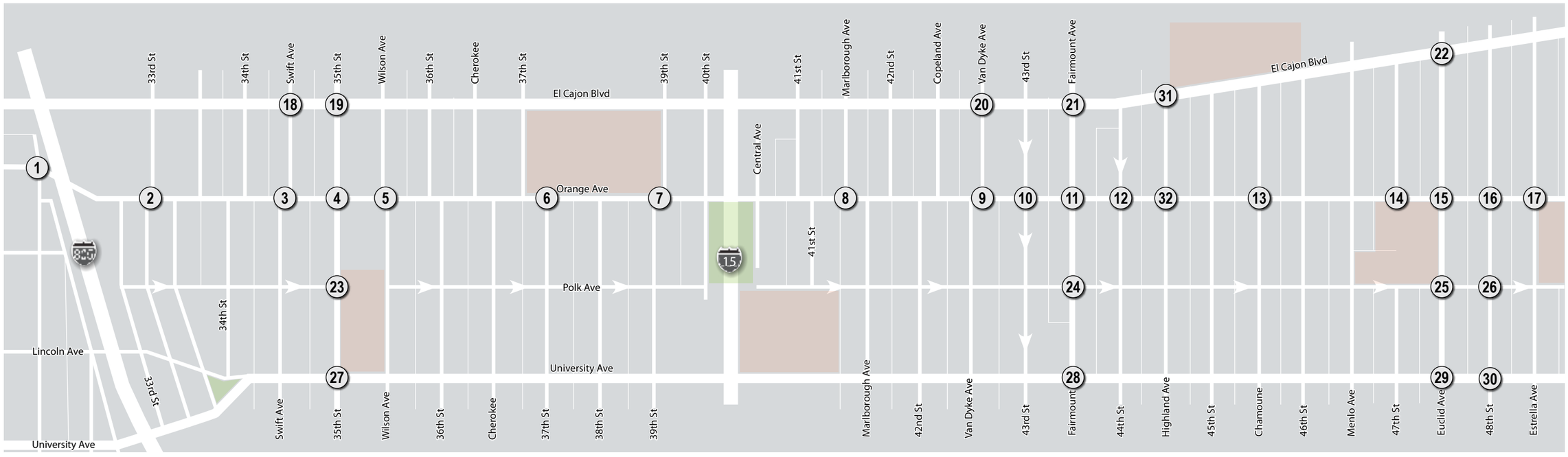
3.4 ROADWAY SEGMENT ANALYSIS

Table 3-2 displays the City roadway segment analysis under Existing (2019) Conditions per City of San Diego guidelines. As shown in the tables, all roadway segments within the study area currently operate at LOS D or better except for the following segments:

- University Avenue – Swift Avenue to 35th Street (LOS E)
- University Avenue – 35th Street to Wilson Avenue (LOS E)
- 33rd Street – El Cajon Boulevard to Orange Avenue (LOS E)
- Euclid Avenue - El Cajon Boulevard to Orange Avenue (LOS F)
- Euclid Avenue – Orange Avenue to Polk Avenue (LOS F)

1				2				3				4				5				6				7				8			
	3 / 1	32nd St	0 / 3 271 / 218 28 / 42 Howard Ave		39 / 104 2 / 5 52 / 251	33rd St	213 / 145 254 / 193 7 / 6 Orange Ave		8 / 9 0 / 3 5 / 2	Swift Ave	4 / 12 406 / 278 32 / 36 Orange Ave		19 / 39 68 / 93 43 / 46	35th St	95 / 48 339 / 273 24 / 28 Orange Ave		8 / 22 5 / 4 3 / 5	Wilson Ave	15 / 19 453 / 297 41 / 33 Orange Ave		7 / 20 3 / 8 24 / 36	37th St	66 / 49 289 / 293 14 / 23 Orange Ave		36 / 28 7 / 11 16 / 11	39th St	162 / 51 313 / 292 38 / 33 Orange Ave		3 / 1 2 / 0 0 / 2	Marlborough Ave	607 / 354 70 / 75 Orange Ave	
	1 / 1 83 / 273 14 / 39		26 / 18 1 / 1 27 / 52		73 / 69 110 / 245		5 / 1 4 / 0		1 / 9 149 / 398 17 / 58		48 / 39 9 / 2 33 / 39		38 / 37 156 / 357 16 / 46		59 / 27 105 / 65 45 / 30		13 / 23 180 / 384 20 / 34		22 / 19 7 / 10 29 / 16		36 / 19 207 / 349 15 / 16		9 / 12 4 / 5 30 / 19		55 / 34 183 / 348 49 / 48		48 / 35 50 / 16 71 / 49		284 / 454 54 / 81		115 / 71 68 / 43	

9				10				11				12				13				14				15				16			
	14 / 30 3 / 7 2 / 7	Van Dyke Ave	24 / 21 472 / 326 11 / 26 Orange Ave		76 / 61 253 / 457 48 / 146	43rd St	501 / 331 18 / 26 Orange Ave		5 / 15 55 / 134 9 / 59	Fairmount Ave	132 / 124 322 / 295 41 / 51 Orange Ave		47 / 58 8 / 13 12 / 15	44th St	435 / 358 13 / 17 Orange Ave		24 / 30 98 / 63 23 / 22	Chamoune Ave	57 / 31 327 / 282 43 / 34 Orange Ave		21 / 30 3 / 1 6 / 24	47th St	36 / 30 390 / 278 30 / 12 Orange Ave		54 / 61 148 / 298 23 / 39	Euclid Ave	65 / 60 195 / 214 66 / 70 Orange Ave		43 / 43 12 / 17 1 / 4	48th St	7 / 10 312 / 228 11 / 22 Orange Ave	
	35 / 17 241 / 404 17 / 45		105 / 32 42 / 15 35 / 40		0 / 1 322 / 396 37 / 61		0 / 1		50 / 79 183 / 390 44 / 74		157 / 101 790 / 370 56 / 46		217 / 447 13 / 20		16 / 10 10 / 15		30 / 22 164 / 380 22 / 36		26 / 29 170 / 53 28 / 20		28 / 17 154 / 372 20 / 10				46 / 47 128 / 281 65 / 88		75 / 57 320 / 237 42 / 58		19 / 28 168 / 315 5 / 23		24 / 20 27 / 13 14 / 10	



LEGEND

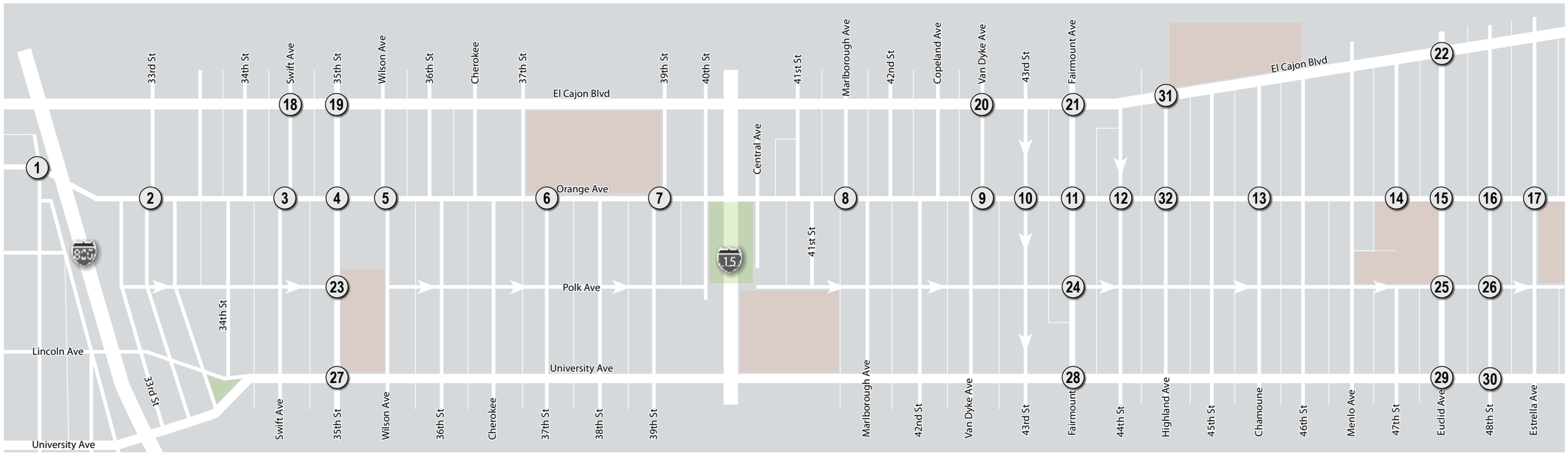
(#) Study Intersection

⇦ X / Y AM / PM Peak Hour Turning Volume

Figure 3-2
Existing (2019) Peak Hour Volumes

17				18				19				20				21				22				23				24			
	29 / 31 34 / 32 14 / 12	Estrella Ave			10 / 23	Swift Ave			79 / 59 60 / 65 27 / 34	35th St			71 / 53	Van Dyke Ave				Fairmount Ave			48 / 40 95 / 245 22 / 49	Euclide Ave			90 / 164	35th St			108 / 255 7 / 17	Fairmount Ave	
	3 / 5 273 / 243 21 / 26	Orange Ave			26 / 11 908 / 729	El Cajon Blvd			72 / 35 746 / 634 19 / 66	El Cajon Blvd			38 / 35 1030 / 768	El Cajon Blvd			338 / 154 982 / 699	El Cajon Blvd			105 / 54 962 / 694 67 / 83	El Cajon Blvd				Polk Ave				Polk Ave	
28 / 28 167 / 301 9 / 15			25 / 22 34 / 23 29 / 14	339 / 854 13 / 14			14 / 23	16 / 66 307 / 733 30 / 78			109 / 47 109 / 66 34 / 49	869 / 1483 19 / 44			101 / 53	217 / 84 598 / 1255 54 / 144			86 / 104 783 / 366 63 / 110	32 / 38 466 / 1025 55 / 145			173 / 52 179 / 154 63 / 90	20 / 10 22 / 17		149 / 113	11 / 28 11 / 21 17 / 37		974 / 524 33 / 33	

25				26				27				28				29				30				31				32			
	258 / 457 11 / 26	Euclid Ave			29 / 28 3 / 10	48th St			41 / 47 27 / 76 39 / 64	35th St			31 / 39 87 / 172 78 / 126	Fairmount Ave			33 / 70 239 / 389 23 / 50	Euclid Ave			17 / 46 7 / 13	48th St				Highland Ave			36 / 24 6 / 11 22 / 23	Highland Ave	
		Polk Ave				Polk Ave			63 / 22 440 / 397 18 / 28	University Ave			151 / 86 442 / 331 84 / 100	University Ave			74 / 51 634 / 472 176 / 191	University Ave			20 / 21 854 / 670	University Ave			1208 / 739 24 / 24	El Cajon Blvd			118 / 80 208 / 171 36 / 14	Orange Ave	
24 / 34 17 / 46 34 / 52			498 / 357 18 / 18	12 / 11 20 / 80 11 / 16			45 / 51 6 / 17	26 / 24 234 / 444 14 / 31			83 / 39 66 / 43 19 / 22	119 / 91 352 / 615 67 / 109			122 / 132 688 / 401 55 / 86	63 / 67 257 / 588 35 / 82			114 / 53 380 / 251 112 / 193	11 / 17 481 / 819				526 / 1230 25 / 76		104 / 58	31 / 51	32 / 24 132 / 238 10 / 31		14 / 18 9 / 6 46 / 19	



LEGEND

(#) Study Intersection

⇦ X / Y AM / PM Peak Hour Turning Volume

Figure 3-2
Existing (2019) Peak Hour Volumes (Continued)

Table 3-1 Existing (2019) Conditions Intersection Analysis Summary

Intersection		Traffic Control (a)	Peak Hour	Existing Conditions	
				Delay (b)	LOS (c)
1	Howard Ave & 32nd St	TWSC	AM	11.2	B
			PM	13.2	B
2	Orange Ave & 33rd St	Signal	AM	13.2	B
			PM	14.5	B
3	Orange Ave & Swift Ave	TWSC	AM	15.0	C
			PM	19.2	C
4	Orange Ave & 35th St	Signal	AM	9.3	A
			PM	8.3	A
5	Orange Ave & Wilson Ave	TWSC	AM	15.8	C
			PM	20.1	C
6	Orange Ave & 37th St	TWSC	AM	16.1	C
			PM	18.6	C
7	Orange Ave & 39th St	TWSC	AM	28.2	D
			PM	20.7	C
8	Orange Ave & Marlborough Ave	Signal	AM	6.9	A
			PM	5.5	A
9	Orange Ave & Van Dyke Ave	TWSC	AM	43.0	**E**
			PM	19.6	C
10	Orange Ave & 43rd St	Signal	AM	10.1	B
			PM	12.3	B
11	Orange Ave & Fairmount Ave	Signal	AM	16.5	B
			PM	11.5	B
12	Orange Ave & 44th St	TWSC	AM	12.8	B
			PM	13.6	B
13	Orange Ave & Chamoune Ave	AWSC	AM	19.2	C
			PM	17.9	C
14	Orange Ave & 47th St	TWSC	AM	12.2	B
			PM	13.8	B
15	Orange Ave & Euclid Ave	Signal	AM	13.7	B
			PM	15.3	B
16	Orange Ave & 48th St	TWSC	AM	16.1	C
			PM	16.5	C
17	Orange Ave & Estrella Ave	AWSC	AM	10.7	B
			PM	13.2	B
18	El Cajon Blvd & Swift Ave	TWSC	AM	13.4	B
			PM	13.3	B
19	El Cajon Blvd & 35th St	Signal	AM	17.9	B
			PM	17.9	B
20	El Cajon Blvd & Van Dyke Ave	TWSC	AM	16.5	C
			PM	22.0	C
21	El Cajon Blvd & Fairmount Ave	Signal	AM	49.1	D
			PM	17.6	B

Intersection		Traffic Control (a)	Peak Hour	Existing Conditions	
				Delay (b)	LOS (c)
22	El Cajon Blvd & Euclid Ave	Signal	AM	23.7	C
			PM	24.9	C
23	Polk Ave & 35th St	AWSC	AM	8.1	A
			PM	7.9	A
24	Polk Ave & Fairmount Ave	TWSC	AM	11.1	B
			PM	12.2	B
25	Polk Ave & Euclid Ave	Signal	AM	5.1	A
			PM	5.8	A
26	Polk Ave & 48th St	TWSC	AM	9.0	A
			PM	9.8	A
27	University Ave & 35th St	Signal	AM	10.4	B
			PM	10.9	B
28	University Ave & Fairmount Ave	Signal	AM	42.3	D
			PM	36.0	D
29	University Ave & Euclid Ave	Signal	AM	42.2	D
			PM	39.9	D
30	University Ave & 48th St	TWSC	AM	15.8	C
			PM	15.6	C
31	El Cajon Blvd & Highland Ave	Signal	AM	12.8	B
			PM	10.6	B
32	Orange Ave & Highland Ave	AWSC	AM	11.3	B
			PM	8.6	A

Notes:
Bold values indicate intersections operating at LOS E or F.
(a) Signal = Traffic Signal, TWSC = Two-Way Stop Control, AWSC = All Way Stop Control.
(b) Delay refers to the average control delay for the entire intersection measured in seconds per vehicle. At TWSC intersections, delay refers to the worst movement.
(c) LOS calculations based on methodologies outlined in the 6th Edition HCM and performed using Synchro 10.

TABLE 3-2
EXISTING (2019) CONDITIONS
ROADWAY ANALYSIS SUMMARY

ROADWAY SEGMENT	ROADWAY CLASSIFICATION (a)	LOS E CAPACITY	ADT	V/C RATIO (b)	LOS
Orange Avenue					
Swift Avenue to 35th Street	2 Lane Collector (continuous left-turn lane)	15,000	8,500	0.567	C
43rd Street to Fairmount Avenue	2 Lane Collector (continuous left-turn lane)	15,000	11,275	0.752	D
47th Street to Euclid Avenue	2 Lane Collector (continuous left-turn lane)	15,000	6,120	0.408	B
El Cajon Boulevard					
34th Street to Swift Avenue	6 Lane Major Arterial	50,000	19,460	0.389	A
35th Street to Wilson Avenue	6 Lane Major Arterial	50,000	19,065	0.381	A
Copeland Avenue to Van Dyke Avenue	6 Lane Major Arterial	50,000	27,100	0.542	B
43rd Street to Fairmount Avenue	5 Lane Major Arterial	45,000	28,065	0.624	C
Fairmount Avenue to 44th Street	4 Lane Major Arterial	40,000	27,570	0.689	C
Euclid Avenue to 48th Street	4 Lane Major Arterial	40,000	24,250	0.606	C
University Avenue					
Swift Avenue to 35th Street	2 Lane Collector (continuous left-turn lane)	15,000	13,824	0.922	**E**
35th Street to Wilson Avenue	2 Lane Collector (continuous left-turn lane)	15,000	13,600	0.907	**E**
43rd Street to Fairmount Avenue	4 Lane Collector	30,000	20,000	0.667	D
Fairmount Avenue to 44th Street	4 Lane Collector	30,000	20,440	0.681	D
47th Street to Euclid Avenue	4 Lane Collector	30,000	18,860	0.629	C
48th Street to Estrella Avenue	4 Lane Collector	30,000	20,715	0.691	D
33rd Street					
El Cajon Boulevard to Orange Avenue	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	6,505	0.813	**E**
Swift Avenue					
El Cajon Boulevard to Orange Avenue	2 Lane Sub-Collector (single-family)	2,200	522	0.237	A
Orange Avenue to Polk Avenue	2 Lane Sub-Collector (single-family)	2,200	1,820	0.827	A
35th Street					
El Cajon Boulevard to Orange Avenue	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	4,260	0.533	C
Orange Avenue to Polk Avenue	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	3,100	0.388	B
Wilson Avenue					
El Cajon Boulevard to Orange Avenue	2 Lane Sub-Collector (single-family)	2,200	1,075	0.489	A
Orange Avenue to Polk Avenue	2 Lane Sub-Collector (single-family)	2,200	1,005	0.457	A
42nd Street					
Orange Avenue to Polk Avenue	2 Lane Sub-Collector (single-family)	2,200	1,965	0.893	A
Copeland Avenue					
El Cajon Boulevard to Orange Avenue	2 Lane Sub-Collector (single-family)	2,200	2,040	0.927	A
Van Dyke Avenue					
El Cajon Boulevard to Orange Avenue	2 Lane Sub-Collector (single-family)	2,200	1,030	0.468	A
Orange Avenue to Polk Avenue	2 Lane Sub-Collector (single-family)	2,200	1,925	0.875	A
43rd Street					
El Cajon Boulevard to Orange Avenue	2 Lane Collector (continuous left-turn lane)	15,000	7,357	0.49	C
Orange Avenue to Polk Avenue	2 Lane Collector (continuous left-turn lane)	15,000	5,955	0.397	B
Fairmount Avenue					
El Cajon Boulevard to Orange Avenue	3 Lane Collector	22,500	11,615	0.516	C
Orange Avenue to Polk Avenue	3 Lane Collector	22,500	12,245	0.544	C
44th Street					
El Cajon Boulevard to Orange Avenue	2 Lane Sub-Collector (single-family)	2,200	960	0.436	A
Orange Avenue to Polk Avenue	2 Lane Sub-Collector (single-family)	2,200	945	0.43	A
Highland Avenue					
El Cajon Boulevard to Orange Avenue	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	2,810	0.351	B
Orange Avenue to Polk Avenue	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	2,925	0.366	B
Menlo Avenue					
Orange Avenue to Polk Avenue	2 Lane Sub-Collector (single-family)	2,200	1,980	0.9	A
47th Street					
El Cajon Boulevard to Orange Avenue	2 Lane Sub-Collector (single-family)	2,200	1,100	0.5	A
Euclid Avenue					
El Cajon Boulevard to Orange Avenue	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	10,400	1.3	**F**
Orange Avenue to Polk Avenue	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	10,915	1.364	**F**
48th Street					
El Cajon Boulevard to Orange Avenue	2 Lane Sub-Collector (single-family)	2,200	1,230	0.559	A
Orange Avenue to Polk Avenue	2 Lane Sub-Collector (single-family)	2,200	1,225	0.557	A

Notes:
Bold values indicate roadway segments operating at LOS E or F.
(a) Classification is based on the City of San Diego Traffic Impact Study Manual.
(b) The v/c Ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity.

4 PROJECT TRAFFIC

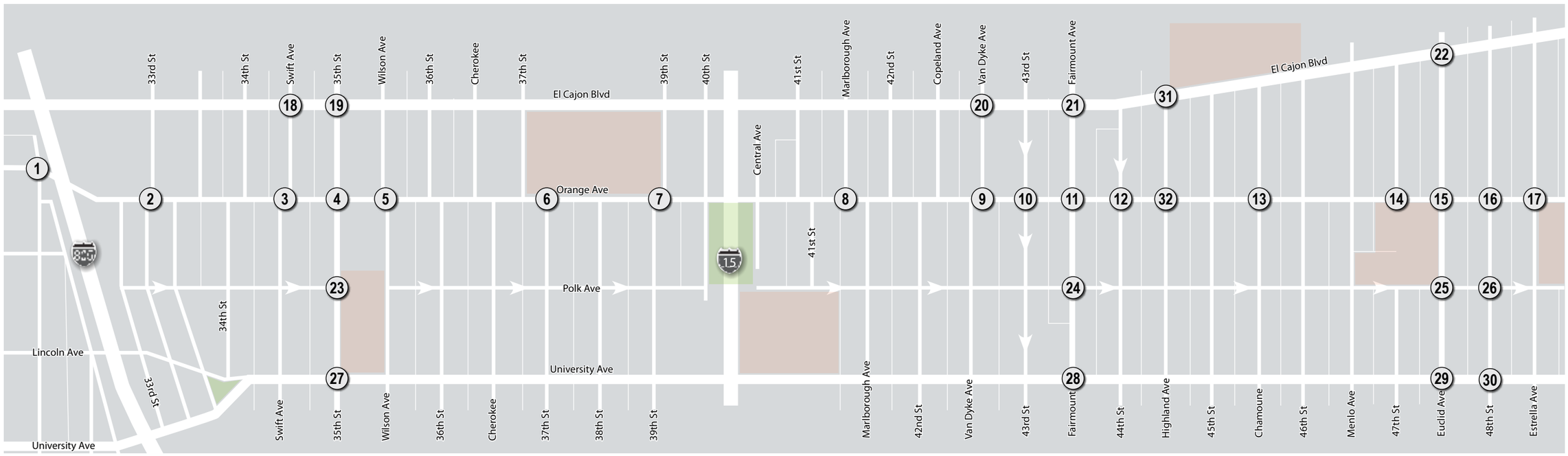
Vehicle trips are not expected to increase as a result of the Orange Bikeway due to the nature of the project; however, vehicular traffic will be reduced along Orange Avenue and shifted to parallel routes as a result of the implementation of the channelizer medians. Orange Avenue will no longer be a through corridor, and alternative routes will be used such as El Cajon Boulevard to the north and University Avenue to the south. The following section describes the vehicular traffic volume redistribution as a result of the three proposed channelizer medians along Orange Avenue.

Appendix B includes the estimation of vehicular volume changes from implementation of channelizer medians on Orange Avenue, which describes the detailed process that was performed for determining the changes in vehicular volume on the surrounding street network. StreetLight GPS data was used to identify the proportion of existing trips on Orange Avenue with final destinations to the north or south of the corridor.

Based on past research, the surrounding street network, and neighborhood characteristics, about 50% of people who currently drive on Orange Avenue and who are impacted by the diverters would be expected to avoid Orange Avenue. These vehicles would use parallel facilities like El Cajon Boulevard or University Avenue instead. The peak hour turning movements, GPS data, and information about the street network were used to determine which route each vehicle is expected to take. These trips were reassigned to the roadway network.

The resulting traffic volumes, accounting for the implementation of channelizer median as part of the project, are shown in **Figure 4-1**. These volumes were applied to the Existing (2019) Conditions to determine the Existing (2019) Plus Project Conditions. Similarly, these volumes were applied to the Near Term (2022) Conditions to determine the Near Term (2022) Plus Project Conditions.

1		32nd St		**2**		33rd St		**3**		Swift Ave		**4**		35th St	
	-160 / -103			80 / 20		-199 / -114		40 / 20		-350 / -249		21 / 23		50 / 35	
Howard Ave						-5 / -3		4 / 4		-25 / -24		-43 / -46		-339 / -273	
				Orange Ave		Orange Ave				Orange Ave				-24 / -28	
-42 / -137				17 / 17				52 / 52		50 /44		-38 / -37		-59 / -27	
				-68 / -135				-136 / -286				-156 / -357		29 /13	
								5 / 30				23 / 97		Orange Ave	
5		Wilson Ave		**6**		37th St		**7**		39th St		**8**		Marlborough Ave	
	9 / 9		-345 / -247		37 / 34		-229 / -211			-241 / -210				-384 / -212	
			30 / 30				Orange Ave			Orange Ave				Orange Ave	
-162 / -374			Orange Ave	-13 / -13		Orange Ave		-6 / -6				-180 / -301			
-5 / -30			2 /2	-153 / -284		12 /69		-87 / -208							
			2 /3					-5 / -30							
9		Van Dyke Ave		**10**		43rd St		**11**		Fairmount Ave		**12**		44th St	
	-387 / -288			31 /20		-437 / -326		4 /30		60 / 47		24 /30		-366 / -328	
	-5 / -6			5 /6		-16 / -19		-9 / -59		-322 / -295				27 /32	
	Orange Ave					Orange Ave				-41 / -51				Orange Ave	
45 / 50				-264 / -364				-50 / -79		-157 / -101		-212 / -445			
-207 / -325				4 / 24				-183 / -390		78 /50				15 /79	
								20 / 3							
	58 /60														
13		Chamoune Ave		**14**		47th St		**15**		Euclid Ave		**16**		48th St	
	7 / 10		-246 / -197		32 /23		-12 / -26		12 /20		58 / 56		5 /8		6 / 5
	22 /20		-34 / -32		25 /20		-335 / -271		-23 / -39		-195 / -214				-207 / -177
	Orange Ave		Orange Ave				Orange Ave				-66 / -70				50 / 60
-12 / -11			20 /40	28 / 27				-46 / -47			Orange Ave	-156 / -298			Orange Ave
-150 / -368			5 /5	-109 / -260				-128 / -281		-75 /-57					3 /3
-4 / -24								10 / 43		38 /29					12 /20



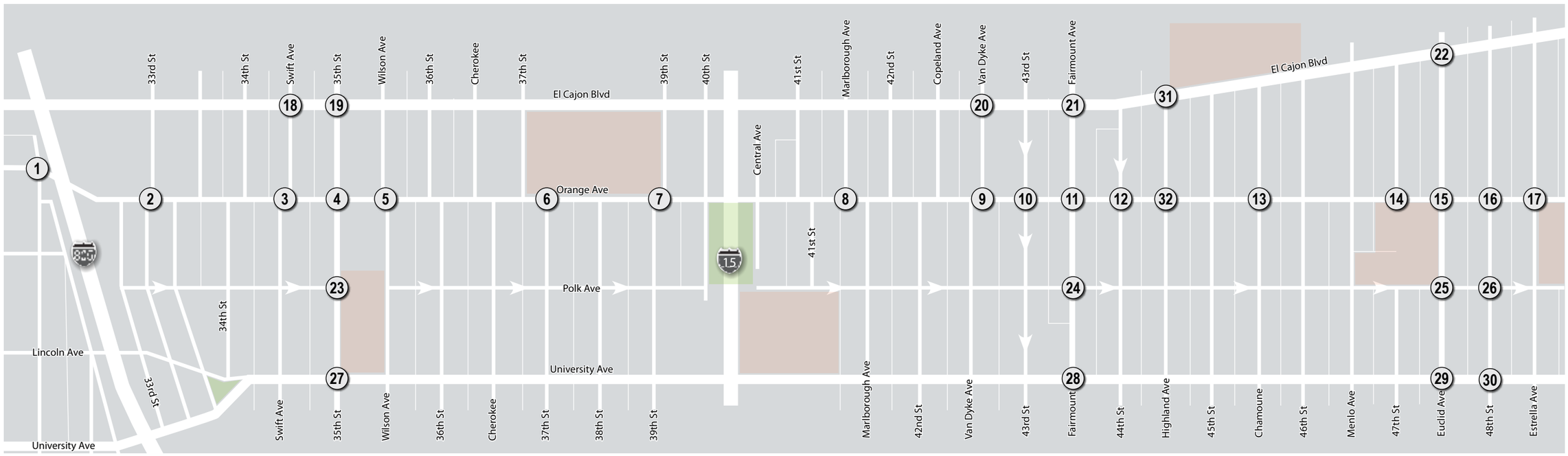
LEGEND

(#) Study Intersection

⇦ X / Y AM / PM Peak Hour Turning Volume

Figure 4-1
Peak Hour Project Trip Assignment

17		20 / 21	**Estrella Ave**		**18**		**Swift Ave**		**19**	-22 / -23	22 / 23	**35th St**		**20**		**Van Dyke Ave**		**21**		**Fairmount Ave**		**22**	-11 / -19	11 / 19	**Euclide Ave**
	-146 / -135	17 / 21	**Orange Ave**			459 / 191	**El Cajon Blvd**			340 / 123	**El Cajon Blvd**			515 / 241	**El Cajon Blvd**			331 / 145	**El Cajon Blvd**			243 / 116	**El Cajon Blvd**
-9 / -9 -137 / -271 -2 / -13		11 / 55		90 / 85		52 / 52		142 / 137		79 / 48	-19 / -18		132 / 120		45 / 50	158 / 161 -5 / -29		138 / 97	-25 / -40	141 / 120		96 / 85	-23 / -24	
23		17 / 17	**35th St**				**Polk Ave**		**24**		-14 / 0 10 / 48	**Fairmount Ave**												
						-30 / -14							**Polk Ave**											
													-79 / -51										
25	-22 / -19	7 / 27	**Euclid Ave**		**26**		**48th St**		**27**	-12 / -14	44 / 120	**35th St**		**28**	-21 / -25	14 / 61	**Fairmount Ave**	**29**	-33 / -35	15 / 36	**Euclid Ave**	**30**	50 / 60	**48th St**
			Polk Ave				**Polk Ave**			152 / 285	**University Ave**			118 / 284	**University Ave**			123 / 282	**University Ave**			95 / 245	**University Ave**
		-38 / -29		4 / 0 3 / 20		11 / 16		24 / 130		30 / 14 -30 / -14			39 / 207	79 / 51 -79 / -51		35 / 171	38 / 29 -38 / -29			11 / 16 39 / 191			
31	50 / 60	**Highland Ave**		**32**	11 / 14	**Highland Ave**																	
	95 / 245	**El Cajon Blvd**			-175 / -157	**Orange Ave**																	
11 / 16 39 / 191				-101 / -213		7 / 38																	



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(#) Study Intersection

⇦ X / Y AM / PM Peak Hour Turning Volume

Figure 4-1
Peak Hour Project Trip Assignment (Continued)

5 EXISTING PLUS PROJECT CONDITIONS

This section provides a description of the Existing (2019) Conditions with the addition of the redistributed project traffic with the implementation the channelizer medians on Orange Avenue.

5.1 ROADWAY NETWORK CHANGES

The proposed project will remove the two-way left-turn lane along Orange Avenue in order to accommodate the proposed buffered bike lanes and maintain existing on-street parking. In addition to slowing down traffic, this will reduce the overall vehicular capacity for the roadway, as left turns will be made from the through lanes rather than the exclusive left-turn lane.

The project will also construct channelizer medians at 35th Street, Fairmount Avenue, and Euclid Avenue. The channelizer medians will require eastbound and westbound through traffic to turn right, while people riding bikes will be able to continue through the intersection. Additionally, vehicles traveling northbound and southbound on the 35th, Fairmount Avenue, and Euclid Avenue will no longer be able to turn left onto Orange Avenue.

Other safety enhancements for the Orange Bikeway that are expected to affect the capacity results include bike boxes and leading pedestrian intervals at the signalized intersections along the Orange Avenue corridor, which will require No Right Turn on Red restrictions at these approaches. Lastly, the project will include a neighborhood traffic circle at the Orange Avenue and Highland Avenue intersection, which is reflected in the Existing Plus Project Conditions.

5.2 TRAFFIC VOLUMES

Changes to traffic as a result of the proposed channelizer medians were added to the Existing Conditions traffic volume network to create the Existing Plus Project Conditions traffic volumes shown in **Figure 5-1**.

5.3 INTERSECTION ANALYSIS

Table 5-1 displays the intersection analysis for the study intersections under the Existing (2019) Plus Project Conditions. As shown in the table, all intersections would continue to operate at LOS D or better with the redistributed traffic away from Orange Avenue, except for the following intersection:

- El Cajon Boulevard and Fairmount Avenue (LOS E – AM Peak)

Many of the intersections along the Orange Avenue corridor are expected to improve operations as a result of the anticipated volume reduction proposed for the Orange Bikeway Project. The Orange Avenue and Van Dyke Avenue intersection is expected to improve from LOS F to LOS C with the reduction of traffic volumes as a result of the project.

Appendix D contains the intersections LOS calculation worksheets.

5.4 ROADWAY SEGMENT ANALYSIS

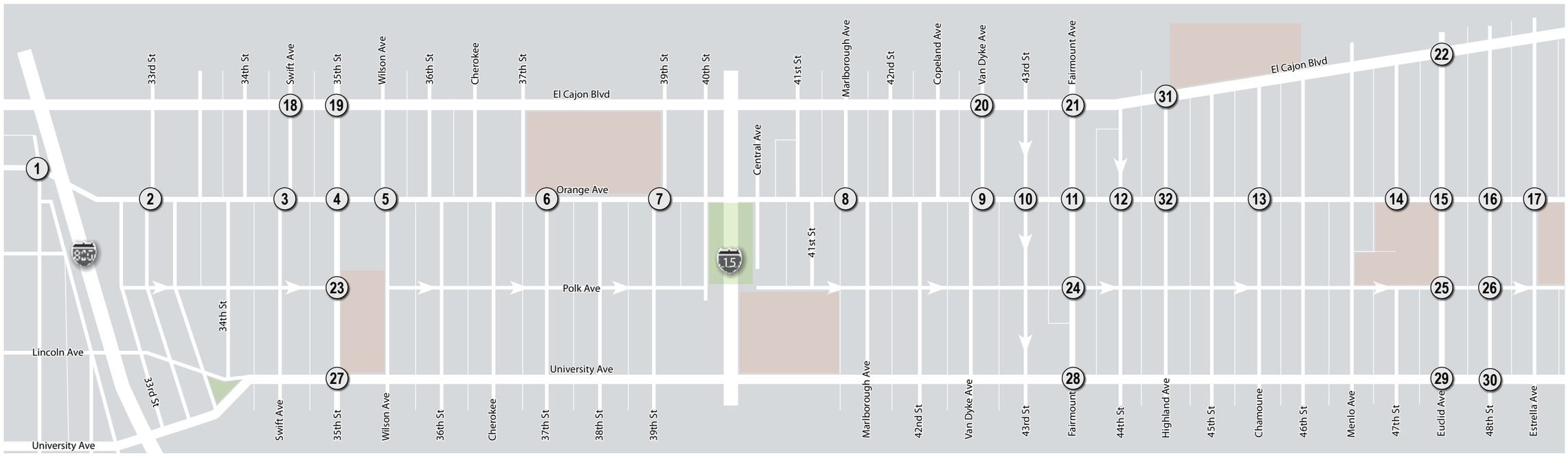
Table 5-2 displays the roadway segment analysis under Existing (2019) with Project Conditions per City of San Diego guidelines. As shown in the tables, all roadway segments within the study area would continue to operate at LOS D or better with the redistributed traffic volumes except the following:

- University Avenue – Swift Avenue to 35th Street (LOS F)
- University Avenue – 35th Street to Wilson Avenue (LOS F)
- University Avenue – 43rd Street to Fairmount Avenue (LOS E)
- University Avenue – Fairmount Avenue to 44th Street (LOS E)
- 33rd Street – El Cajon Boulevard to Orange Avenue (LOS E)
- Euclid Avenue - El Cajon Boulevard to Orange Avenue (LOS F)
- Euclid Avenue – Orange Avenue to Polk Avenue (LOS F)

To maintain or improve all roadway segment operations within the project study area to LOS D or better, an additional vehicle travel lane would be required along the roadway segments listed above. Adding an additional vehicle lane along these segments is not feasible due to lack of public right-of-way; the road is not wide enough to accommodate an additional travel lane while maintaining the existing parking configuration and space for people walking on sidewalks without impacting private property. Additionally, the roadway segments along 33rd Street and Euclid Avenue operate at LOS E and LOS F, respectively, both with and without the project.

Furthermore, the Orange Avenue study area segments are expected to improve to LOS A with the reduction of traffic volumes as a result of the Orange Bikeway Project.

1	3 / 1 **32nd St** 0 / 3 111 / 115 28 / 42 **Howard Ave** 1 / 1 41 / 136 14 / 39 26 / 18 1 / 1 27 / 52	**2**	119 / 124 2 / 5 52 / 251 **33rd St** 213 / 145 55 / 79 2 / 3 **Orange Ave** 90 / 86 42 / 110 5 / 1 4 / 0	**3**	48 / 29 4 / 7 5 / 2 **Swift Ave** 4 / 12 56 / 29 7 / 12 **Orange Ave** 53 / 61 13 / 112 22 / 88 98 / 83 9 / 2 33 / 39	**4**	19 / 39 89 / 116 **35th St** 145 / 83 **Orange Ave** 39 / 143 134 / 78 45 / 30	**5**	8 / 22 5 / 4 12 / 14 **Wilson Ave** 15 / 19 108 / 50 71 / 63 **Orange Ave** 13 / 23 18 / 10 15 / 4 22 / 19 9 / 12 31 / 19	**6**	7 / 20 3 / 8 61 / 70 **37th St** 66 / 49 60 / 82 14 / 23 **Orange Ave** 23 / 6 54 / 65 15 / 16 9 / 12 4 / 5 42 / 88	**7**	36 / 28 7 / 11 16 / 11 **39th St** 162 / 51 72 / 82 38 / 33 **Orange Ave** 49 / 28 96 / 140 44 / 18 48 / 35 50 / 16 71 / 49	**8**	3 / 1 2 / 0 0 / 2 **Marlborough Ave** 223 / 142 70 / 75 **Orange Ave** 104 / 153 54 / 81 115 / 71 68 / 43
9	14 / 30 3 / 7 2 / 7 **Van Dyke Ave** 24 / 21 85 / 38 6 / 20 **Orange Ave** 80 / 67 34 / 79 17 / 45 163 / 92 42 / 15 35 / 40	**10**	107 / 81 258 / 463 48 / 146 **43rd St** 64 / 5 2 / 7 **Orange Ave** 0 / 1 58 / 32 41 / 85 0 / 1	**11**	5 / 15 59 / 164 **Fairmount Ave** 192 / 171 **Orange Ave** 64 / 77 868 / 420 56 / 46	**12**	47 / 58 8 / 13 36 / 45 **44th St** 69 / 30 40 / 49 **Orange Ave** 5 / 2 13 / 20 16 / 10 25 / 94	**13**	24 / 30 105 / 73 45 / 42 **Chamoune Ave** 57 / 31 81 / 85 9 / 2 **Orange Ave** 18 / 11 14 / 12 18 / 12 46 / 69 175 / 58 28 / 20	**14**	53 / 53 28 / 21 6 / 24 **47th St** 24 / 4 55 / 7 30 / 12 **Orange Ave** 56 / 44 45 / 112 20 / 10	**15**	54 / 61 160 / 318 **Euclid Ave** 123 / 116 **Orange Ave** 75 / 131 358 / 266 42 / 58	**16**	43 / 43 12 / 17 6 / 12 **48th St** 13 / 15 105 / 51 61 / 82 **Orange Ave** 19 / 28 12 / 17 5 / 23 24 / 20 30 / 16 26 / 30



LEGEND

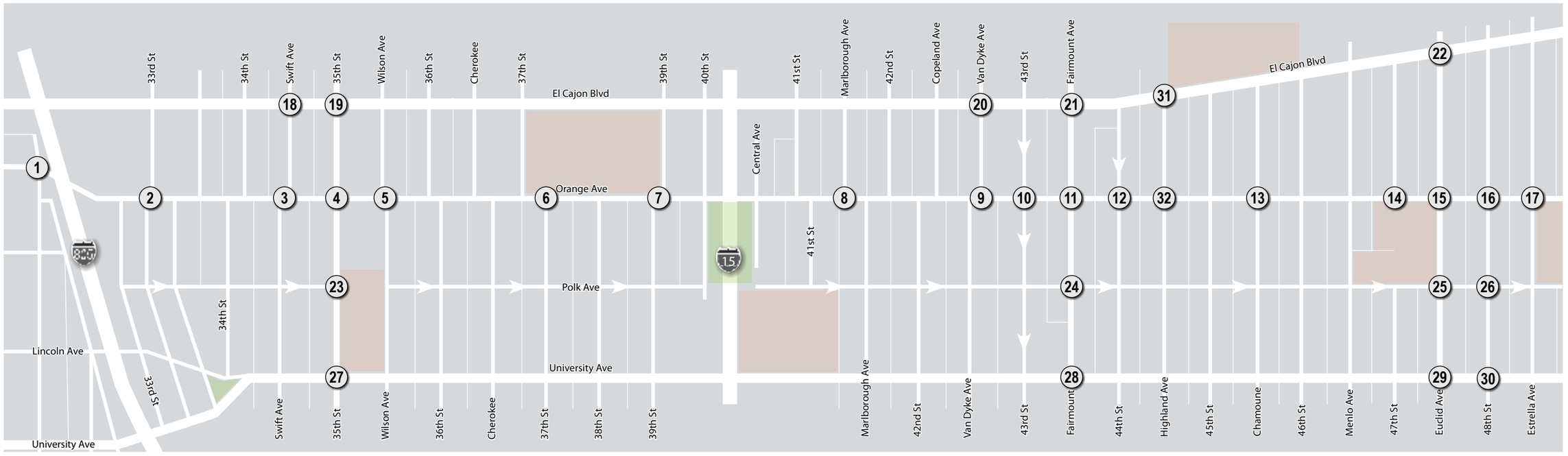
(#) Study Intersection

⇦ X / Y AM / PM Peak Hour Turning Volume

Figure 5-1
Existing (2019) Plus Project Peak Hour Volumes

17				18				19				20				21				22				23				24			
	29 / 31	34 / 32	34 / 33		10 / 23				79 / 59	38 / 42	49 / 57		71 / 53								48 / 40	84 / 226	33 / 68		107 / 181				94 / 255	17 / 65	
	Estrella Ave				Swift Ave				35th St				Van Dyke Ave				Fairmount Ave				Euclide Ave				35th St				Fairmount Ave		
		3 / 5				26 / 11				72 / 35				38 / 35				338 / 154			105 / 54									
		127 / 108				1367 / 920				1086 / 757				1545 / 1009				1313 / 844			1205 / 810									
		38 / 47								19 / 66											67 / 83									
	Orange Ave					El Cajon Blvd				El Cajon Blvd				El Cajon Blvd				El Cajon Blvd			El Cajon Blvd				Polk Ave				Polk Ave	
19 / 19				429 / 939				16 / 66				1001 / 1603				217 / 84				32 / 38				20 / 10				11 / 28			
30 / 30				13 / 14				449 / 870				19 / 44				756 / 1416				607 / 1145								11 / 21			
7 / 2								30 / 78								49 / 115				55 / 145				22 / 17				17 / 37			
		25 / 22	34 / 23	40 / 69			66 / 75			188 / 95	109 / 66	15 / 31			146 / 103			224 / 201	783 / 366	38 / 70		269 / 137	179 / 154	40 / 66		119 / 99			895 / 473	33 / 33		

25				26				27				28				29				30				31				32			
	236 / 438	18 / 53			79 / 88	3 / 10			29 / 33	27 / 76	83 / 184		10 / 14	87 / 172	92 / 187		0 / 35	239 / 389	38 / 86		67 / 106	7 / 13			50 / 60				36 / 24	6 / 11	33 / 37	
	Euclid Ave				48th St				35th St				Fairmount Ave				Euclid Ave				48th St				Highland Ave				Highland Ave		
										63 / 22				151 / 86				74 / 51			20 / 21				1303 / 984			118 / 80		
										592 / 682				560 / 615				757 / 754			949 / 915				24 / 24			33 / 14		
										18 / 28				84 / 100				176 / 191											36 / 14		
	Polk Ave				Polk Ave				University Ave				University Ave				University Ave				University Ave				El Cajon Blvd			Orange Ave		
24 / 34				16 / 11				26 / 24				119 / 91				63 / 67				22 / 33				11 / 16				32 / 24			
17 / 46				23 / 100				258 / 574				391 / 822				292 / 759				520 / 1010				565 / 1421				31 / 25			
34 / 52				11 / 16				14 / 31				67 / 109				35 / 82								25 / 76				10 / 31			
		460 / 328	18 / 18			56 / 67	6 / 17			113 / 53	36 / 29	19 / 22		201 / 183	609 / 350	55 / 86		152 / 82	342 / 222	112 / 193						104 / 58	31 / 51			14 / 18	9 / 6	53 / 57	



LEGEND

(#) Study Intersection

⇦ X / Y AM / PM Peak Hour Turning Volume

Figure 5-1
Existing (2019) Plus Project Peak Hour Volumes (Continued)

Table 5-1 Existing (2019) Plus Project Conditions Intersection Analysis Summary

Intersection		Traffic Control (a)	Peak Hour	Existing Conditions		Existing Plus Project Conditions	
				Delay (b)	LOS (c)	Delay (b)	LOS (c)
1	Howard Ave & 32nd St	TWSC	AM	11.2	B	9.7	A
			PM	13.2	B	10.3	B
2	Orange Ave & 33rd St	Signal	AM	13.2	B	7.7	A
			PM	14.5	B	8.7	A
3	Orange Ave & Swift Ave	TWSC	AM	15.0	C	11.4	B
			PM	19.2	C	12.6	B
4	Orange Ave & 35th St	Signal	AM	9.3	A	7.8	A
			PM	8.3	A	7.8	A
5	Orange Ave & Wilson Ave	TWSC	AM	15.8	C	11.1	B
			PM	20.1	C	10.4	B
6	Orange Ave & 37th St	TWSC	AM	16.1	C	11.3	B
			PM	18.6	C	12.0	B
7	Orange Ave & 39th St	TWSC	AM	28.2	D	15.2	C
			PM	20.7	C	12.0	B
8	Orange Ave & Marlborough Ave	Signal	AM	6.9	A	6.2	A
			PM	5.5	A	5.4	A
9	Orange Ave & Van Dyke Ave	TWSC	AM	43.0	**E**	13.1	B
			PM	19.6	C	13.2	B
10	Orange Ave & 43rd St	Signal	AM	10.1	B	14.7	B
			PM	12.3	B	17.3	B
11	Orange Ave & Fairmount Ave	Signal	AM	16.5	B	19.9	B
			PM	11.5	B	17.1	B
12	Orange Ave & 44th St	TWSC	AM	12.8	B	9.8	A
			PM	13.6	B	10.1	B
13	Orange Ave & Chamoune Ave	AWSC	AM	19.2	C	10.6	B
			PM	17.9	C	8.8	A
14	Orange Ave & 47th St	TWSC	AM	12.2	B	9.3	A
			PM	13.8	B	9.4	A
15	Orange Ave & Euclid Ave	Signal	AM	13.7	B	7.0	A
			PM	15.3	B	8.8	A
16	Orange Ave & 48th St	TWSC	AM	16.1	C	11.7	B
			PM	16.5	C	11.3	B
17	Orange Ave & Estrella Ave	AWSC	AM	10.7	B	8.5	A
			PM	13.2	B	8.9	A
18	El Cajon Blvd & Swift Ave	TWSC	AM	13.4	B	17.5	C
			PM	13.3	B	15.3	C
19	El Cajon Blvd & 35th St	Signal	AM	17.9	B	19.9	B
			PM	17.9	B	17.2	B
20	El Cajon Blvd & Van Dyke Ave	TWSC	AM	16.5	C	24.9	C
			PM	22.0	C	29.8	D
21	El Cajon Blvd & Fairmount Ave	Signal	AM	49.1	D	65.3	**E**
			PM	17.6	B	21.6	C

Intersection		Traffic Control (a)	Peak Hour	Existing Conditions		Existing Plus Project Conditions	
				Delay (b)	LOS (c)	Delay (b)	LOS (c)
22	El Cajon Blvd & Euclid Ave	Signal	AM	23.7	C	27.9	C
			PM	24.9	C	27.4	C
23	Polk Ave & 35th St	AWSC	AM	8.1	A	7.9	A
			PM	7.9	A	8.5	A
24	Polk Ave & Fairmount Ave	TWSC	AM	11.1	B	10.9	B
			PM	12.2	B	13.0	B
25	Polk Ave & Euclid Ave	Signal	AM	5.1	A	5.0	A
			PM	5.8	A	5.8	A
26	Polk Ave & 48th St	TWSC	AM	9.0	A	9.5	A
			PM	9.8	A	10.1	B
27	University Ave & 35th St	Signal	AM	10.4	B	10.7	B
			PM	10.9	B	13.0	B
28	University Ave & Fairmount Ave	Signal	AM	42.3	D	42.0	D
			PM	36.0	D	46.1	D
29	University Ave & Euclid Ave	Signal	AM	42.2	D	38.7	D
			PM	39.9	D	38.4	D
30	University Ave & 48th St	TWSC	AM	15.8	C	15.3	C
			PM	15.6	C	19.8	C
31	El Cajon Blvd & Highland Ave	Signal	AM	12.8	B	11.6	B
			PM	10.6	B	6.3	A
32	Orange Ave & Highland Ave	AWSC (E) NTC (PP)	AM	11.3	B	4.3	A
			PM	8.6	A	3.5	A

Notes:
Bold values indicate intersections operating at LOS E or F.
(E) indicates Existing Conditions
(PP) indicates Plus Project Conditions
(a) Signal = Traffic Signal, TWSC = Two-Way Stop Control, AWSC = All Way Stop Control.
(b) Delay refers to the average control delay for the entire intersection measured in seconds per vehicle. At TWSC intersections, delay refers to the worst movement.
(c) LOS calculations based on methodologies outlined in the 6th Edition HCM and performed using Synchro 10.

TABLE 5-2
EXISTING (2019) PLUS PROJECT CONDITIONS
ROADWAY ANALYSIS SUMMARY

ROADWAY SEGMENT		ROADWAY CLASSIFICATION (a)	LOS E CAPACITY	EXISTING BASELINE			EXISTING PLUS PROJECT		
				ADT	V/C RATIO (b)	LOS	ADT	V/C RATIO (b)	LOS
Orange Avenue (c)									
Swift Avenue to 35th Street	Existing	2 Lane Collector (continuous left-turn lane)	15,000	8,500	0.567	C			
	Plus Proj.	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000				2,005	0.134	A
43rd Street to Fairmount Avenue	Existing	2 Lane Collector (continuous left-turn lane)	15,000	11,275	0.752	D			
	Plus Proj.	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000				2,620	0.175	A
47th Street to Euclid Avenue	Existing	2 Lane Collector (continuous left-turn lane)	15,000	6,120	0.408	B			
	Plus Proj.	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000				2,435	0.162	A
El Cajon Boulevard									
34th Street to Swift Avenue		6 Lane Major Arterial	50,000	19,460	0.389	A	23,375	0.468	B
35th Street to Wilson Avenue		6 Lane Major Arterial	50,000	19,065	0.381	A	22,980	0.46	B
Copeland Avenue to Van Dyke Avenue		6 Lane Major Arterial	50,000	27,100	0.542	B	32,510	0.65	C
43rd Street to Fairmount Avenue		5 Lane Major Arterial	45,000	28,065	0.624	C	33,475	0.744	C
Fairmount Avenue to 44th Street		4 Lane Major Arterial	40,000	27,570	0.689	C	30,713	0.768	D
Euclid Avenue to 48th Street		4 Lane Major Arterial	40,000	24,250	0.606	C	27,393	0.685	C
University Avenue									
Swift Avenue to 35th Street		2 Lane Collector (continuous left-turn lane)	15,000	13,824	0.922	**E**	17,730	1.182	**F**
35th Street to Wilson Avenue		2 Lane Collector (continuous left-turn lane)	15,000	13,600	0.907	**E**	17,506	1.167	**F**
43rd Street to Fairmount Avenue		4 Lane Collector	30,000	20,000	0.667	D	25,310	0.844	**E**
Fairmount Avenue to 44th Street		4 Lane Collector	30,000	20,440	0.681	D	25,750	0.858	**E**
47th Street to Euclid Avenue		4 Lane Collector	30,000	18,860	0.629	C	22,064	0.735	D
48th Street to Estrella Avenue		4 Lane Collector	30,000	20,715	0.691	D	23,919	0.797	D
33rd Street									
El Cajon Boulevard to Orange Avenue		2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	6,505	0.813	**E**	6,725	0.841	**E**
Swift Avenue									
El Cajon Boulevard to Orange Avenue		2 Lane Sub-Collector (single-family)	2,200	522	0.237	A	1,196	0.544	A
Orange Avenue to Polk Avenue		2 Lane Sub-Collector (single-family)	2,200	1,820	0.827	A	2,149	0.977	A
35th Street									
El Cajon Boulevard to Orange Avenue		2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	4,260	0.533	C	4,753	0.594	C
Orange Avenue to Polk Avenue		2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	3,100	0.388	B	3,877	0.485	C
Wilson Avenue									
El Cajon Boulevard to Orange Avenue		2 Lane Sub-Collector (single-family)	2,200	1,075	0.489	A	1,192	0.542	A
Orange Avenue to Polk Avenue		2 Lane Sub-Collector (single-family)	2,200	1,005	0.457	A	1,365	0.62	A
42nd Street									
Orange Avenue to Polk Avenue		2 Lane Sub-Collector (single-family)	2,200	1,965	0.893	A	2,255	1.025	D
Copeland Avenue									
El Cajon Boulevard to Orange Avenue		2 Lane Sub-Collector (single-family)	2,200	2,040	0.927	A	2,330	1.059	D
Van Dyke Avenue									
El Cajon Boulevard to Orange Avenue		2 Lane Sub-Collector (single-family)	2,200	1,030	0.468	A	1,841	0.837	A
Orange Avenue to Polk Avenue		2 Lane Sub-Collector (single-family)	2,200	1,925	0.875	A	2,221	1.01	D
43rd Street									
El Cajon Boulevard to Orange Avenue		2 Lane Collector (continuous left-turn lane)	15,000	7,357	0.49	C	7,505	0.5	C
Orange Avenue to Polk Avenue		2 Lane Collector (continuous left-turn lane)	15,000	5,955	0.397	B	6,194	0.413	B
Fairmount Avenue									
El Cajon Boulevard to Orange Avenue		3 Lane Collector	22,500	11,615	0.516	C	12,246	0.544	C
Orange Avenue to Polk Avenue		3 Lane Collector	22,500	12,245	0.544	C	13,090	0.582	C
44th Street									
El Cajon Boulevard to Orange Avenue		2 Lane Sub-Collector (single-family)	2,200	960	0.436	A	1,080	0.491	A
Orange Avenue to Polk Avenue		2 Lane Sub-Collector (single-family)	2,200	945	0.43	A	980	0.445	A
Highland Avenue									
El Cajon Boulevard to Orange Avenue		2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	2,810	0.351	B	3,103	0.388	B
Orange Avenue to Polk Avenue		2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	2,925	0.366	B	3,214	0.402	B
Menlo Avenue									
Orange Avenue to Polk Avenue		2 Lane Sub-Collector (single-family)	2,200	1,980	0.9	A	2,208	1.004	D
47th Street									
El Cajon Boulevard to Orange Avenue		2 Lane Sub-Collector (single-family)	2,200	1,100	0.5	A	1,535	0.698	A
Euclid Avenue									
El Cajon Boulevard to Orange Avenue		2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	10,400	1.3	**F**	10,900	1.363	**F**
Orange Avenue to Polk Avenue		2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	10,915	1.364	**F**	11,334	1.417	**F**
48th Street									
El Cajon Boulevard to Orange Avenue		2 Lane Sub-Collector (single-family)	2,200	1,230	0.559	A	1,377	0.626	A
Orange Avenue to Polk Avenue		2 Lane Sub-Collector (single-family)	2,200	1,225	0.557	A	1,737	0.79	A

Notes:
Bold values indicate roadway segments operating at LOS E or F.
(a) Classification is based on the City of San Diego Traffic Impact Study Manual.
(b) The v/c Ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity.

(c) Orange Avenue roadway classification will be modified as part of the Orange Bikeway Project. Under Existing Conditions, Orange Avenue is a 2 Lane Collector (With Continuous Left-Turn Lane) with a capacity of 15,000 vehicles per day, as reflected in Table 3-2 of this report. This table reflects proposed project conditions where Orange Avenue is converted to a 2 Lane Collector (Multi-family, commercial-industrial fronting) with a capacity of 8,000 vehicles per day.

6 NEAR TERM (2022) BASELINE CONDITIONS

This section provides a description of the Near Term (2022) Conditions without the project. Year 2022 was selected as the anticipated opening year of the Orange Bikeway Project. This scenario establishes a baseline to compare against the Near Term Plus Project scenario to determine project impacts.

6.1 TRAFFIC VOLUMES

The Near Term (2022) Baseline traffic volumes were determined by applying a 2% annual growth factor to the existing traffic volumes. The resulting Near Term (2022) Baseline traffic volumes are shown in **Figure 6-1**.

6.2 INTERSECTION ANALYSIS

Table 6-1 displays the LOS analysis results for the study intersections under the Near Term (2022) Baseline Conditions. As shown in the table, all intersections within the study area would operate at LOS D or better during both beak periods except for the following intersection:

- Orange Avenue and Van Dyke Avenue (LOS F – AM Peak)

Appendix D contains the intersections LOS calculation worksheets.

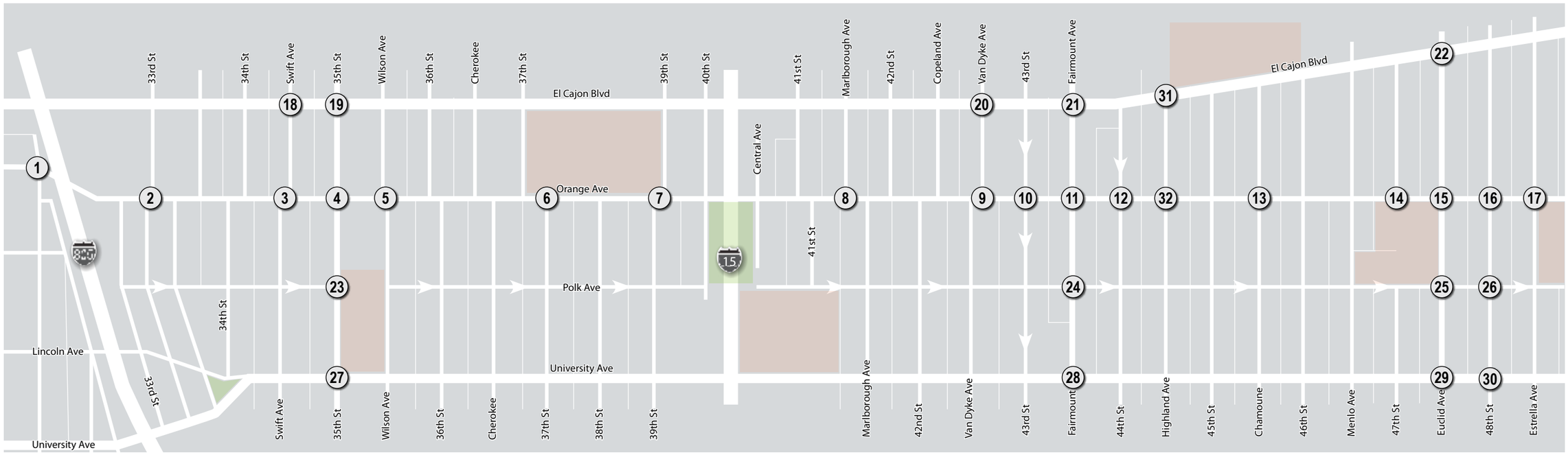
6.3 ROADWAY SEGMENT ANALYSIS

Table 6-2 displays the City roadway segment analysis under Near Term (2022) Baseline Conditions per City of San Diego guidelines. As shown in the tables, all roadway segments within the study area would operate at LOS D or better except the following:

- University Avenue – Swift Avenue to 35th Street (LOS E)
- University Avenue – 35th Street to Wilson Avenue (LOS E)
- 33rd Street – El Cajon Boulevard to Orange Avenue (LOS E)
- Euclid Avenue - El Cajon Boulevard to Orange Avenue (LOS F)
- Euclid Avenue – Orange Avenue to Polk Avenue (LOS F)

1			2			3			4			5			6			7			8		
3 / 1	32nd St	0 / 3 288 / 231 30 / 45 Howard Ave	41 / 110 2 / 5 55 / 266	33rd St	226 / 154 270 / 205 7 / 6 Orange Ave	8 / 10 0 / 3 5 / 2	Swift Ave	4 / 13 431 / 295 34 / 38 Orange Ave	20 / 41 72 / 99 46 / 49	35th St	101 / 51 360 / 290 25 / 30 Orange Ave	8 / 23 5 / 4 3 / 5	Wilson Ave	16 / 20 481 / 315 44 / 35 Orange Ave	7 / 21 3 / 8 25 / 38	37th St	70 / 52 307 / 311 15 / 24 Orange Ave	38 / 30 7 / 12 17 / 12	39th St	172 / 54 332 / 310 40 / 35 Orange Ave	3 / 1 2 / 0 0 / 2	Marlborough Ave	644 / 376 74 / 80 Orange Ave
1 / 1 88 / 290 15 / 41		28 / 19 1 / 1 29 / 55	77 / 73 117 / 260		5 / 1 4 / 0	1 / 10 158 / 422 18 / 62		51 / 41 10 / 2 35 / 41	40 / 39 166 / 379 17 / 49		63 / 29 111 / 69 48 / 32	14 / 24 191 / 408 21 / 36		23 / 20 7 / 11 31 / 17	38 / 20 220 / 370 16 / 17		10 / 13 4 / 5 32 / 20	58 / 36 194 / 369 52 / 51		51 / 37 53 / 17 75 / 52	301 / 482 57 / 86		122 / 75 72 / 46

9			10			11			12			13			14			15			16		
15 / 32 3 / 7 2 / 7	Van Dyke Ave	25 / 22 501 / 346 12 / 28 Orange Ave	81 / 65 268 / 485 51 / 155	43rd St	532 / 351 19 / 28 Orange Ave	5 / 16 58 / 142 10 / 63	Fairmount Ave	140 / 132 342 / 313 44 / 54 Orange Ave	50 / 62 8 / 14 13 / 16	44th St	462 / 380 14 / 18 Orange Ave	25 / 32 104 / 67 24 / 23	Chamoune Ave	60 / 33 347 / 299 46 / 36 Orange Ave	22 / 32 3 / 1 6 / 25	47th St	38 / 32 414 / 295 32 / 13 Orange Ave	57 / 65 157 / 316 24 / 41	Euclid Ave	69 / 64 207 / 227 70 / 74 Orange Ave	46 / 46 13 / 18 1 / 4	48th St	7 / 11 331 / 242 12 / 23 Orange Ave
37 / 18 256 / 429 18 / 48		111 / 34 45 / 16 37 / 42	0 / 1 342 / 420 39 / 65		0 / 1	53 / 84 194 / 414 47 / 79		167 / 107 838 / 393 59 / 49	230 / 474 14 / 21		17 / 11 11 / 16	32 / 23 174 / 403 23 / 38		28 / 31 180 / 56 30 / 21	30 / 18 163 / 395 21 / 11			49 / 50 136 / 298 69 / 93		80 / 60 340 / 252 45 / 62	20 / 30 178 / 334 5 / 24		25 / 21 29 / 14 15 / 11



LEGEND

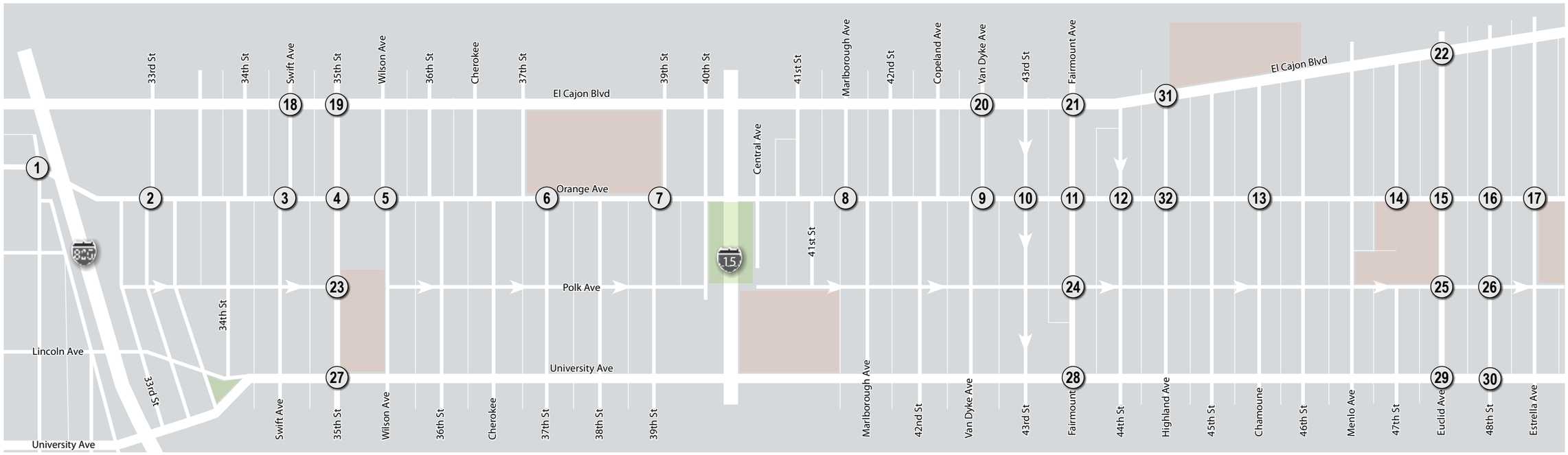
(#) Study Intersection

⇦ X / Y AM / PM Peak Hour Turning Volume

Figure 6-1
Near Term (2022) Baseline Peak Hour Volumes

17				18				19				20				21				22				23				24			
	31 / 33		Estrella Ave		11 / 24		Swift Ave		84 / 63		35th St		75 / 56		Van Dyke Ave				Fairmount Ave		51 / 42		Euclide Ave		96 / 174		35th St		115 / 271		Fairmount Ave
	36 / 34								64 / 69												101 / 260							7 / 18		
	15 / 13								29 / 36												23 / 52									
		3 / 5			28 / 12					76 / 37				40 / 37				359 / 163				111 / 57								
		290 / 258			964 / 774					792 / 673				1093 / 815				1042 / 742				1021 / 736								
		22 / 28								20 / 70												71 / 88								
		Orange Ave			El Cajon Blvd					El Cajon Blvd				El Cajon Blvd				El Cajon Blvd				El Cajon Blvd				Polk Ave				Polk Ave
30 / 30								17 / 70								230 / 89				34 / 40										
177 / 319				360 / 906				326 / 778				922 / 1574				635 / 1332				495 / 1088				21 / 11				12 / 30		
10 / 16				14 / 15				32 / 83				20 / 47				57 / 153				58 / 154				23 / 18				12 / 22		
																												18 / 39		
27 / 23					15 / 24			116 / 50					107 / 56				91 / 110				184 / 55				158 / 120			1034 / 556		
36 / 24								116 / 70									831 / 388				190 / 163							35 / 35		
31 / 15								36 / 52									67 / 117				67 / 96									

25				26				27				28				29				30				31				32			
	274 / 485		Euclid Ave		31 / 30		48th St		44 / 50		35th St		33 / 41		Fairmount Ave		35 / 74		Euclid Ave		18 / 49		48th St				Highland Ave		38 / 25		Highland Ave
	12 / 28				3 / 11				29 / 81				92 / 183				254 / 413				7 / 14								6 / 12		
									41 / 68				83 / 134				24 / 53												23 / 24		
			Polk Ave				Polk Ave			67 / 23				160 / 91				79 / 54				21 / 22			1282 / 784				125 / 85		
25 / 36				13 / 12				28 / 25		467 / 421		126 / 97		469 / 351		67 / 71		673 / 501		12 / 18					25 / 25			34 / 25		221 / 181
18 / 49				21 / 85				248 / 471		19 / 30		374 / 653		89 / 106		273 / 624		187 / 203		510 / 869								140 / 253		38 / 15
36 / 55				12 / 17				15 / 33		University Ave		71 / 116		University Ave		37 / 87		University Ave				University Ave		558 / 1305		El Cajon Blvd		11 / 33		Orange Ave
																								27 / 81							
528 / 379				48 / 54				88 / 41				129 / 140				121 / 56									110 / 62		33 / 54		15 / 19		
19 / 19				6 / 18				70 / 46				730 / 426				403 / 266													10 / 6		
								20 / 23				58 / 91				119 / 205													49 / 20		



LEGEND

(#) Study Intersection

⇦ X / Y AM / PM Peak Hour Turning Volume

Figure 6-1
Near Term (2022) Baseline Peak Hour Volumes (Continued)

Table 6-1 Near Term (2022) Baseline Conditions Intersection Analysis Summary

Intersection		Traffic Control (a)	Peak Hour	Near Term Conditions	
				Delay (b)	LOS (c)
1	Howard Ave & 32nd St	TWSC	AM	11.4	B
			PM	12.5	B
2	Orange Ave & 33rd St	Signal	AM	13.7	B
			PM	15.2	B
3	Orange Ave & Swift Ave	TWSC	AM	15.9	C
			PM	21.0	C
4	Orange Ave & 35th St	Signal	AM	10.2	B
			PM	9.3	A
5	Orange Ave & Wilson Ave	TWSC	AM	16.7	C
			PM	21.7	C
6	Orange Ave & 37th St	TWSC	AM	17.0	C
			PM	20.2	C
7	Orange Ave & 39th St	TWSC	AM	34.5	D
			PM	23.2	C
8	Orange Ave & Marlborough Ave	Signal	AM	7.3	A
			PM	5.7	A
9	Orange Ave & Van Dyke Ave	TWSC	AM	59.8	**F**
			PM	21.6	C
10	Orange Ave & 43rd St	Signal	AM	10.3	B
			PM	12.8	B
11	Orange Ave & Fairmount Ave	Signal	AM	17.7	B
			PM	12.3	B
12	Orange Ave & 44th St	TWSC	AM	13.2	B
			PM	14.2	B
13	Orange Ave & Chamoune Ave	AWSC	AM	23.2	C
			PM	20.9	C
14	Orange Ave & 47th St	TWSC	AM	12.5	B
			PM	14.2	B
15	Orange Ave & Euclid Ave	Signal	AM	14.4	B
			PM	16.3	B
16	Orange Ave & 48th St	TWSC	AM	17.1	C
			PM	17.3	C
17	Orange Ave & Estrella Ave	AWSC	AM	11.1	B
			PM	11.1	B
18	El Cajon Blvd & Swift Ave	TWSC	AM	14.2	B
			PM	13.9	B
19	El Cajon Blvd & 35th St	Signal	AM	13.7	B
			PM	18.5	B
20	El Cajon Blvd & Van Dyke Ave	TWSC	AM	18.3	B
			PM	17.4	C
21	El Cajon Blvd & Fairmount Ave	Signal	AM	24.1	C
			PM	55.0	D

Intersection		Traffic Control (a)	Peak Hour	Near Term Conditions	
				Delay (b)	LOS (c)
22	El Cajon Blvd & Euclid Ave	Signal	AM	24.6	C
			PM	26.4	C
23	Polk Ave & 35th St	AWSC	AM	8.1	A
			PM	8.0	A
24	Polk Ave & Fairmount Ave	TWSC	AM	11.4	B
			PM	12.6	B
25	Polk Ave & Euclid Ave	Signal	AM	5.1	A
			PM	5.9	A
26	Polk Ave & 48th St	TWSC	AM	9.0	A
			PM	10.0	B
27	University Ave & 35th St	Signal	AM	10.5	B
			PM	11.1	B
28	University Ave & Fairmount Ave	Signal	AM	43.3	D
			PM	37.3	D
29	University Ave & Euclid Ave	Signal	AM	45.8	D
			PM	40.7	D
30	University Ave & 48th St	TWSC	AM	16.5	C
			PM	16.8	C
31	El Cajon Blvd & Highland Ave	Signal	AM	13.0	B
			PM	10.6	B
32	Orange Ave & Highland Ave	AWSC	AM	10.8	B
			PM	10.8	B

Notes:
Bold values indicate intersections operating at LOS E or F.
(a) Signal = Traffic Signal, TWSC = Two-Way Stop Control, AWSC = All Way Stop Control.
(b) Delay refers to the average control delay for the entire intersection measured in seconds per vehicle. At TWSC intersections, delay refers to the worst movement.
(c) LOS calculations based on methodologies outlined in the 6th Edition HCM and performed using Synchro 10.

TABLE 6-2
NEAR TERM (2022) BASELINE CONDITIONS
ROADWAY ANALYSIS SUMMARY

ROADWAY SEGMENT	ROADWAY CLASSIFICATION (a)	LOS E CAPACITY	NEAR TERM BASELINE		
			ADT	V/C RATIO (b)	LOS
Orange Avenue					
Swift Avenue to 35th Street	2 Lane Collector (continuous left-turn lane)	15,000	9,020	0.601	C
43rd Street to Fairmount Avenue	2 Lane Collector (continuous left-turn lane)	15,000	11,965	0.798	D
47th Street to Euclid Avenue	2 Lane Collector (continuous left-turn lane)	15,000	6,495	0.433	B
El Cajon Boulevard					
34th Street to Swift Avenue	6 Lane Major Arterial	50,000	20,650	0.413	B
35th Street to Wilson Avenue	6 Lane Major Arterial	50,000	20,230	0.405	B
Copeland Avenue to Van Dyke Avenue	6 Lane Major Arterial	50,000	28,760	0.575	C
43rd Street to Fairmount Avenue	5 Lane Major Arterial	45,000	29,785	0.662	C
Fairmount Avenue to 44th Street	4 Lane Major Arterial	40,000	29,260	0.732	C
Euclid Avenue to 48th Street	4 Lane Major Arterial	40,000	25,735	0.643	C
University Avenue					
Swift Avenue to 35th Street	2 Lane Collector (continuous left-turn lane)	15,000	14,669	0.978	**E**
35th Street to Wilson Avenue	2 Lane Collector (continuous left-turn lane)	15,000	14,430	0.962	**E**
43rd Street to Fairmount Avenue	4 Lane Collector	30,000	21,225	0.708	D
Fairmount Avenue to 44th Street	4 Lane Collector	30,000	21,690	0.723	D
47th Street to Euclid Avenue	4 Lane Collector	30,000	20,015	0.667	D
48th Street to Estrella Avenue	4 Lane Collector	30,000	21,985	0.733	D
33rd Street					
El Cajon Boulevard to Orange Avenue	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	6,905	0.863	**E**
Swift Avenue					
El Cajon Boulevard to Orange Avenue	2 Lane Sub-Collector (single-family)	2,200	552	0.251	A
Orange Avenue to Polk Avenue	2 Lane Sub-Collector (single-family)	2,200	1,930	0.877	A
35th Street					
El Cajon Boulevard to Orange Avenue	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	4,520	0.565	C
Orange Avenue to Polk Avenue	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	3,290	0.411	B
Wilson Avenue					
El Cajon Boulevard to Orange Avenue	2 Lane Sub-Collector (single-family)	2,200	1,140	0.518	A
Orange Avenue to Polk Avenue	2 Lane Sub-Collector (single-family)	2,200	1,065	0.484	A
42nd Street					
Orange Avenue to Polk Avenue	2 Lane Sub-Collector (single-family)	2,200	2,085	0.948	A
Copeland Avenue					
El Cajon Boulevard to Orange Avenue	2 Lane Sub-Collector (single-family)	2,200	2,165	0.984	A
Van Dyke Avenue					
El Cajon Boulevard to Orange Avenue	2 Lane Sub-Collector (single-family)	2,200	1,095	0.498	A
Orange Avenue to Polk Avenue	2 Lane Sub-Collector (single-family)	2,200	2,045	0.93	A
43rd Street					
El Cajon Boulevard to Orange Avenue	2 Lane Collector (continuous left-turn lane)	15,000	7,807	0.52	C
Orange Avenue to Polk Avenue	2 Lane Collector (continuous left-turn lane)	15,000	6,320	0.421	B
Fairmount Avenue					
El Cajon Boulevard to Orange Avenue	3 Lane Collector	22,500	12,325	0.548	C
Orange Avenue to Polk Avenue	3 Lane Collector	22,500	12,995	0.578	C
44th Street					
El Cajon Boulevard to Orange Avenue	2 Lane Sub-Collector (single-family)	2,200	1,020	0.464	A
Orange Avenue to Polk Avenue	2 Lane Sub-Collector (single-family)	2,200	1,005	0.457	A
Highland Avenue					
El Cajon Boulevard to Orange Avenue	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	2,980	0.373	B
Orange Avenue to Polk Avenue	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	3,105	0.388	B
Menlo Avenue					
Orange Avenue to Polk Avenue	2 Lane Sub-Collector (single-family)	2,200	2,100	0.955	A
47th Street					
El Cajon Boulevard to Orange Avenue	2 Lane Sub-Collector (single-family)	2,200	1,165	0.53	A
Euclid Avenue					
El Cajon Boulevard to Orange Avenue	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	11,035	1.379	**F**
Orange Avenue to Polk Avenue	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	11,585	1.448	**F**
48th Street					
El Cajon Boulevard to Orange Avenue	2 Lane Sub-Collector (single-family)	2,200	1,305	0.593	A
Orange Avenue to Polk Avenue	2 Lane Sub-Collector (single-family)	2,200	1,300	0.591	A

Notes:
Bold values indicate roadway segments operating at LOS E or F.
(a) Classification is based on the City of San Diego Traffic Impact Study Manual.
(b) The v/c Ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity.

7 NEAR TERM (2022) PLUS PROJECT CONDITIONS

This section provides a description of the Near Term (2022) Conditions with the addition of the proposed project traffic as described in Section 4 of this report and shown in Figure 4-1.

7.1 TRAFFIC VOLUMES

The assigned traffic volumes resulting from the channelizer medians were added to the Near Term Baseline Conditions traffic volumes to create Near Term Plus Project Conditions traffic volumes, shown in **Figure 7-1**.

7.2 INTERSECTION ANALYSIS

Table 7-1 displays the LOS analysis results for the study intersections under the Near Term (2022) with Project Conditions. As shown in the table, all intersections within the study area would operate at LOS D or better with the addition of the proposed project except for the following intersections:

- El Cajon Boulevard and Fairmount Avenue (LOS E – AM Peak)

Many of the intersections along the Orange Avenue corridor are expected to improve operations as a result of the anticipated volume reduction proposed for the Orange Bikeway Project. The Orange Avenue and Van Dyke Avenue intersection is expected to improve from LOS F to LOS C with the reduction of traffic volumes as a result of the project.

Appendix D contains the intersections LOS calculation worksheets.

7.3 ROADWAY SEGMENT ANALYSIS

Table 7-2 displays the roadway segment analysis under the Near Term (2022) Plus Project Conditions per City of San Diego guidelines. As shown in the table, all study roadway segments would continue to operate at LOS D or better with the addition of the proposed project traffic, except the following:

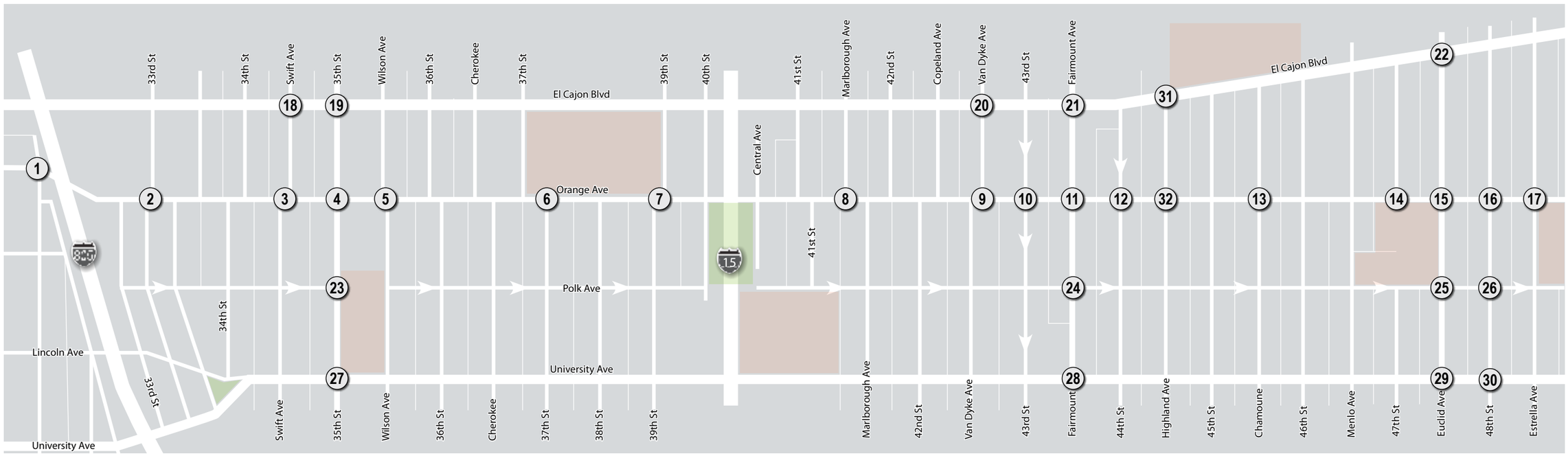
- University Avenue – Swift Avenue to 35th Street (LOS F)
- University Avenue – 35th Street to Wilson Avenue (LOS F)
- University Avenue – 43rd Street to Fairmount Avenue (LOS E)
- University Avenue – Fairmount Avenue to 44th Street (LOS E)
- University Avenue – 48th Street to Estrella Avenue (LOS E)
- 33rd Street – El Cajon Boulevard to Orange Avenue (LOS E)
- Euclid Avenue - El Cajon Boulevard to Orange Avenue (LOS F)
- Euclid Avenue – Orange Avenue to Polk Avenue (LOS F)

To maintain or improve all roadway segment operations within the project study area to LOS D or better, an additional vehicle travel lane would be required along the roadway segments listed above. Adding an additional vehicle lane along these segments is not feasible due to lack of public right-of-way; the road is not wide enough to accommodate an additional travel lane while maintaining the existing parking configuration and space for people walking on sidewalks without impacting private property. Additionally, the roadway segments along 33rd Street and Euclid Avenue operate at LOS E and LOS F, respectively, both with and without the project.

Furthermore, the Orange Avenue study area segments are expected to improve to LOS A with the reduction of traffic volumes as a result of the Orange Bikeway Project.

1				2				3				4				5				6				7				8			
	3 / 1	32nd St	0 / 3 128 / 128 30 / 45		121 / 130 2 / 5 55 / 266	33rd St	226 / 154 71 / 91 2 / 3		48 / 30 4 / 7 5 / 2	Swift Ave	4 / 13 81 / 46 9 / 14		20 / 41 93 / 122 3 / 3	35th St	151 / 86		8 / 23 5 / 4 12 / 14	Wilson Ave	16 / 20 136 / 68 74 / 65		7 / 21 3 / 8 62 / 72	37th St	70 / 52 78 / 100 15 / 24		38 / 30 7 / 12 17 / 12	39th St	172 / 54 91 / 100 40 / 35		3 / 1 2 / 0 0 / 2	Marlborough Ave	260 / 164 74 / 80
		Howard Ave				Orange Ave				Orange Ave				Orange Ave				Orange Ave				Orange Ave				Orange Ave				Orange Ave	
	1 / 1 46 / 153 15 / 41		28 / 19 1 / 1 29 / 55		94 / 90 49 / 125		5 / 1 4 / 0		53 / 62 22 / 136 23 / 92		101 / 85 10 / 2 35 / 41		40 / 146		4 / 2 140 / 82 48 / 32		14 / 24 29 / 34 16 / 6		23 / 20 9 / 13 33 / 20		25 / 7 67 / 86 16 / 17		10 / 13 4 / 5 44 / 89		52 / 30 107 / 161 47 / 21		51 / 37 53 / 17 75 / 52		121 / 181 57 / 86		122 / 75 72 / 46

9				10				11				12				13				14				15				16			
	15 / 32 3 / 7 2 / 7	Van Dyke Ave	25 / 22 114 / 58 7 / 22		112 / 85 273 / 491 51 / 155	43rd St	95 / 25 3 / 9		5 / 16 62 / 172 1 / 4	Fairmount Ave	200 / 179		50 / 62 8 / 14 37 / 46	44th St	96 / 52 41 / 50		25 / 32 111 / 77 46 / 43	Chamoune Ave	60 / 33 101 / 102 12 / 4		54 / 55 28 / 21 6 / 25	47th St	26 / 6 79 / 24 32 / 13		57 / 65 169 / 336 1 / 2	Euclid Ave	127 / 120		46 / 46 13 / 18 6 / 12	48th St	13 / 16 124 / 65 62 / 83
		Orange Ave				Orange Ave				Orange Ave				Orange Ave				Orange Ave				Orange Ave				Orange Ave				Orange Ave	
	82 / 68 49 / 104 18 / 48		169 / 94 45 / 16 37 / 42		0 / 1 78 / 56 43 / 89		0 / 1		67 / 82		10 / 6 916 / 443 59 / 49		18 / 29 14 / 21		17 / 11 26 / 95		20 / 12 24 / 35 19 / 14		48 / 71 185 / 61 30 / 21		58 / 45 54 / 135 21 / 11				79 / 136		5 / 3 378 / 281 45 / 62		20 / 30 22 / 36 5 / 24		25 / 21 32 / 17 27 / 31



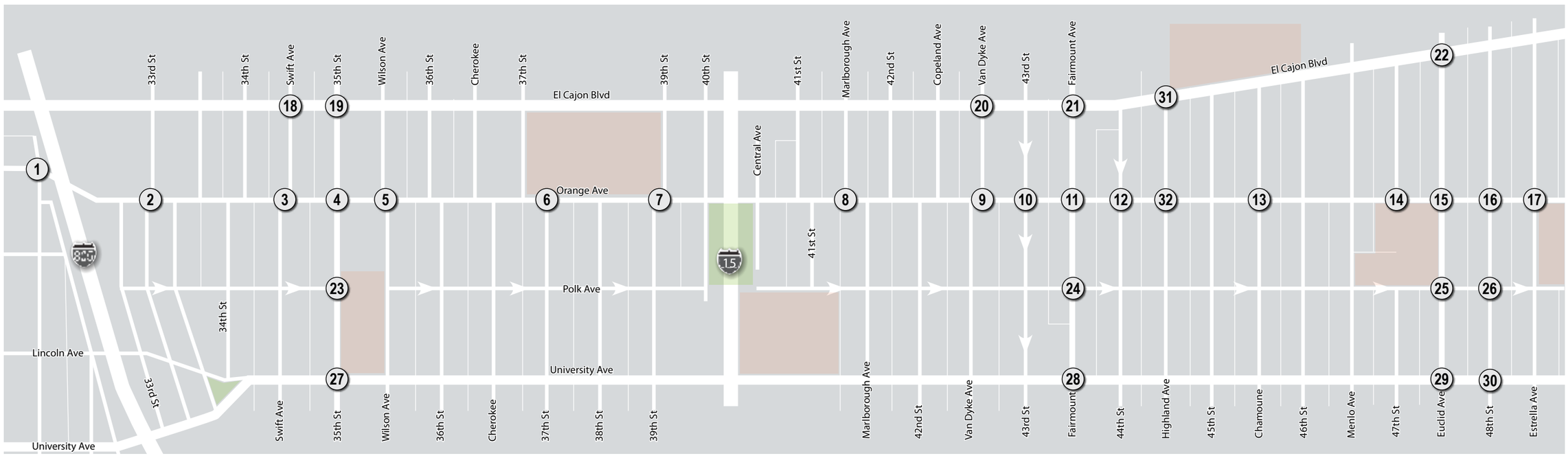
LEGEND

(#) Study Intersection

⇦ X / Y AM / PM Peak Hour Turning Volume

Figure 7-1
Near Term (2022) Plus Project Peak Hour Volumes

17	31 / 33 36 / 34 35 / 34 **Estrella Ave**	3 / 5 144 / 123 39 / 49 **Orange Ave**	**18**	11 / 24 **Swift Ave**	28 / 12 1423 / 965 **El Cajon Blvd**	**19**	84 / 63 42 / 46 51 / 59 **35th St**	76 / 37 1132 / 796 20 / 70 **El Cajon Blvd**	**20**	75 / 56 **Van Dyke Ave**	40 / 37 1608 / 1056 **El Cajon Blvd**	**21**	**Fairmount Ave**	359 / 163 1373 / 887 **El Cajon Blvd**	**22**	51 / 42 90 / 241 34 / 71 **Euclide Ave**	111 / 57 1264 / 852 71 / 88 **El Cajon Blvd**	**23**	113 / 191 **35th St**	**Polk Ave**	**24**	101 / 271 17 / 66 **Fairmount Ave**	**Polk Ave**
	21 / 21 40 / 48 8 / 3	27 / 23 36 / 24 42 / 70		450 / 991 14 / 15	67 / 76		17 / 70 468 / 915 32 / 83	195 / 98 116 / 70 17 / 34		1054 / 1694 20 / 47	152 / 106		230 / 89 793 / 1493 52 / 124	229 / 207 831 / 388 42 / 77		34 / 40 636 / 1208 58 / 154	280 / 140 190 / 163 44 / 72		21 / 11 23 / 18	128 / 106		12 / 30 12 / 22 18 / 39	955 / 505 35 / 35
25	252 / 466 19 / 55 **Euclid Ave**	**Polk Ave**	**26**	81 / 90 3 / 11 **48th St**	**Polk Ave**	**27**	32 / 36 29 / 81 85 / 188 **35th St**	67 / 23 619 / 706 19 / 30 **University Ave**	**28**	12 / 16 92 / 183 97 / 195 **Fairmount Ave**	160 / 91 587 / 635 89 / 106 **University Ave**	**29**	2 / 39 254 / 413 39 / 89 **Euclid Ave**	79 / 54 796 / 783 187 / 203 **University Ave**	**30**	68 / 109 7 / 14 **48th St**	21 / 22 1001 / 956 **University Ave**	**31**	50 / 60 **Highland Ave**	1377 / 1029 25 / 25 **El Cajon Blvd**	**32**	38 / 25 6 / 12 34 / 38 **Highland Ave**	125 / 85 46 / 24 38 / 15 **Orange Ave**
	25 / 36 18 / 49 36 / 55	490 / 350 19 / 19		17 / 12 24 / 105 12 / 17	59 / 70 6 / 18		28 / 25 272 / 601 15 / 33	118 / 55 40 / 32 20 / 23		126 / 97 413 / 860 71 / 116	208 / 191 651 / 375 58 / 91		67 / 71 308 / 795 37 / 87	159 / 85 365 / 237 119 / 205		23 / 34 549 / 1060			11 / 16 597 / 1496 27 / 81	110 / 62 33 / 54		34 / 25 39 / 40 11 / 33	15 / 19 10 / 6 56 / 58



LEGEND

(#) Study Intersection

⇦ X / Y AM / PM Peak Hour Turning Volume

Figure 7-1
Near Term (2022) Plus Project Peak Hour Volumes (Continued)

Table 7-1 Near Term (2022) Plus Project Conditions Intersection Analysis Summary

Intersection		Traffic Control (a)	Peak Hour	Near Term Conditions		Near Term Plus Project Conditions	
				Delay (b)	LOS (c)	Delay (b)	LOS (c)
1	Howard Ave & 32nd St	TWSC	AM	11.4	B	10	B
			PM	12.5	B	10.6	B
2	Orange Ave & 33rd St	Signal	AM	13.7	B	7.8	A
			PM	15.2	B	8.8	A
3	Orange Ave & Swift Ave	TWSC	AM	15.9	C	11.9	B
			PM	21.0	C	13.4	B
4	Orange Ave & 35th St	Signal	AM	10.2	B	7.9	A
			PM	9.3	A	7.9	A
5	Orange Ave & Wilson Ave	TWSC	AM	16.7	C	11.7	B
			PM	21.7	C	10.9	B
6	Orange Ave & 37th St	TWSC	AM	17.0	C	11.8	B
			PM	20.2	C	12.7	B
7	Orange Ave & 39th St	TWSC	AM	34.5	D	16.8	C
			PM	23.2	C	12.7	B
8	Orange Ave & Marlborough Ave	Signal	AM	7.3	A	6.4	A
			PM	5.7	A	5.5	A
9	Orange Ave & Van Dyke Ave	TWSC	AM	59.8	**F**	17.8	C
			PM	21.6	C	14.1	B
10	Orange Ave & 43rd St	Signal	AM	10.3	B	14.4	B
			PM	12.8	B	17.3	B
11	Orange Ave & Fairmount Ave	Signal	AM	17.7	B	19.9	B
			PM	12.3	B	16.9	B
12	Orange Ave & 44th St	TWSC	AM	13.2	B	10.1	B
			PM	14.2	B	10.6	B
13	Orange Ave & Chamoune Ave	AWSC	AM	23.2	C	11.3	B
			PM	20.9	C	9	A
14	Orange Ave & 47th St	TWSC	AM	12.5	B	9.5	A
			PM	14.2	B	9.6	A
15	Orange Ave & Euclid Ave	Signal	AM	14.4	B	7.1	A
			PM	16.3	B	7.5	A
16	Orange Ave & 48th St	TWSC	AM	17.1	C	12.2	B
			PM	17.3	C	11.8	B
17	Orange Ave & Estrella Ave	AWSC	AM	11.1	B	9.3	A
			PM	14.2	B	8.7	A
18	El Cajon Blvd & Swift Ave	TWSC	AM	13.9	B	18.1	C
			PM	13.7	B	15.9	C
19	El Cajon Blvd & 35th St	Signal	AM	18.5	B	21.1	C
			PM	18.3	B	17.7	B
20	El Cajon Blvd & Van Dyke Ave	TWSC	AM	17.4	C	27.1	D
			PM	24.1	C	34.1	D
21	El Cajon Blvd & Fairmount Ave	Signal	AM	55.0	D	79.3	**E**
			PM	18.5	B	22.8	C

Intersection		Traffic Control (a)	Peak Hour	Near Term Conditions		Near Term Plus Project Conditions	
				Delay (b)	LOS (c)	Delay (b)	LOS (c)
22	El Cajon Blvd & Euclid Ave	Signal	AM	24.6	C	29.9	C
			PM	26.4	C	29.3	C
23	Polk Ave & 35th St	AWSC	AM	8.1	A	8.0	A
			PM	8.0	A	8.3	A
24	Polk Ave & Fairmount Ave	TWSC	AM	11.4	B	11.2	B
			PM	12.6	B	13.5	B
25	Polk Ave & Euclid Ave	Signal	AM	5.1	A	5.1	A
			PM	5.9	A	5.9	A
26	Polk Ave & 48th St	TWSC	AM	9.0	A	9.5	A
			PM	10.0	B	10.3	B
27	University Ave & 35th St	Signal	AM	10.5	B	11.0	B
			PM	11.1	B	13.6	B
28	University Ave & Fairmount Ave	Signal	AM	43.3	D	43.1	D
			PM	37.3	D	48.0	D
29	University Ave & Euclid Ave	Signal	AM	45.8	D	40.9	D
			PM	40.7	D	41.0	D
30	University Ave & 48th St	TWSC	AM	16.5	C	16.0	C
			PM	16.8	C	22.0	C
31	El Cajon Blvd & Highland Ave	Signal	AM	13.0	B	11.9	B
			PM	10.6	B	6.6	A
32	Orange Ave & Highland Ave	AWSC (E) NTC (PP)	AM	10.8	B	4.4	A
			PM	10.8	B	3.6	A

Notes:
Bold values indicate intersections operating at LOS E or F.
(E) indicates Existing Conditions
(PP) indicates Plus Project Conditions
(a) Signal = Traffic Signal, TWSC = Two-Way Stop Control, AWSC = All Way Stop Control.
(b) Delay refers to the average control delay for the entire intersection measured in seconds per vehicle. At TWSC intersections, delay refers to the worst movement.
(c) LOS calculations based on methodologies outlined in the 6th Edition HCM and performed using Synchro 10.

TABLE 7-2
NEAR TERM (2022) WITH PROJECT CONDITIONS
ROADWAY ANALYSIS SUMMARY

ROADWAY SEGMENT		ROADWAY CLASSIFICATION (a)	LOS E CAPACITY	NEAR TERM BASELINE			NEAR TERM PLUS PROJECT		
				ADT	V/C RATIO (b)	LOS	ADT	V/C RATIO (b)	LOS
Orange Avenue (c)									
Swift Avenue to 35th Street	Existing	2 Lane Collector (continuous left-turn lane)	15,000	9,020	0.601	C			
	Plus Proj.	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000				2,525	0.168	A
43rd Street to Fairmount Avenue	Existing	2 Lane Collector (continuous left-turn lane)	15,000	11,965	0.798	D			
	Plus Proj.	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000				3,310	0.221	A
47th Street to Euclid Avenue	Existing	2 Lane Collector (continuous left-turn lane)	15,000	6,495	0.433	B			
	Plus Proj.	2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000				2,810	0.187	A
El Cajon Boulevard									
34th Street to Swift Avenue		6 Lane Major Arterial	50,000	20,650	0.413	B	24,565	0.491	B
35th Street to Wilson Avenue		6 Lane Major Arterial	50,000	20,230	0.405	B	24,145	0.483	B
Copeland Avenue to Van Dyke Avenue		6 Lane Major Arterial	50,000	28,760	0.575	C	34,170	0.683	C
43rd Street to Fairmount Avenue		5 Lane Major Arterial	45,000	29,785	0.662	C	35,195	0.782	D
Fairmount Avenue to 44th Street		4 Lane Major Arterial	40,000	29,260	0.732	C	32,403	0.81	D
Euclid Avenue to 48th Street		4 Lane Major Arterial	40,000	25,735	0.643	C	28,878	0.722	C
University Avenue									
Swift Avenue to 35th Street		2 Lane Collector (continuous left-turn lane)	15,000	14,669	0.978	**E**	18,575	1.238	**F**
35th Street to Wilson Avenue		2 Lane Collector (continuous left-turn lane)	15,000	14,430	0.962	**E**	18,336	1.222	**F**
43rd Street to Fairmount Avenue		4 Lane Collector	30,000	21,225	0.708	D	26,535	0.885	**E**
Fairmount Avenue to 44th Street		4 Lane Collector	30,000	21,690	0.723	D	27,000	0.9	**E**
47th Street to Euclid Avenue		4 Lane Collector	30,000	20,015	0.667	D	23,219	0.774	D
48th Street to Estrella Avenue		4 Lane Collector	30,000	21,985	0.733	D	25,189	0.84	**E**
33rd Street									
El Cajon Boulevard to Orange Avenue		2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	6,905	0.863	**E**	7,125	0.891	**E**
Swift Avenue									
El Cajon Boulevard to Orange Avenue		2 Lane Sub-Collector (single-family)	2,200	552	0.251	A	1,226	0.557	A
Orange Avenue to Polk Avenue		2 Lane Sub-Collector (single-family)	2,200	1,930	0.877	A	2,259	1.027	D
35th Street									
El Cajon Boulevard to Orange Avenue		2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	4,520	0.565	C	5,013	0.627	D
Orange Avenue to Polk Avenue		2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	3,290	0.411	B	4,067	0.508	C
Wilson Avenue									
El Cajon Boulevard to Orange Avenue		2 Lane Sub-Collector (single-family)	2,200	1,140	0.518	A	1,257	0.571	A
Orange Avenue to Polk Avenue		2 Lane Sub-Collector (single-family)	2,200	1,065	0.484	A	1,425	0.648	A
42nd Street									
Orange Avenue to Polk Avenue		2 Lane Sub-Collector (single-family)	2,200	2,085	0.948	A	2,375	1.08	D
Copeland Avenue									
El Cajon Boulevard to Orange Avenue		2 Lane Sub-Collector (single-family)	2,200	2,165	0.984	A	2,455	1.116	D
Van Dyke Avenue									
El Cajon Boulevard to Orange Avenue		2 Lane Sub-Collector (single-family)	2,200	1,095	0.498	A	1,906	0.866	A
Orange Avenue to Polk Avenue		2 Lane Sub-Collector (single-family)	2,200	2,045	0.93	A	2,341	1.064	D
43rd Street									
El Cajon Boulevard to Orange Avenue		2 Lane Collector (continuous left-turn lane)	15,000	7,807	0.52	C	7,955	0.53	C
Orange Avenue to Polk Avenue		2 Lane Collector (continuous left-turn lane)	15,000	6,320	0.421	B	6,559	0.437	B
Fairmount Avenue									
El Cajon Boulevard to Orange Avenue		3 Lane Collector	22,500	12,325	0.548	C	12,956	0.576	C
Orange Avenue to Polk Avenue		3 Lane Collector	22,500	12,995	0.578	C	13,840	0.615	C
44th Street									
El Cajon Boulevard to Orange Avenue		2 Lane Sub-Collector (single-family)	2,200	1,020	0.464	A	1,140	0.518	A
Orange Avenue to Polk Avenue		2 Lane Sub-Collector (single-family)	2,200	1,005	0.457	A	1,040	0.473	A
Highland Avenue									
El Cajon Boulevard to Orange Avenue		2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	2,980	0.373	B	3,273	0.409	B
Orange Avenue to Polk Avenue		2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	3,105	0.388	B	3,394	0.424	B
Menlo Avenue									
Orange Avenue to Polk Avenue		2 Lane Sub-Collector (single-family)	2,200	2,100	0.955	A	2,328	1.058	D
47th Street									
El Cajon Boulevard to Orange Avenue		2 Lane Sub-Collector (single-family)	2,200	1,165	0.53	A	1,600	0.727	A
Euclid Avenue									
El Cajon Boulevard to Orange Avenue		2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	11,035	1.379	**F**	11,535	1.442	**F**
Orange Avenue to Polk Avenue		2 Lane Collector (Multi-family, commercial-industrial fronting)	8,000	11,585	1.448	**F**	12,004	1.501	**F**
48th Street									
El Cajon Boulevard to Orange Avenue		2 Lane Sub-Collector (single-family)	2,200	1,305	0.593	A	1,452	0.66	A
Orange Avenue to Polk Avenue		2 Lane Sub-Collector (single-family)	2,200	1,300	0.591	A	1,812	0.824	A

Notes:
Bold values indicate roadway segments operating at LOS E or F.
(a) Classification is based on the City of San Diego Traffic Impact Study Manual.
(b) The v/c Ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity.
(c) Orange Avenue roadway classification will be modified as part of the Orange Bikeway Project. Under Existing Conditions, Orange Avenue is a 2 Lane Collector (With Continuous Left-Turn Lane) with a capacity of 15,000 vehicles per day, as reflected in Table 3-2 of this report. This table reflects proposed project conditions where Orange Avenue is converted to a 2 Lane Collector (Multi-family, commercial-industrial fronting) with a capacity of 8,000 vehicles per day.

7.4 EL CAJON BOULEVARD PILOT PROJECT

The City of San Diego, SANDAG, and MTS are currently considering implementation of a transit-only lane pilot project along segments of El Cajon Boulevard. This project is currently in the planning phase and, if implemented, will reduce the number of general purpose travel lanes on eastbound and westbound El Cajon Boulevard to provide space for a transit-only lane west of 43rd Street. At this time, it is assumed that traffic volumes on the corridor would not change with the implementation of the pilot project. Analysis of the Near Term (2022) Conditions with project traffic and the potential travel lane reduction on El Cajon Boulevard was performed, and the results are included in **Appendix E**. The analysis only considers impacts to El Cajon Boulevard.

8 PROJECT SAFETY ASSESSMENT

One of the major goals of the proposed Orange Bikeway Project is to improve safety for all roadway users in the project area. The design enhancements proposed for Orange Avenue are expected to increase safety for people walking and biking on the corridor, creating a low-stress route with slow travel speeds and low traffic volumes.

As a result of the proposed channelizer medians, vehicular traffic volumes will be re-routed from Orange Avenue onto parallel corridors such as El Cajon Boulevard, Polk Avenue, and University Avenue. The increase of potential traffic volumes along these parallel corridors may increase the number of potential conflicts between vehicles and people walking and biking. However, by creating a continuous low-stress corridor along Orange Avenue, people walking and biking are anticipated to use Orange Avenue rather than other parallel routes when feasible, reducing the number of vehicle-pedestrian and vehicle-bicycle conflicts through the community as a whole.

This section of the report focuses on the safety enhancements proposed for the Orange Avenue corridor as part of the Orange Bikeway Project.

8.1 CRASH DATA ANALYSIS

Data from the Statewide Integrated Traffic Records System (SWITRS) was obtained to assess the collision history within the corridor. SWITRS is a database that serves as a means to collect and process data gathered from a collision scene. The collision data for the study area is provided in **Appendix F**.

8.1.1 BICYCLE-INVOLVED COLLISIONS

A total of 22 collisions involving people biking occurred along the Orange Avenue project corridor, or within 50' of the corridor, during the five-year period from 2013 to 2017, or an average of 4.4 collisions each year. The highest number of reported collisions in a given year was six, which occurred in 2015. Of the five-year total, these collisions included one severe injury at the intersection of Orange Avenue and 44th Street in 2015.

The highest concentrations of collisions along Orange Avenue were at Fairmount Avenue and Highland Avenue. This project aims to reduce collisions involving people biking by reducing vehicle travel speeds and volumes and providing bike facilities that are comfortable and easy to use. Reducing vehicle speeds give everyone more time to react to potential conflicts, thereby reducing collision severity and frequency. Reducing vehicle volumes helps reduce the number of potential conflicts between people biking and people driving. A diverter is proposed at Fairmount Avenue and a neighborhood traffic circle is proposed at Highland Avenue.

A total of 18 collisions involving people biking were reported along El Cajon Boulevard within the project area, or within 50' of the corridor, during the five-year study period, or an average of 3.6 collisions each year. The highest number of reported collisions in a given year was five, which occurred in 2014 and 2015. Of the five-year total, these collisions included zero fatalities and zero severe injuries.

A total of 27 collisions involving people biking were reported along University Avenue within the project area, or within 50' of the corridor, during the five-year study period, or an average of 5.4 collisions each year. The highest number of reported collisions in a given year was eleven, which occurred in 2014. Of the five-year total, these collisions included two severe injuries, one at University Avenue at Chamoune Avenue, and the other at University Avenue at 47th Street.

Figure 8-1 shows the location of collisions involving people biking on Orange Avenue, El Cajon Boulevard, and University Avenue discussed above, as well as other collisions within the study area on roadways crossing the study corridors for the 2013 through 2017 period.

8.1.2 PEDESTRIAN-INVOLVED COLLISIONS

A total of 24 collisions involving people walking occurred along the Orange Avenue project corridor during the five-year period from 2013 to 2017, or an average of 4.8 collisions each year. The highest number of reported collisions in a given year was six, which occurred in 2014, 2015, and 2016. Of the five-year total, these collisions included one fatality at Orange Avenue and 41st Street in 2013, and one severe injury at Orange Avenue and 44th Street in 2014.

A total of 35 collisions involving people walking occurred along El Cajon Boulevard within the project area during the five-year study period, or an average of 6.6 collisions each year. The highest number of reported collisions in a given year was thirteen, which occurred in 2015. Of the five-year total, these collisions included five severe injuries, three of which occurred at the El Cajon Boulevard and 36th Street intersection.

A total of 69 collisions involving people walking occurred along University Avenue within the project area during the five-year study period, or an average of 13.8 collisions each year. The highest number of reported collisions in a given year was sixteen, which occurred in 2015. Of the five-year total, these collisions included one fatality the University Avenue and 36th Street intersection, and three severe injuries, two of which occurred at the University Avenue and 44th Street intersection.

Figure 8-1 shows the location of the collisions involving people walking on Orange Avenue, El Cajon Boulevard, and University Avenue discussed above, as well as other collisions within the study area on roadways crossing the study corridors for the 2013 through 2017 period.

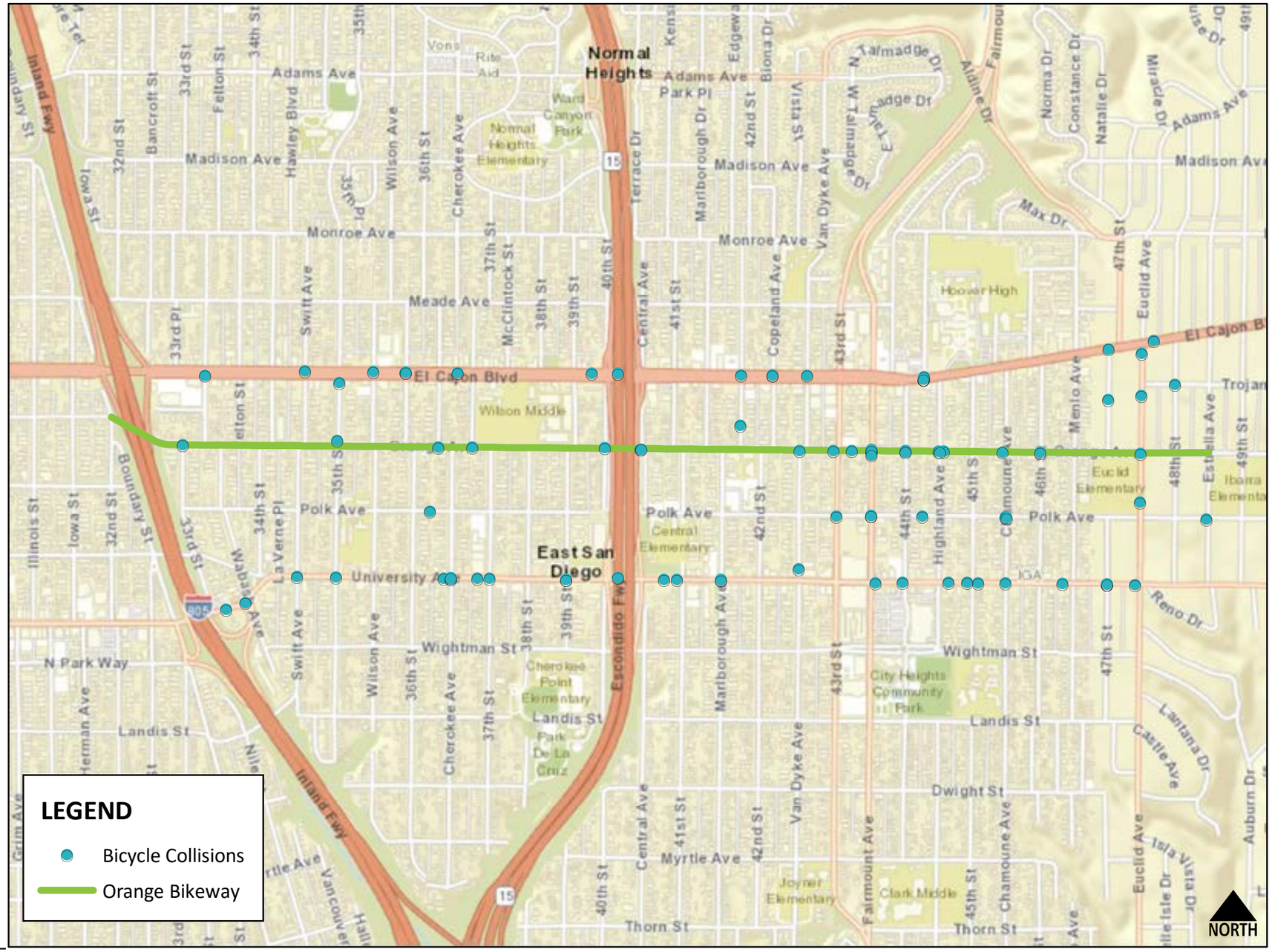


Figure 8-1
Collisions Involving People Biking Map

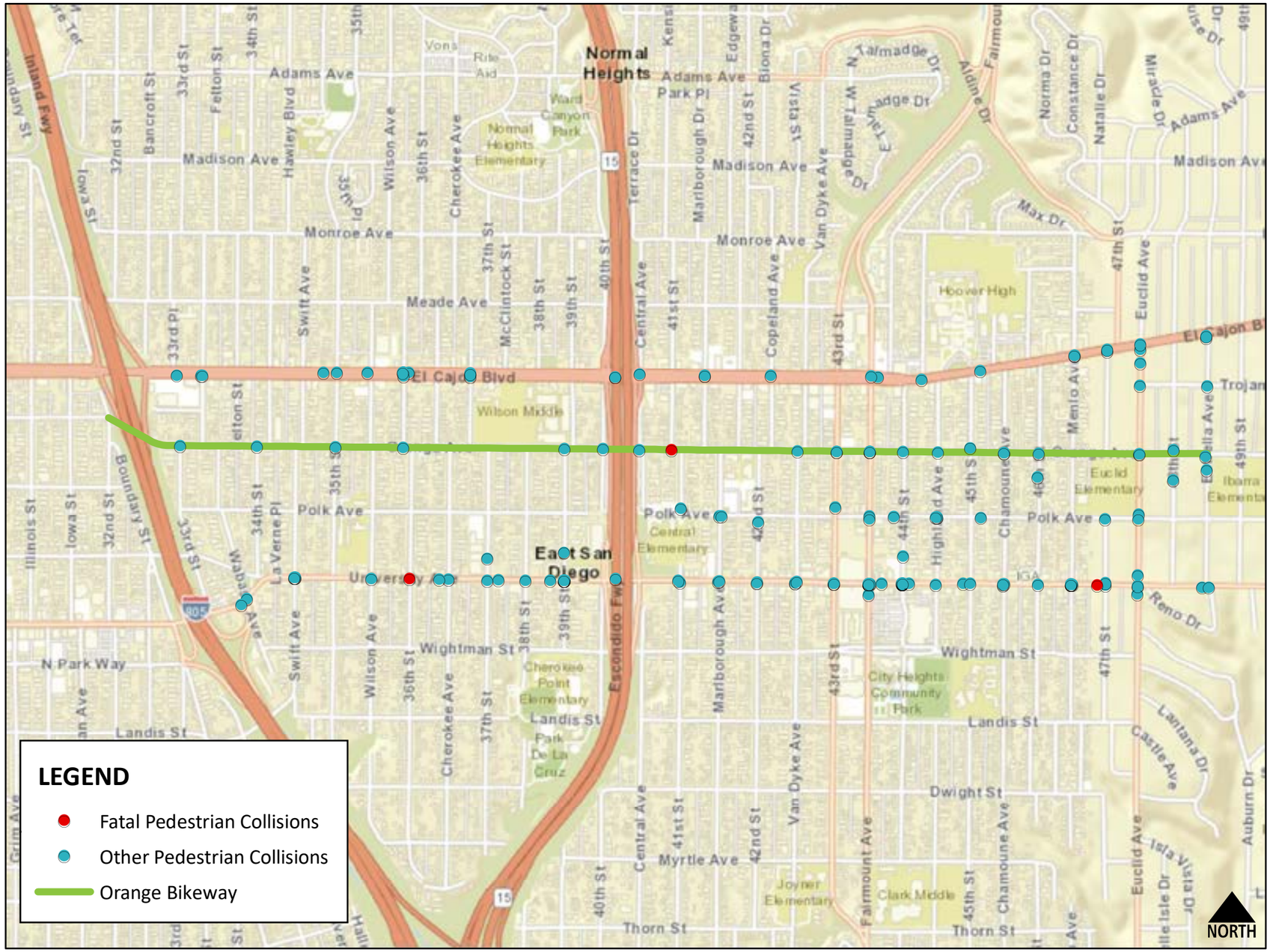


Figure 8-2
Collisions Involving People Walking Map

8.2 BICYCLE LEVEL OF TRAFFIC STRESS

8.2.1 ROADWAY SEGMENT LTS

The LTS for roadway segments in the project area was assessed based upon the criteria identified in Table 2-4 and Table 2-5. **Table 8-1** provides the level of traffic stress results along roadway segments in the project area for Existing Conditions. **Table 8-2** provides the level of traffic stress results along Orange Avenue under Existing Plus Project conditions.

Currently, Orange Avenue provides a Class III bike route with sharrows for people biking and operates at LTS 2 given the low posted speed limit. With implementation of the project, the level of traffic stress would improve to LTS 1 as a result of implementing bike lanes along the project corridor.

El Cajon Boulevard carries two or more travel lanes in each direction with a posted speed limit of 35 miles per hour. Bike facilities are not currently provided on the corridor, creating a high stress environment for people biking on the corridor. The analysis results indicate LTS 4 under existing conditions.

University Avenue carries one or two lanes in each direction with a posted speed limit of 30 miles per hour between Swift Avenue and 43rd Street and a posted speed limit of 35 miles per hour between 43rd Street and Estrella Avenue. Segments of University Avenue were recently restriped to provide Class II bike lanes, while other segments do not have a bike facility. The analysis results indicate LTS 3 for a majority of the corridor, where there are fewer travel lanes or where bike lanes are provided, while other segments operate at LTS 4.

Although the project does not include enhancements on El Cajon Boulevard or University Avenue, the objective of the project is to create a parallel low-stress (LTS 1) facility on Orange Avenue, and encourage people biking to use the new bicycle boulevard to access key destinations within the community and regionally.

8.2.2 INTERSECTION CROSSINGS LTS

The LTS for intersection crossings in the project area was assessed based upon criteria identified in Table 2-6 and Table 2-7. **Table 8-3** provides the level of traffic stress results for the unsignalized study area intersection crossings along Orange Avenue, El Cajon Boulevard, and University Avenue under existing conditions. The project is not anticipated to impact LTS crossing results for any of the corridors.

Currently the intersection crossings on all three study corridors are operating at LTS 1 due to cross streets with low speeds and short crossing distances. The LTS criteria for intersection crossings relates to uncontrolled crossings only. Since the proposed enhancements on Orange Avenue are at signalized intersections, the LTS scores are not expected to change under plus project conditions. Similarly LTS criteria for intersection approaches relates to intersections with right-turn lanes. The Orange Avenue corridor does not currently have right turn lanes, and right turn lanes are not proposed. Therefore, unsignalized intersections were analyzed.

Table 8-1. Bicycle Level of Traffic Stress (BLTS) Analysis Results – Existing Conditions

Segment	Direction	Speed Limit	Through Lanes	Bike Lane Classification	Parking Lane	Bike Lane Blockage	Physically Separated Bikeway	Overall LTS
El Cajon Boulevard								
33rd Street to Swift Avenue	WB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
	EB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
Swift Avenue to 35th Street	WB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
	EB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
35th Street to I-15 SB Ramps	WB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
	EB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
I-15 SB Ramps to I-15 NB Ramps	WB	35 mph	2 or more	N/A	No	Frequent	No	**LTS 4**
	EB	35 mph	2 or more	N/A	No	Frequent	No	**LTS 4**
I-15 NB Ramps to Marlborough Avenue	WB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
	EB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
Marlborough Avenue to Van Dyke Avenue	WB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
	EB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
Van Dyke Avenue to 43rd Street	WB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
	EB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
43rd Street to Fairmount Avenue	WB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
	EB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
Fairmount Avenue to Highland Avenue	WB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
	EB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
Highland Avenue to Euclid Avenue	WB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
	EB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
Orange Avenue								
Boundary Street to 33rd Street	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
33rd Street to Swift Avenue	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
Swift Avenue to 35th Street	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
35th Street to Wilson Avenue	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
Wilson Avenue to 37th Street	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
37th Street to 39th Street	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
39st Street to Marlborough Avenue	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
Marlborough Avenue to Van Dyke Avenue	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
Van Dyke Avenue to 43rd Street	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
43rd Street to Farmount Avenue	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
Fairmount Avenue to 44th Street	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
44th Street to Highland Avenue	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
Highland Avenue to Chamoune Avenue	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
Chamoune Avenue to 47th Street	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
47th Street to Euclid Avenue	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
Euclid Avenue to 48th Street	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
48th Street to Estrella Avenue	WB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
	EB	25 mph or less	1	Class III	Yes	Rare	No	**LTS 2**
University Avenue								
Swift Avenue to 35th Street	WB	30 mph	1	N/A	Yes	Frequent	No	**LTS 3**
	EB	30 mph	1	N/A	Yes	Frequent	No	**LTS 3**
35th Street to Wilson Avenue	WB	30 mph	1	N/A	Yes	Frequent	No	**LTS 3**
	EB	30 mph	1	N/A	Yes	Frequent	No	**LTS 3**

Segment	Direction	Speed Limit	Through Lanes	Bike Lane Classification	Parking Lane	Bike Lane Blockage	Physically Separated Bikeway	Overall LTS
University Avenue (continued)								
Wilson Avenue to 39th Street	WB	30 mph	1	N/A	Yes	Frequent	No	**LTS 3**
	EB	30 mph	1	N/A	Yes	Frequent	No	**LTS 3**
39th Street to 40th Street	WB	30 mph	1	N/A	Yes	Frequent	No	**LTS 3**
	EB	30 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
40th Street to I-15 NB Ramps	WB	30 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
	EB	30 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
I-15 NB Ramps to 41st Street	WB	30 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
	EB	30 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
41st Street to Marlborough Avenue	WB	30 mph	1	N/A	Yes	Frequent	No	**LTS 3**
	EB	30 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
Marlborough Avenue to Van Dyke Avenue	WB	30 mph	1	N/A	Yes	Frequent	No	**LTS 3**
	EB	30 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
Van Dyke Avenue to 43rd Street	WB	30 mph	1	N/A	Yes	Frequent	No	**LTS 3**
	EB	30 mph	2 or more	N/A	Yes	Frequent	No	**LTS 3**
43rd Street to Fairmount Avenue	WB	35 mph	2 or more	N/A	No	Frequent	No	**LTS 4**
	EB	35 mph	2 or more	N/A	Yes	Frequent	No	**LTS 4**
Fairmount Avenue to 44th Street	WB	35 mph	1	N/A	Yes	Frequent	No	**LTS 4**
	EB	35 mph	1	N/A	Yes	Frequent	No	**LTS 4**
44th Street to Highland Avenue	WB	35 mph	1	Class II	Yes	Frequent	No	**LTS 3**
	EB	35 mph	1	Class II	Yes	Frequent	No	**LTS 3**
Highland Avenue to Chamoune Avenue	WB	35 mph	1	Class II	Yes	Frequent	No	**LTS 3**
	EB	35 mph	1	Class II	Yes	Frequent	No	**LTS 3**
Chamoune Avenue to Menlo Avenue	WB	35 mph	1	Class II	Yes	Frequent	No	**LTS 3**
	EB	35 mph	1	Class II	Yes	Frequent	No	**LTS 3**
Menlo Avenue to 47th Street	WB	35 mph	1	Class II	Yes	Frequent	No	**LTS 3**
	EB	35 mph	1	Class II	Yes	Frequent	No	**LTS 3**
47th Street to Euclid Avenue	WB	35 mph	1	Class III	Yes	Frequent	No	**LTS 4**
	EB	35 mph	1	Class III	Yes	Frequent	No	**LTS 4**
Euclid Avenue to Estrella Avenue	WB	35 mph	1	Class III	Yes	Frequent	No	**LTS 4**
	EB	35 mph	1	Class III	Yes	Frequent	No	**LTS 4**

Table 8-2. Bicycle Level of Traffic Stress (BLTS) Analysis Results – Plus Project Conditions

Segment	Direction	Speed Limit	Through Lanes	Bike Lane Classification	Parking Lane	Bike Lane Blockage	Physically Separated Bikeway	Overall LTS
Orange Avenue								
Boundary Street to 33rd Street	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
33rd Street to Swift Avenue	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
Swift Avenue to 35th Street	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
35th Street to Wilson Avenue	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
Wilson Avenue to 37th Street	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
37th Street to 39th Street	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
39st Street to Marlborough Avenue	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
Marlborough Avenue to Van Dyke Avenue	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
Van Dyke Avenue to 43rd Street	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
43rd Street to Farmount Avenue	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
Fairmount Avenue to 44th Street	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
44th Street to Highland Avenue	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
Highland Avenue to Chamoune Avenue	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
Chamoune Avenue to 47th Street	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
47th Street to Euclid Avenue	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
Euclid Avenue to 48th Street	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
48th Street to Estrella Avenue	WB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**
	EB	25 mph or less	1	Class II	Yes	Rare	No	**LTS 1**

Table 8-3 Bicycle Level of Traffic Stress (BLTS) Intersection Crossing Analysis Results – Existing Conditions

EB / WB	NB / SB	Traffic Control (a)	Median (Yes/No)	# Lanes	Speed	Intersection BLTS
Howard Avenue	32nd Street / Boundary Avenue	TWSC	N	3	25	1
Orange Avenue	Swift Avenue	TWSC	N	2	25	1
Orange Avenue	Wilson Avenue	TWSC	N	2	25	1
Orange Avenue	37th Street	TWSC	N	2	25	1
Orange Avenue	39th Street	TWSC	N	2	25	1
Orange Avenue	Van Dyke Avenue	TWSC	N	2	25	1
Orange Avenue	Highland Avenue	AWSC (E) NTC (PP)	N	2	25	1
Orange Avenue	44th Street	TWSC	N	2	25	1
Orange Avenue	47th Street	TWSC	N	2	25	1
Orange Avenue	48th Street	TWSC	N	2	25	1
Orange Avenue	Estrella Avenue	AWSC	N	2	25	1
El Cajon Boulevard	Swift Avenue	TWSC	N	2	25	1
El Cajon Boulevard	Van Dyke Avenue	TWSC	N	2	25	1
University Avenue	48th Street	TWSC	N	2	25	1

(a)
AWSC = All-Way Stop Control;
TWSC = Two-Way Stop Control or One-Way Stop Control
NTC = Neighborhood Traffic Circle
E = Existing Conditions

8.3 PROJECT SAFETY FEATURES

Class II buffered bike lanes are proposed for the Orange Avenue corridor as part of the Orange Bikeway Project. The existing two-way left-turn lane will be removed in order to accommodate the proposed bike facilities, while parking will be maintained along both sides of the roadway.

The proposed project includes various treatments to facilitate the safe and comfortable movement of people walking and biking along the corridor. The goal of the project is to create a low-stress, comfortable bicycle boulevard by managing the vehicular traffic volumes and speeds along the corridor. The proposed physical improvements, intended to enhance the safety of the corridor, are described below.

8.3.1 NEIGHBORHOOD TRAFFIC CIRCLES (NTCS)

A neighborhood traffic circle is a raised island, placed in the center of an intersection, around which traffic circulates. Neighborhood traffic circles reduce traffic speeds and improve the safety and comfort of streets for everyone who uses them. Vehicles and bicycles travel in a counter-clockwise direction around the center island, and users on all approaches must yield to vehicles already traveling around the NTC.

8.3.2 CURB EXTENSIONS

Curb extensions visually and physically narrow the roadway, creating shorter and safer crossings for people walking at intersections. They increase the visibility of people walking by improving sight distances for people driving, encourage slower turning speeds by tightening turning areas, and shorten crossing distances.

8.3.3 SPEED CUSHIONS

Speed cushions are vertical deflections in the road that encourage people driving to slow. They include wheel cutouts to allow larger vehicles like emergency vehicles to pass through easily.

8.3.4 RAISED CROSSWALKS

A raised crosswalk is essentially a speed cushion with a flat section along the center across the entire street width that allows people walking to cross the street at curb level (i.e. without having to use a curb ramp or step off a curb). The sloped approaches to the crosswalk in the street serve to promote safe vehicle speeds, whether or not pedestrians are present.

8.3.5 PEDESTRIAN REFUGE ISLAND

Pedestrian refuge islands provide a protected area in the middle of a raised median for people walking to wait for a gap in each direction of traffic when crossing a street. The islands prevent a person walking from being stuck in the middle of a roadway exposed to both directions of traffic. The median nose that protects people walking from traffic also encourages slower speeds for turning vehicles.

8.3.6 ENHANCED PEDESTRIAN CROSSINGS – RECTANGULAR RAPID FLASHING BEACON (RRFB)

According to the National Highway Traffic Safety Administration, RRFBs improve safety conditions by reducing crashes between people walking and vehicles at unsignalized intersections. RRFBs use irregular light-emitting diode (LED) flash patterns similar to emergency vehicles that are triggered by either push

buttons or detection system. It is a lower cost alternative to traffic signals that increases driver awareness and yielding behavior when vehicles approaching a crossing.

Overall, traffic volumes on most of the streets crossing the Orange Bikeway are relatively low and gaps for the existing or anticipated volume of people walking and biking are sufficient. However, at several locations, gaps in east-west traffic are more limited or the projected volume of traffic is expected to be higher than average given the adjacent land uses and or available facilities. At the Orange Avenue/Central Avenue intersection, for example, pedestrian and bicycle volumes crossing Orange Avenue are expected to be higher because of the attractiveness of Teralta Park and the Central Avenue Bikeway/multi-use path. Because of this concentration of crossing volume, an enhanced crossing treatment was deemed appropriate at this location.

A rectangular rapid flashing beacon (RRFB) installation is proposed for the intersection of Central Avenue & Orange Avenue. The stop signs along the north and south legs are proposed to remain in place. Additionally, center medians are proposed, which would provide a pedestrian refuge area. For Central Avenue & Orange Avenue, RRFBs would be installed on both the eastern and western legs of the intersection, and push button poles would be installed on the northwest and southeast corner of the intersection to allow people who are biking on Central Avenue to activate the RRFBs.

8.3.7 CHANNELIZER MEDIANS

Two major components of bicycle boulevards are volume management and speed management. Channelizer medians (also referred to as median island traffic diverters) seek to reduce the number of through vehicles on a corridor by requiring drivers to turn right, rather than driving through an intersection, while allowing people walking and biking to travel through the intersection. They are designed to reduce the volume of cut-through traffic, creating a safer and more comfortable experience for people walking and biking by reducing the potential conflict between vehicles and people walking and biking at the intersection.

Similar to pedestrian refuge islands, channelizer medians create an opening in a raised median where people biking cross one direction of traffic at a time while protected from oncoming vehicles. The medians are designed so that only bicycles can make a through movement, and vehicles are required to turn right off the main street. This reduces traffic volumes by minimizing or eliminating cut through traffic on the main roadway.

9 CONCLUSIONS

The proposed Orange Bikeway Project includes Class II buffered bike lanes with various traffic calming and volume reduction elements that are expected to reduce the ADT along Orange Avenue from between 6,000 and 11,300 vehicles per day to between 2,000 and 5,000 vehicles per day. A majority of the traffic volumes diverted from Orange Avenue are anticipated to use parallel routes such as El Cajon Boulevard and University Avenue.

Under Existing (2019) and Near Term (2022) Baseline Conditions, the following intersections and roadway segments operate at LOS E or LOS F:

- Intersection: Orange Avenue and Van Dyke Avenue – (LOS E – AM Peak)
- Roadway Segment: University Avenue – Swift Avenue to 35th Street (LOS E)
- Roadway Segment: University Avenue – 35th Street to Wilson Avenue (LOS E)
- Roadway Segment: 33rd Street – El Cajon Boulevard to Orange Avenue (LOS E)
- Roadway Segment: Euclid Avenue – El Cajon Boulevard to Orange Avenue (LOS F)
- Roadway Segment: Euclid Avenue – Orange Avenue to Polk Avenue (LOS F)

Under Existing (2019) Plus Project and Near Term (2022) Plus Project Conditions, the following intersections and roadway segments operate at LOS E or LOS F:

- Intersection: El Cajon Boulevard and Fairmount Avenue – (LOS E – AM Peak)
- Roadway Segment: University Avenue – Swift Avenue to 35th Street (LOS F)
- Roadway Segment: University Avenue – 35th Street to Wilson Avenue (LOS F)
- Roadway Segment: University Avenue – 43rd Street to Fairmount Avenue (LOS E)
- Roadway Segment: University Avenue – Fairmount Avenue to 44th Street (LOS E)
- Roadway Segment: University Avenue – 48th Street to Estrella Avenue (LOS E)
- Roadway Segment: 33rd Street – El Cajon Boulevard to Orange Avenue (LOS E) *
- Roadway Segment: Euclid Avenue - El Cajon Boulevard to Orange Avenue (LOS F) *
- Roadway Segment: Euclid Avenue – Orange Avenue to Polk Avenue (LOS F) *

  * Indicates that the roadway segment operates at the stated LOS in both with and without project conditions

To maintain or improve all roadway segment operations within the project study area to LOS D or better, an additional vehicle travel lane would be required along the roadway segments listed above. Adding an additional vehicle lane along these segments is not feasible due to lack of public right-of-way; the road is not wide enough to accommodate an additional travel lane while maintaining the existing parking configuration and space for people walking on sidewalks without impacting private property.

Additionally, from an operational perspective, the Orange Bikeway Project will improve roadway segment and intersection operations along the Orange Avenue corridor by reducing cut-through traffic through the implementation of the proposed channelizer medians.

From a safety perspective, the Orange Bikeway Project will include features that enhance both safety and comfort for people walking and biking on Orange Avenue. The project proposes to improve the environment for people walking and decrease the level of traffic stress for people biking along the corridor. Enhancements to the walking environment include reduced crossing distances, increased visibility of people walking, and pedestrian-actuated crossings. The level of traffic stress for people biking will be reduced on Orange Avenue from LTS 2 to LTS 1 by providing buffered bike lanes, and the overall comfort will be improved by reducing vehicle travel speeds and reducing vehicle traffic volumes.

APPENDICES

APPENDIX A

ORANGE BIKEWAY PROJECT CONCEPTUAL DRAWINGS

APPENDIX B

ESTIMATION OF VEHICULAR VOLUME CHANGES FROM IMPLEMENTATION OF Channelizer Medians on Orange Avenue (December 2018 – KHA)

APPENDIX C

EXISTING TRAFFIC VOLUME DATA

APPENDIX D

INTERSECTION LOS WORKSHEETS

APPENDIX E

EL CAJON BOULEVARD PILOT PROJECT ANALYSIS

APPENDIX F

HISTORICAL COLLISION DATA (2013-2017)