State Street Village - Redlands

TRAFFIC ANALYSIS

CITY OF REDLANDS

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CA MUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CMP	Congestion Management Program
DIF	Development Impact Fee
DU	Dwelling Unit
E+P	Existing Plus Project
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
N/A	Not Applicable
NCHRP	National Cooperative Highway Research Program
OPR	Office of Planning and Research
PHF	Peak Hour Factor
Project	State Street Village - Redlands
SBCTA	San Bernardino County Transportation Authority
TA	Traffic Analysis
TSF	Thousand Square Feet
VMT	Vehicle Miles Traveled

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1 INTRODUCTION

This report presents the results of the traffic analysis (TA) for the proposed State Street Village - Redlands redevelopment (Project) which is bounded by Redlands Boulevard, Orange Street, Citrus Avenue, and Eureka Street, in the City of Redlands, as shown on Exhibit 1-1.

The purpose of this traffic analysis is to evaluate the potential deficiencies to traffic and circulation associated with the development of the proposed Project, and to recommend improvements to mitigate deficiencies considered significant in comparison to established regulatory thresholds. The scope of this study has been developed through consultation with the City of Redlands, and follows the City's traffic study requirements. The Project Traffic Study Scoping agreement with the City of Redlands is provided in Appendix 1.1 of this TA.

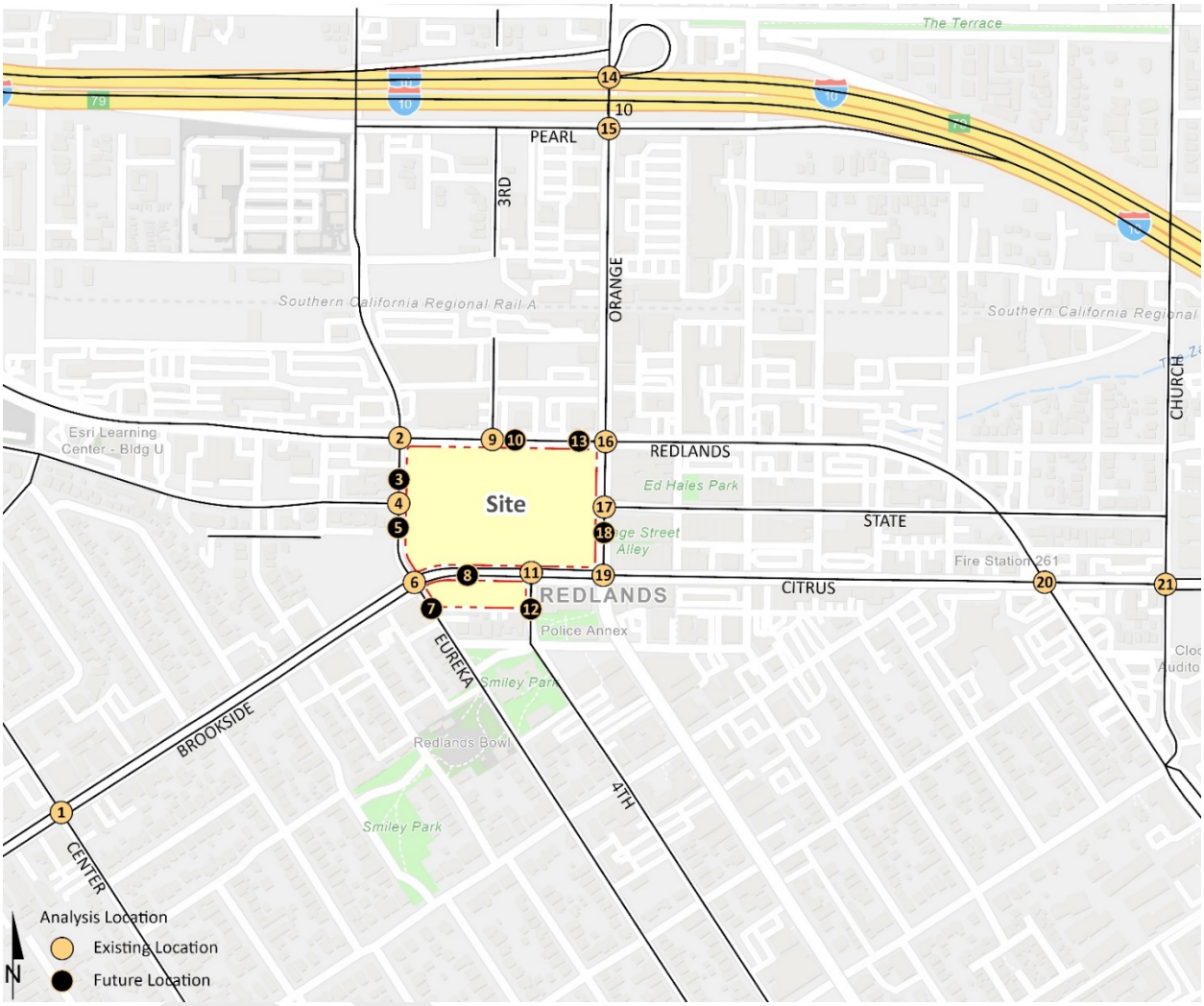
1.1 SUMMARY OF FINDINGS

The Project is proposing to construct the following improvements as design features in conjunction with development of the site:

- Project to construct 3rd Street from the Redlands Boulevard to Citrus Avenue at its ultimate full-section width as a Local Street (60-foot right-of-way) in compliance with the circulation recommendations found in the City of Redlands General Plan Circulation Element.
- Project to construct State Street from the 3rd Street to Orange Street at its ultimate full-section width as a Local Street (60-foot right-of-way) in compliance with the circulation recommendations found in the City of Redlands General Plan Circulation Element.
- Modify the traffic signal at the intersection of Orange Street and Redlands Boulevard to provide a cycle length of 120 seconds and maintain the existing lanes. No additional lanes are necessary to accommodate the Project traffic.

Additional details are provided in Section 1.8 *On-Site Roadway and Site Access Improvements* of this report. The contribution of Project traffic to the off-site study area intersections is less than significant. As such, no improvements have been recommended at the off-site study area intersections.

EXHIBIT 1-1: LOCATION MAP



1.2 PROJECT OVERVIEW

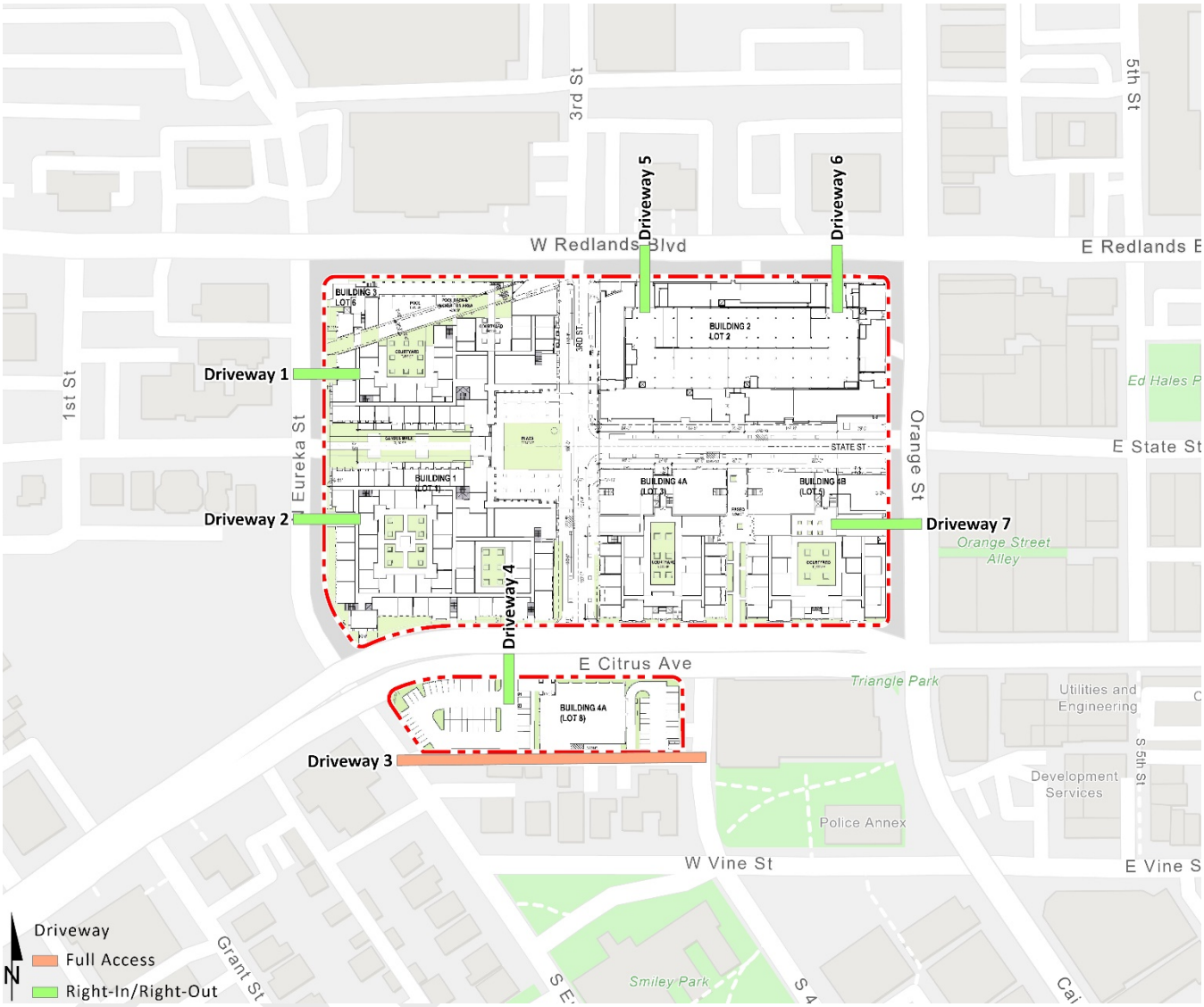
The site is occupied by the Redlands Mall, which is currently vacant, in conjunction with a CVS Pharmacy, Union Bank, and Denny's restaurant (which were operational at the time the driveway counts were conducted for existing uses). The mall site is proposed to be redeveloped with mixed-use buildings with housing over retail, restaurants, and other services. Specifically, the proposed uses include 723 multifamily residential units (within six 3 to 5 story buildings) and include live/work units with studio and one/two/three-bedroom plans, 39,000 square feet of retail space, 32,000 square feet of restaurant space, 12,222 square feet of office space, and a 2,200 square foot rooftop restaurant. A drug store of approximately 14,500 square feet with drive-through window for the pharmacy is planned for the outparcel site on the south side of Citrus Avenue. The Project is anticipated to be constructed in a single phase by the year 2025. A preliminary site plan is shown on Exhibit 1-2. Vehicular traffic access will be provided via the following driveways (see Exhibit 1-2):

- Eureka St. & Driveway 1 – right-in/right-out access
- Eureka St. & Driveway 2 – right-in/right-out access
- Eureka St. & Driveway 3 – full access
- Driveway 4 & Citrus Av. – right-in/right-out access
- 3rd St. & Redlands Bl. – full access
- 3rd St. & Citrus Av. – full access
- Driveway 5 & Redlands Bl. – right-in/right-out access
- 4th St. & Driveway 3 – full access
- Driveway 6 & Redlands Bl. – right-in/right-out access
- Orange St. & State St. – full access
- Orange St. & Driveway 7 – right-in/right-out access

It should be noted that the driveways lead to proposed parking garages, whereas Driveway 3 and Driveway 4 for the outparcel leads an open parking lot. Regional access to the Project site is provided via the I-10 Freeway and Orange Street interchange.

Trips generated by the Project's proposed land use has been estimated based on trip generation rates collected by the Institute of Transportation Engineers (ITE) and published in their most current edition of the Trip Generation Manual, 10th Edition, 2017. (1) The Project is anticipated to generate a net increase of 1,866 two-way trips per day with 682 AM peak hour trips and 217 PM peak hour trips. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in detail in Section 4.1 *Project Trip Generation* of this report.

EXHIBIT 1-2: PRELIMINARY SITE PLAN



1.3 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential deficiencies to traffic and circulation have been assessed for each of the following conditions:

- Existing (1 scenario)
- Existing plus Project (1 scenario)

1.3.1 EXISTING (2021) CONDITIONS

Information for Existing conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared. Historic and new traffic counts have been utilized to adjust the baseline to account for the effects of the currently on-going COVID-19 pandemic. Additional details on the adjustments made to Existing traffic volumes are discussed in Section 3.5 *Existing (2021) Traffic Counts* of this report.

1.3.2 EXISTING PLUS PROJECT CONDITIONS

The Existing Plus Project (E+P) analysis determines significant traffic deficiencies that would occur on the existing roadway system with the addition of Project traffic. The E+P analysis has been utilized to identify the project-specific deficiencies associated solely with the development of the proposed Project based on a comparison of the E+P traffic conditions to Existing conditions.

1.4 STUDY AREA

To ensure that this TA satisfies the City of Redlands' traffic study requirements, Urban Crossroads, Inc. prepared a project traffic study scoping package for review by City staff prior to the preparation of this report. The Agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology. The Agreement approved by the City is included in Appendix 1.1.

The following 22 study area intersections shown on Exhibit 1-3 and listed in Table 1-1 were selected for this TA based on consultation with City of Redlands staff. The "50 peak hour trip" criterion utilized by the City of Redlands is consistent with the methodology employed by the County of San Bernardino, and generally represents a minimum number of trips at which a typical intersection would have the potential to be substantively deficient by a given development proposal. Although each intersection may have unique operating characteristics, this traffic engineering rule of thumb is a widely utilized tool for estimating a potential area of deficiency (i.e., study area).

EXHIBIT 1-3: STUDY AREA

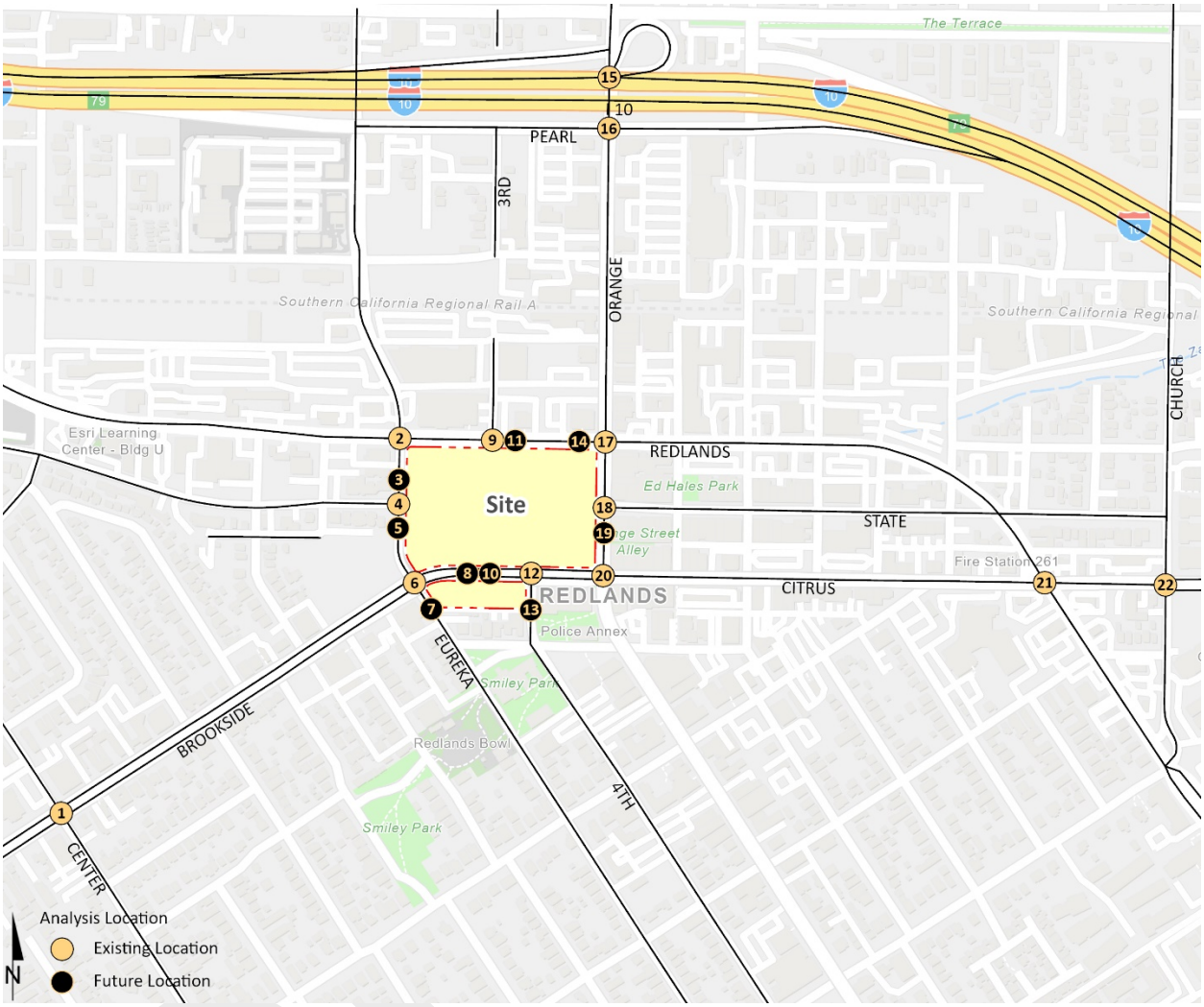


TABLE 1-1: STUDY AREA INTERSECTIONS

#	Intersection
1	Center St. & Brookside Av.*
2	Eureka St. & Redlands Bl.
3	Eureka St. & Driveway 1 – Future Intersection
4	Eureka St. & State St.
5	Eureka St. & Driveway 2 – Future Intersection
6	Eureka St. & Citrus Av.
7	Eureka St. & Driveway 3 – Future Intersection*
8	Driveway 4 & Citrus Av. – Future Intersection
9	3rd St. & Redlands Bl.
10	3rd St. & Citrus Av. – Future Intersection
11	Driveway 5 & Redlands Bl. – Future Intersection
12	4th St. & Citrus Av.
13	4th St. & Driveway 3 – Future Intersection*
14	Driveway 6 & Redlands Bl. – Future Intersection
15	Orange St. & I-10 WB Ramps
16	Orange St. & Pearl Av.
17	Orange St. & Redlands Bl.
18	Orange St. & State St.
19	Orange St. & Driveway 7 – Future Intersection
20	Orange St. & Citrus Av.
21	Redlands Bl. & Citrus Av.
22	Church St. & Citrus Av.

* Note: The Project is anticipated to contribute less than 50 peak hour trips to this study area intersection.

1.5 DEFICIENCIES

This section provides a summary of deficiencies by analysis scenario. Section 2 *Methodologies* provides information on the methodologies used in the analysis and Section 5 *E+P Traffic Conditions* includes the detailed analysis. A summary of LOS results for all analysis scenarios is presented on Table 1-2.

1.5.1 E+P CONDITIONS

The following study area intersection is anticipated to operate at a deficient LOS (i.e., LOS D or worse) with the addition of Project traffic under E+P traffic conditions:

- Orange St. & Redlands Bl. (#17) – LOS D AM peak hour only

This deficiency is Project-related as the deficiency does not occur under Existing traffic conditions and only occurs with the addition of Project traffic.

1.6 RECOMMENDATIONS

This section provides a summary of deficiencies and recommended improvements. Section 2 *Methodologies* provides information on the methodologies used in the analyses and Section 5 *E+P Traffic Conditions* include the detailed analyses. The study area intersection deficiency occurs with Project traffic (see Table 1-2). As such, there is a direct project-related deficiency that can be mitigated.

TABLE 1-2: SUMMARY OF LOS BY ANALYSIS SCENARIO

		Existing		E+P	
#	Intersection	AM	PM	AM	PM
1	Center St. & Brookside Av.	●	●	●	●
2	Eureka St. & Redlands Bl.	●	●	●	●
3	Eureka St. & Driveway 1	N/A	N/A	●	●
4	Eureka St. & State St.	●	●	●	●
5	Eureka St. & Driveway 2	N/A	N/A	●	●
6	Eureka St. & Brookside Av./Citrus	●	●	●	●
7	Eureka St. & Driveway 3	N/A	N/A	●	●
8	Driveway 4 & Citrus Av.	N/A	N/A	●	●
9	3rd St. & Redlands Bl.	●	●	●	●
10	3rd St. & Citrus Av.	N/A	N/A	●	●
11	Driveway 5 & Redlands Bl.	N/A	N/A	●	●
12	4th St. & Citrus Av.	●	●	●	●
13	4th St. & Driveway 3	N/A	N/A	●	●
14	Driveway 6 & Redlands Bl.	N/A	N/A	●	●
15	Orange St. & I-10 WB On-Ramps	●	●	●	●
16	Orange St. & Pearl Av.	●	●	●	●
17	Orange St. & Redlands Bl.	●	●	●	●
18	Orange St. & State St.	●	●	●	●
19	Orange St. & Driveway 7	N/A	N/A	●	●
20	Orange St./Cajon St. & Citrus Av.	●	●	●	●
21	Redlands Bl. & Citrus Av.	●	●	●	●
22	Church St. & Citrus Av.	●	●	●	●

● = A - C ● = D ● = E - F

1.6.1 Circulation System Deficiencies and Recommended Improvements

A summary of the operationally deficient study area intersections and recommended improvements required to achieve acceptable circulation system performance are described in detail within Section 3 *Area Conditions* and Section 5 *E+P Traffic Conditions* of this report.

A summary of off-site improvements needed to address intersection operational deficiencies for each analysis scenario is included in Table 1-3. These recommended improvements are consistent with or less than the geometrics assumed in the City of Redlands General Plan Circulation Element. Improvements found to be included in the City of Redlands's (lead agency) Development Impact Fee (DIF) program have been identified as such.

TABLE 1-3: SUMMARY OF IMPROVEMENTS BY ANALYSIS SCENARIO

#	Intersection Location	Jurisdiction	Recommended Improvements E+P	Improvements in DIF, etc.[1,2]	Project Responsibility
17	Orange St. & Redlands Bl.	City of Redlands	- Modify the traffic signal to provide a 120 cycle length.	No	Construct

[1] Improvements included in City of Redlands DIF program have been identified as such.

[2] Program improvements constructed by Project may be eligible for fee credit. In lieu fee payment is at discretion of City. Represents the fair share percentage for the Project during the most impacted peak hour.

1.7 Site Adjacent Roadway and Site Access Improvements

1.7.1 Site Adjacent Roadway Recommendations

The recommended site-adjacent roadway improvements for the Project are described below. Exhibit 1-4 illustrates the site access recommendations.

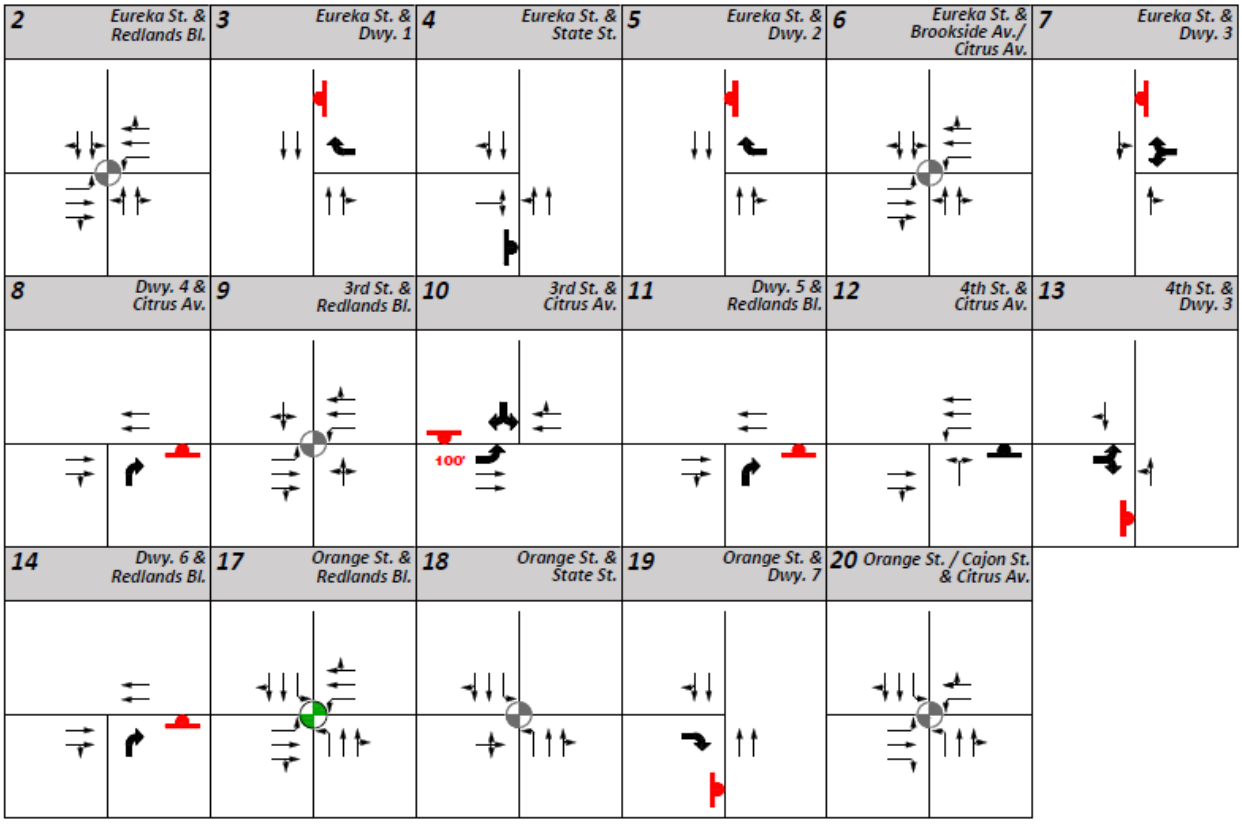
Redlands Boulevard – Redlands Boulevard is an east-west oriented roadway located along the Project's northern boundary. Redlands Boulevard is currently constructed at its ultimate full-section pavement width as a Boulevard (96- to 106-foot right-of-way) between Eureka Street and Orange Street consistent with the City of Redlands General Plan Circulation Element.

Eureka Street – Eureka Street is a north-south oriented roadway located along the Project's western boundary. Eureka Street is currently constructed at its ultimate full-section pavement width as a Minor Arterial (88-foot right-of-way) between Redlands Boulevard and Citrus Avenue consistent with the City of Redlands General Plan Circulation Element.

Orange Street – Orange Street is a north-south oriented roadway located along the Project's eastern boundary. Orange Street is currently constructed at its ultimate full-section pavement width as a Minor Arterial (88-foot right-of-way) between Redlands Boulevard and Citrus Avenue consistent with the City of Redlands General Plan Circulation Element.

Citrus Avenue – Citrus Avenue is an east-west oriented roadway located along the Project's southern boundary. Citrus Avenue is currently constructed at its ultimate full-section pavement width as a Major Arterial (110-foot right-of-way) between the Eureka Street and Orange Street consistent with the City of Redlands General Plan Circulation Element.

EXHIBIT 1-4: SITE ADJACENT ROADWAY AND SITE ACCESS RECOMMENDATIONS



3rd Street – 3rd Street is a north-south oriented roadway located bisected by the Project. Construct 3rd Street at its ultimate full-section pavement width as a Local Street (60-foot right-of-way) between the Redlands Boulevard and the Project's southern boundary consistent with the City of Redlands General Plan Circulation Element.

State Street – State Street is an east-west oriented roadway located bisected by the Project. Construct State Street at its ultimate full-section pavement width as a Local Street (60-foot right-of-way) between the 3rd Street and Orange Street consistent with the City of Redlands General Plan Circulation Element.

4th Street – 4th Street is a north-south oriented roadway located along the Project's eastern boundary. 4th Street is currently constructed at its ultimate full-section pavement width as a Local Street (60-foot right-of-way) between the Citrus Avenue and the Project's southern boundary consistent with the City of Redlands General Plan Circulation Element.

Wherever necessary, roadways adjacent to the Project, site access points and site-adjacent intersections will be constructed to be consistent with the identified roadway classifications and respective cross-sections in the City of Redlands General Plan Circulation Element.

1.7.2 SITE ACCESS RECOMMENDATIONS

The recommended site access driveway improvements for the Project are described below. Exhibit 1-4 also illustrates the site access improvements. Construction of on-site and site adjacent improvements shall occur in conjunction with adjacent Project development activity or as needed for Project access purposes.

Eureka Street & Redlands Boulevard (#2) – Maintain the intersection with the current traffic signal and existing lane geometrics.

Eureka Street & Driveway 1 (#3) – Install a stop control on the westbound approach and construct the intersection with the following geometrics:

- Northbound Approach: One through lane and one shared through-right turn lane.
- Southbound Approach: Two through lanes.
- Eastbound Approach: Not Applicable (N/A)
- Westbound Approach (Project Driveway 1): One right turn only lane.

Eureka Street & State Street (#4) – Maintain the current stop control on the eastbound approach and construct the intersection with the following geometrics:

- Northbound Approach: One shared left-through lane and one through lane.
- Southbound Approach: One through lane and one shared through-right turn lane.
- Eastbound Approach: One shared left-right turn lane.
- Westbound Approach: N/A

Eureka Street & Driveway 2 (#5) – Install a stop control on the westbound approach and construct the intersection with the following geometrics:

- Northbound Approach: One through lane and one shared through-right turn lane.
- Southbound Approach: Two through lanes.
- Eastbound Approach: N/A
- Westbound Approach (Project Driveway 2): One right turn only lane.

Eureka Street & Brookside Avenue/Citrus Avenue (#6) – Maintain the intersection with the current traffic signal and existing lane geometrics.

Eureka Street & Driveway 3 (#7) – Install a stop control on the westbound approach and construct the intersection with the following geometrics:

- Northbound Approach: One shared through-right turn lane.
- Southbound Approach: One shared left-through lane.
- Eastbound Approach: N/A
- Westbound Approach (Project Driveway 3): One shared left-right turn lane.

Driveway 4 & Citrus Avenue (#8) – Install a stop control on the northbound approach and construct the intersection with the following geometrics:

- Northbound Approach (Project Driveway 4): One right turn only lane.
- Southbound Approach: N/A
- Eastbound Approach: One through lane and one shared through-right turn lane.
- Westbound Approach: Two through lanes.

3rd Street & Redlands Boulevard (#9) – Maintain the intersection with the current traffic signal and existing lane geometrics.

3rd Street & Citrus Avenue (#10) – Install a stop control on the southbound approach and construct the intersection with the following geometrics:

- Northbound Approach: N/A
- Southbound Approach: One shared left-right turn lane.
- Eastbound Approach: One left turn lane with a minimum storage length of 100’ and two through lanes.
- Westbound Approach: One through lane and one shared through-right turn lane.

Driveway 5 & Redlands Boulevard (#11) – Install a stop control on the northbound approach and construct the intersection with the following geometrics:

- Northbound Approach (Project Driveway 5): One right turn only lane.
- Southbound Approach: N/A
- Eastbound Approach: One through lane and one shared through-right turn lane.
- Westbound Approach: Two through lanes.

4th Street & Citrus Avenue (#12) – Maintain the current stop control on the northbound approach and construct the intersection with the following geometrics:

- Northbound Approach: One shared left-right turn lane.
- Southbound Approach: N/A
- Eastbound Approach: One through lane and one shared through-right turn lane.
- Westbound Approach: One left turn lane and two through lanes.

4th Street & Driveway 3 (#13) – Install a stop control on the eastbound approach and construct the intersection with the following geometrics:

- Northbound Approach: One shared left-through lane.
- Southbound Approach: One shared through-right turn lane.
- Eastbound Approach (Project Driveway 3): One shared left-right turn lane.
- Westbound Approach: N/A

Driveway 6 & Redlands Boulevard (#14) – Install a stop control on the northbound approach and construct the intersection with the following geometrics:

- Northbound Approach (Project Driveway 6): One right turn only lane.
- Southbound Approach: N/A
- Eastbound Approach: One through lane and one shared through-right turn lane.
- Westbound Approach: Two through lanes.

Orange Street & Redlands Boulevard (#17) – Modify the traffic signal to provide a cycle length of 120 seconds and construct the intersection with the following geometrics:

- Northbound Approach: One left turn lane, one through lane and one shared through-right turn lane.
- Southbound Approach: One left turn lane, one through lane and one shared through-right turn lane.
- Eastbound Approach: One left turn lane, one through lane and one shared through-right turn lane.
- Westbound Approach: One left turn lane, one through lane and one shared through-right turn lane.

Orange Street & State Street (#18) – Maintain the intersection with the current traffic signal and existing lane geometrics.

Orange Street & Driveway 7 (#19) – Install a stop control on the eastbound approach and construct the intersection with the following geometrics:

- Northbound Approach: Two through lanes.
- Southbound Approach: One through lane and one shared through-right turn lane.
- Eastbound Approach (Project Driveway 7): One right turn only lane.
- Westbound Approach: N/A

Orange Street & Citrus Avenue (#20) – Maintain the intersection with the current traffic signal and existing lane geometrics.

On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the Project site.

Sight distance at each project access point should be reviewed with respect to standard Caltrans and City of Redlands sight distance standards at the time of preparation of final grading, landscape, and street improvement plans.

1.8 QUEUING ANALYSIS AT THE PROJECT DRIVEWAYS

A queuing analysis was conducted along the site adjacent roadways for E+P traffic conditions to determine the turn pocket lengths necessary to accommodate near term 95th percentile queues. The analysis was conducted for both the weekday AM and weekday PM peak hours. The E+P queuing results are provided in Appendix 1.2 of this report.

The traffic modeling and signal timing optimization software package Synchro (Version 11) has been utilized to assess queues at the Project access points. Synchro is a macroscopic traffic software program that is based on the signalized and unsignalized intersection capacity analyses as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length in Synchro. The LOS and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

SimTraffic is designed to model networks of signalized and unsignalized intersections, with the primary purpose of checking and fine-tuning signal operations. SimTraffic uses the input parameters from Synchro to generate random simulations. The 95th percentile queue is not necessarily ever observed; it is simply based on statistical calculations (or Average Queue plus 1.65 standard deviations). SimTraffic has been utilized to assess peak hour queuing at the site access driveways for E+P traffic conditions. The random simulations generated by SimTraffic have been utilized to determine the 50th and 95th percentile queue lengths observed for each turn lane. A SimTraffic simulation has been recorded five (5) times, during the weekday AM and weekday PM peak hours, and has been seeded for 30-minute periods with 60-minute recording intervals.

The peak hour queuing analysis was utilized to determine the required turn pocket storage lengths necessary to accommodate the 95th percentile peak hour traffic flows and to ensure there was adequate spacing between the proposed driveways and study intersections with no queuing issues.

1.9 PEDESTRIAN AND BICYCLE FACILITIES RECOMMENDATIONS

The proposed Project is a mixed-use development consisting of residential, retail, office, and restaurant use. The mixed-use nature of the Project encourages pedestrian circulation within the boundaries of the Project site and the surrounding uses. As such, quality pedestrian and

bicycle facilities are recommended to promote pedestrian and bicyclist circulation. The Project can apply the following, where feasible, to promote pedestrian and bicyclist circulation:

- construct paved pedestrian space that is continuous from curb to building
- minimize spatial gaps created by parking or other non-pedestrian areas
- plant trees along the street edge in a rhythmic pattern
- provide pedestrian-scaled lighting to supplement overhead street lighting
- provide secure and convenient bicycle parking
- implement bike boxes at signalized intersections to improve bicyclist visibility
- apply green bike lanes within conflict areas with vehicular traffic

1.10 SENATE BILL 743 – VEHICLE MILES TRAVELED (VMT)

Senate Bill 743 (SB 743), approved in 2013, endeavors to change the way transportation impacts will be determined according to the California Environmental Quality Act (CEQA). The Office of Planning and Research (OPR) has recommended the use of vehicle miles traveled (VMT) as the replacement for automobile delay-based LOS. In December 2018, the Natural Resources Agency finalized updates to CEQA Guidelines to incorporate SB 743 (i.e., VMT). While a lead agency has the option to immediately apply the new VMT based analysis methodology and thresholds for the purposes of evaluating transportation impacts, statewide application of the new guidelines is required July 1, 2020.

The City of Redlands City Council adopted their VMT guidelines only July 21, 2020. The City acknowledges automobile delay will no longer be considered a CEQA impact for development projects and will use VMT as the metric for determining. As such, the LOS operations included in this TA for study area intersections are informational and are not anticipated to support the environmental document. The VMT analysis for the proposed Project has been prepared under separate cover from the TA.

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2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are generally consistent with City of Redlands and San Bernardino County CMP traffic study guidelines. (2)

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The *Highway Capacity Manual* (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (3) The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

The City of Redlands requires signalized intersection operations analysis based on the methodology described in the HCM 6th Edition. (3) Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections, LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-1. Study area intersections have been evaluated using the Synchro (Version 11) analysis software package.

Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A	F
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B	F
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C	F
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.01 to 55.00	D	F
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E	F
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths	80.01 and up	F	F

Source: HCM, 6th Edition

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Common practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g., PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per Chapter 4 of the HCM 6th Edition, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (3)

2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Redlands requires the operations of unsignalized intersections be evaluated using the methodology described in the HCM 6th Edition. (3) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay Per Vehicle (Seconds)	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Little or no delays.	0 to 10.00	A	F
Short traffic delays.	10.01 to 15.00	B	F
Average traffic delays.	15.01 to 25.00	C	F
Long traffic delays.	25.01 to 35.00	D	F
Very long traffic delays.	35.01 to 50.00	E	F
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F	F

Source: HCM, 6th Edition

At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. The "worst case" movement delay and LOS is reported for the intersection. For all-way stop controlled intersections, LOS is computed for the intersection as a whole.

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by the Caltrans and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TA uses the signal warrant criteria presented in the latest edition of the California Department of Transportation (Caltrans) California Manual on Uniform Traffic Control Devices *(CA MUTCD)* for all study area intersections. (4)

The signal warrant criteria for Existing conditions are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The Caltrans CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (4) Specifically, this TA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing study area intersections for all analysis scenarios. Warrant 3 is appropriate to use for this TA because it provides specialized warrant criteria for intersections with rural characteristics (e.g., located in communities with populations of less than 10,000 persons or with adjacent major streets operating above 40 miles per hour). For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection.

Future intersections that do not currently exist have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets. Traffic signal warrant analyses were performed for the following study area intersection shown in Table 2-3:

TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction
4	Eureka St. & State St.	City of Redlands
7	Eureka St. & Driveway 3 – Future Intersection	City of Redlands
10	3rd St. & Citrus Av. – Future Intersection	City of Redlands
12	4th St. & Citrus Av.	City of Redlands
13	4th St. & Driveway 3 – Future Intersection	City of Redlands

Traffic signal warrant analyses were performed for all of the full access unsignalized study area intersections. The traffic signal warrant analyses for future conditions are presented in Section 5 *E+P Traffic Conditions* of this report.

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.4 LOS CRITERIA

2.4.1 CITY OF REDLANDS

The City of Redlands has established specific performance criteria for intersection operations. These performance criteria include standards related to determining the significance of project deficiencies on the roadway system. The City of Redlands has established LOS C as the minimum level of service for its intersections. Therefore, any intersection operating at LOS D or worse will be considered deficient for the purposes of this analysis. Additionally, General Plan Policy 5.20c from the Redlands General Plan states that: Where the current level of service at a location within the City of Redlands is below the LOS C standard, no development project shall be approved that cannot be mitigated so that it does not reduce the existing level of service at that location (i.e., intersections in Redlands that are deficient to start out with are acceptable as long as they do not further degrade LOS) except as provided in Section 5.20b.

2.4.2 CMP

The CMP definition of deficiency is based on maintaining a level of service standard of LOS E or better, where feasible, except where an existing LOS F condition is identified in the CMP document.

2.4.3 MEASURE U

General Plan Policy 5.20b of Measure U (see GP Figure 5-1):

> *The purpose and intent of this initiative measure is to establish comprehensive and inviolable principles of managed development for the City of Redlands that will preserve, enhance, and maintain the special quality of life valued by this community. The principles of managed development established by this initiative measure assure that future development within the City of Redlands occurs in a way that promotes the social and economic well-being of the entire community.*

In order to be in compliance with Measure U, the Project is required to maintain a minimum LOS C or better at all intersections presently at LOS C or better.

2.5 THRESHOLDS OF SIGNIFICANCE

2.5.1 CITY OF REDLANDS INTERSECTIONS

The following thresholds of significance will be utilized to determine whether the addition of Project traffic at a study intersection results in a significant project-related deficiency:

- A significant project deficiency occurs at a study intersection if the addition of project-generated trips reduces the peak hour level of service of the study intersection to change from acceptable operation (e.g., LOS A, B or C) to deficient operation (e.g., LOS D, E or F) and, if applicable, also causes an unsignalized intersection to satisfy a Caltrans traffic signal warrant; or
- A significant project deficiency occurs at a study intersection if the addition of project-generated trips worsens the pre-project level of service grade at a deficiently operating (e.g., LOS D, E or F) intersection and, if applicable, also causes an unsignalized intersection to satisfy a Caltrans traffic signal warrant.

2.5.2 CMP INTERSECTIONS

To determine whether the addition of project traffic (as defined through the comparison of Existing traffic conditions to E+P traffic conditions) at a CMP study intersection would result in a direct project-specific traffic deficiency, the following will be utilized:

- When the pre-Project condition is at or better than LOS E for CMP intersections (i.e., acceptable LOS), and project-generated traffic, as measured by 50 or more peak hour trips, causes deterioration below LOS E (i.e., unacceptable LOS), a deficiency is deemed to occur.

In the event that an intersection is operating at or is forecast to operate at a deficient LOS, the CMP guidelines have defined a series of steps to be completed to determine the Project's contribution to the deficiency of intersections, which has been applied to both CMP and non-CMP study area intersections. The steps are as follows:

- Determine the mitigation measures necessary to achieve an acceptable service level,
- Calculate the Project's share in the future traffic volume projections for the peak hours,
- Estimate the cost to implement recommended mitigation measures, and
- Calculate the Project's fair-share contribution to mitigate the Project's traffic deficiencies

2.5.3 MEASURE U

Per 5.20c of Measure U, where the current LOS at a location within the City of Redlands is below the LOS C standard, no development project shall be approved that cannot be mitigated so that it does not reduce the existing LOS at that location except as provided in Section 5.20b.

3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Redlands General Plan Circulation Network, and a review of existing peak hour intersection operations and traffic signal warrants.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the Traffic Study Scoping Agreement (Appendix 1.1) and discussion with City of Redlands staff, the study area includes a total of 22 existing and future intersections as shown previously on Exhibit 1-3. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 GENERAL PLAN CIRCULATION ELEMENT

As previously noted, the Project site is located within the City of Redlands. Exhibit 3-2 shows the City of Redlands General Plan Circulation Element. Exhibit 3-3 shows the City of Redlands General Plan roadway cross-sections.

3.3 BICYCLE AND PEDESTRIAN FACILITIES

The existing pedestrian facilities within the study area are shown on Exhibit 3-4. Existing bus stop locations, crosswalks, sidewalks, and bike lanes are shown. Exhibits 3-5 and 3-6 illustrates the planned bicycle facilities and trails in the vicinity of the Project as included on the City of Redlands General Plan Bicycle Facilities and Multi-Use Trails. There are existing Class II (on-road, striped) and Class III (on-road, not striped) along Citrus Avenue to the south of the Project. Future bicycle routes are proposed along Redlands Boulevard and Orange Street. The multi-use trail is proposed along Redlands Boulevard that will connect to an existing multi-use trail to the east along Church Street and to the west of Texas Street to the Orange Blossom Trail.

The proposed extension of State Street into the Project will extend the commercial activity of historic State Street and provide new pedestrian and bicyclist connectivity through Downtown. The introduction of Third Street through the site will provide vital pedestrian connectivity including a pedestrian connection to the Arrow Line train station.

EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

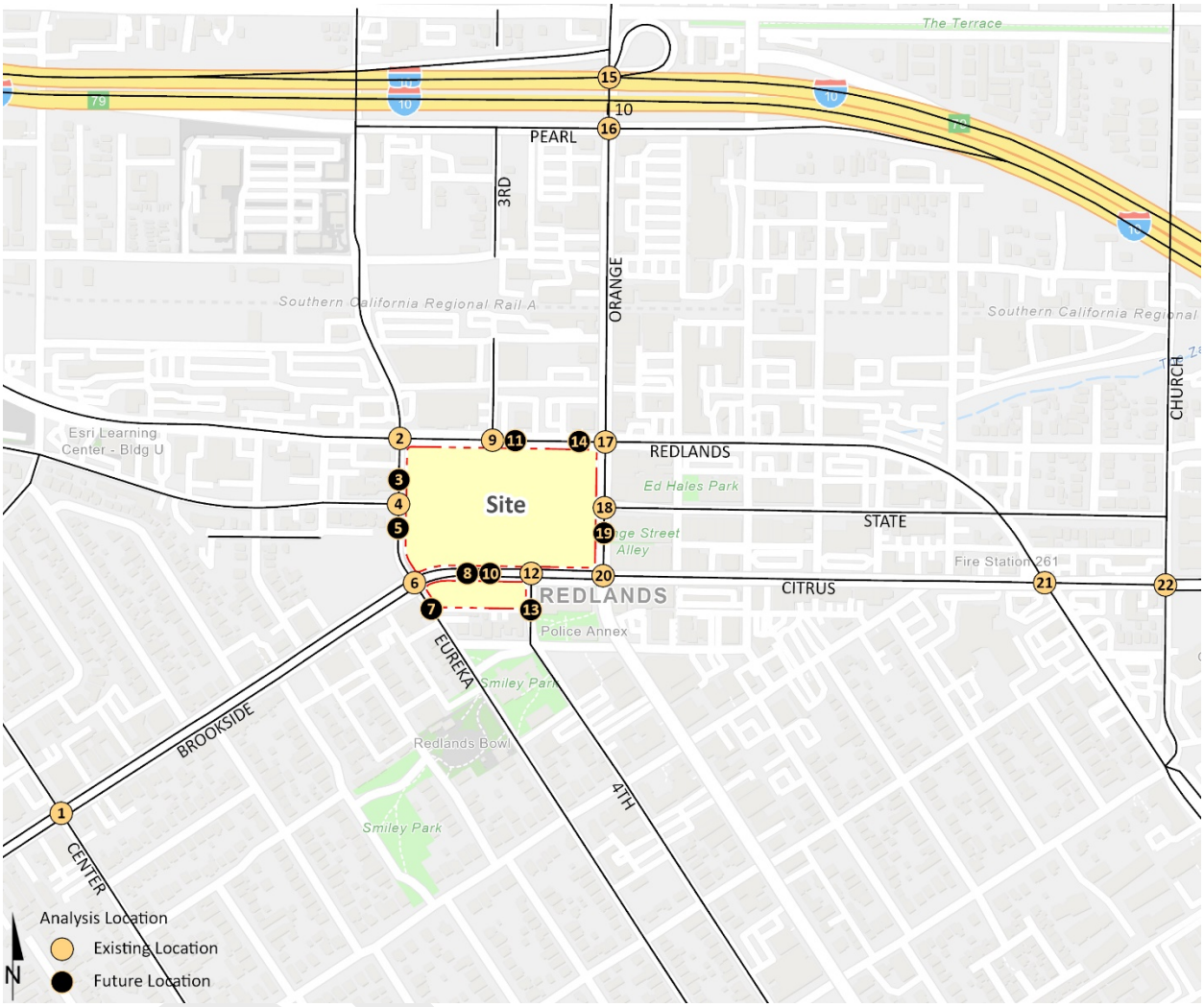


EXHIBIT 3-2: CITY OF REDLANDS GENERAL PLAN CIRCULATION ELEMENT

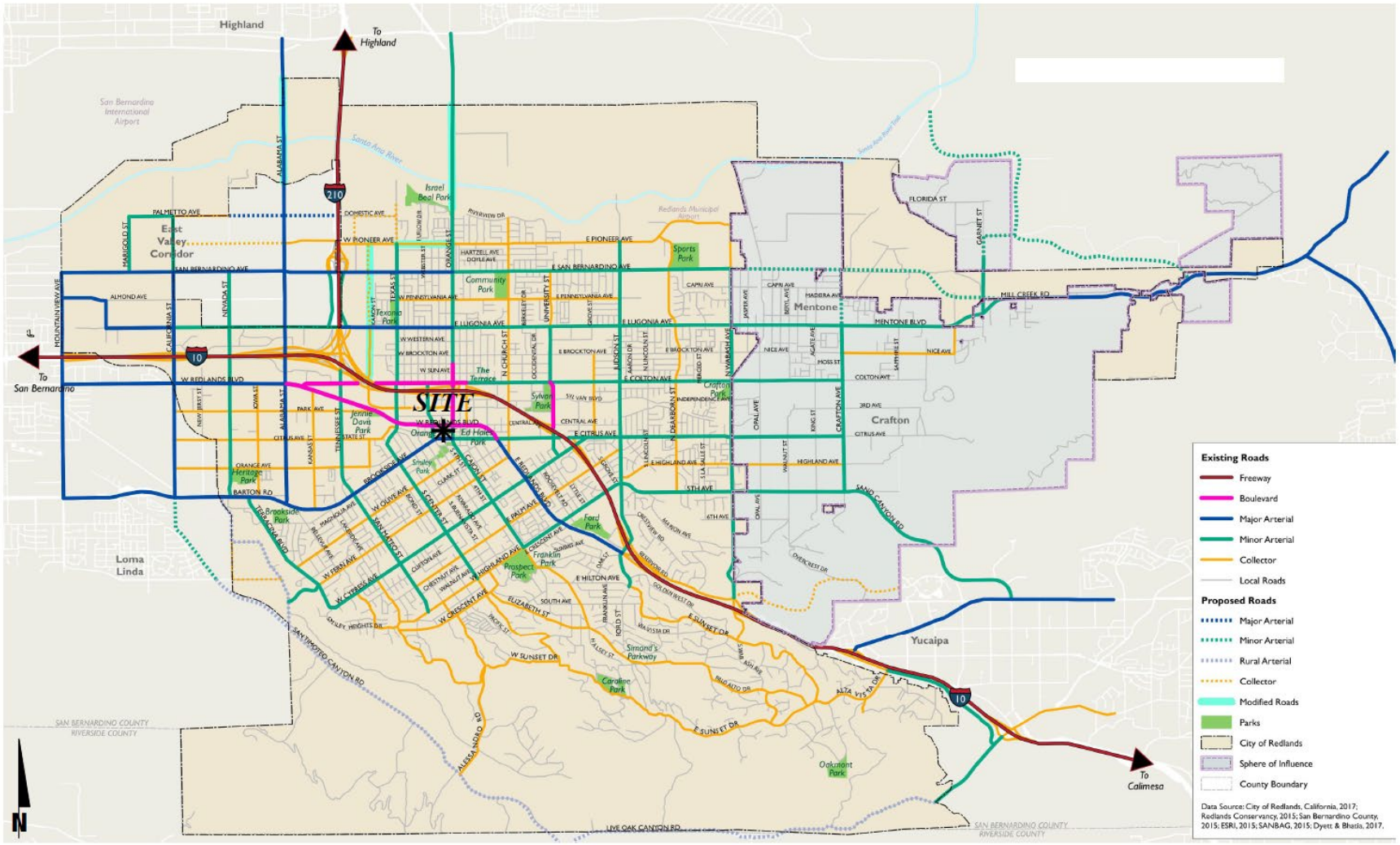
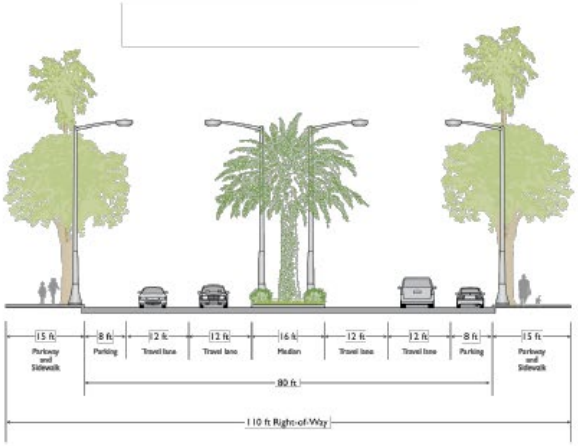
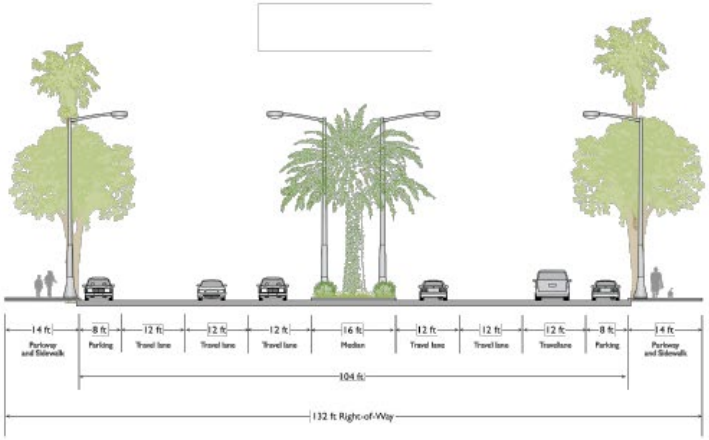


EXHIBIT 3-3: CITY OF REDLANDS GENERAL PLAN ROADWAY CROSS-SECTIONS (PAGE 1 OF 4)

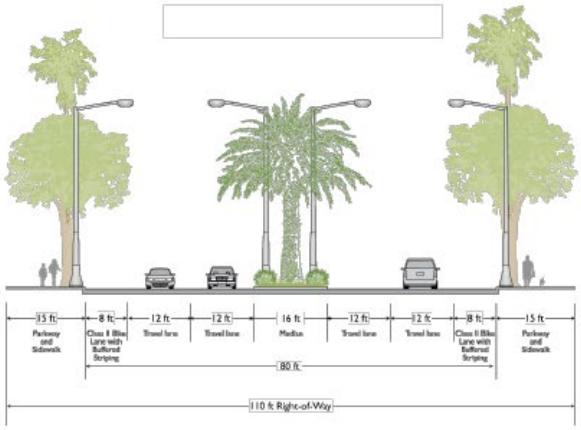
MAJOR ARTERIALS



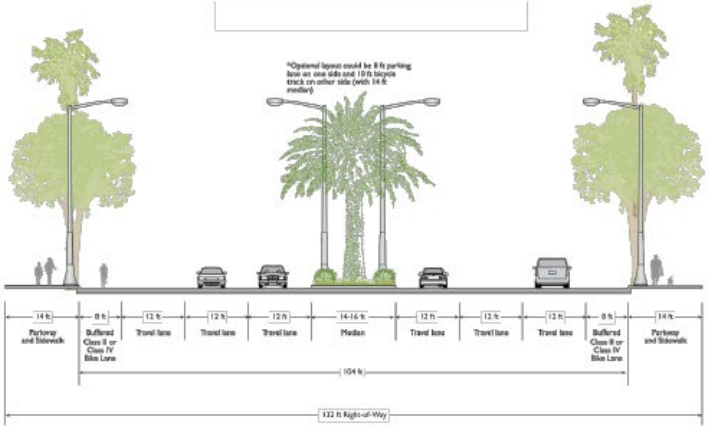
n. Major Arterial – 4 Lanes Divided(Standard)



p. Major Arterial – 6 Lanes Divided (Standard)



o. Major Arterial – 4 Lanes Divided (Complete Streets)



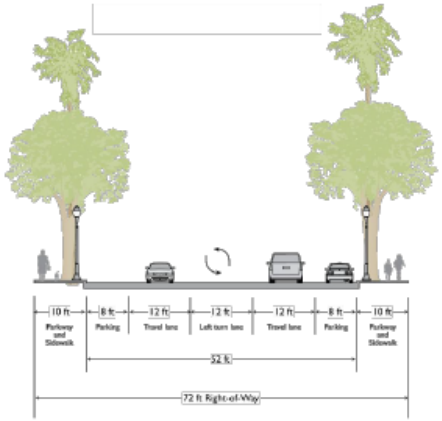
q. Major Arterial – 6 Lanes Divided (Complete Streets)

Notes:

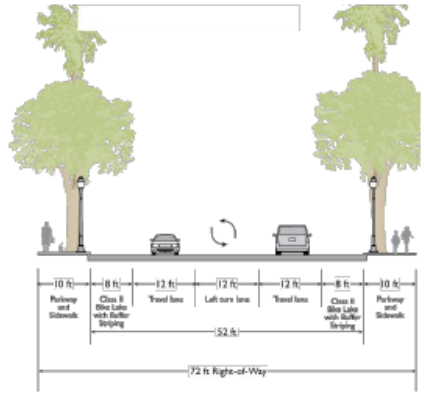
1. Street sections are illustrative. Minor variations and deviations from dimensions are permitted, and would not require a General Plan Amendment.
2. Bicycle facilities are based on dimensions included in the Bicycle Facility Design Guidelines for the Bicycle Master Plan (2015).

EXHIBIT 3-3: CITY OF REDLANDS GENERAL PLAN ROADWAY CROSS-SECTIONS (PAGE 2 OF 4)

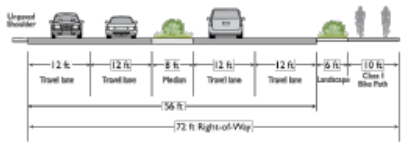
MINOR AND RURAL ARTERIALS



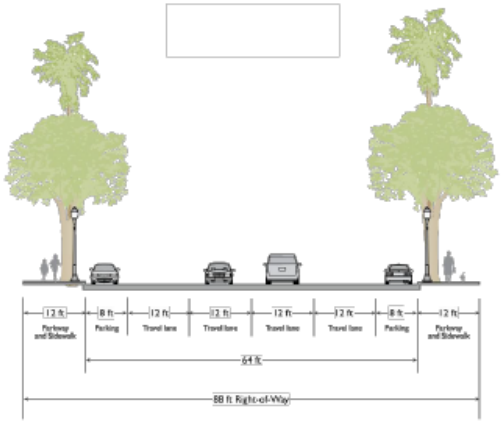
i. Minor Arterial – 2 Lanes Plus Left Turn Lane (Standard)



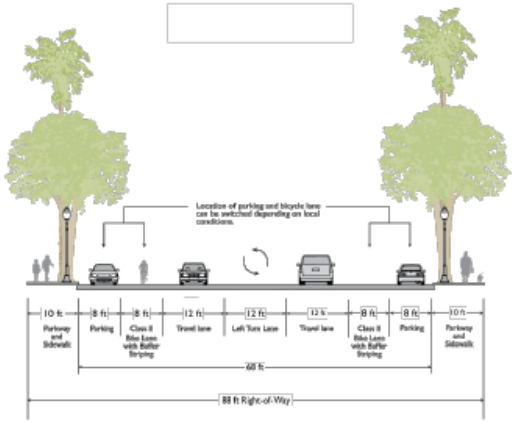
k. Minor Arterial – 2 Lanes Plus Left Turn Lane (Complete Streets)



m. Rural Arterial



j. Minor Arterial – 4 Lanes Undivided (Standard)



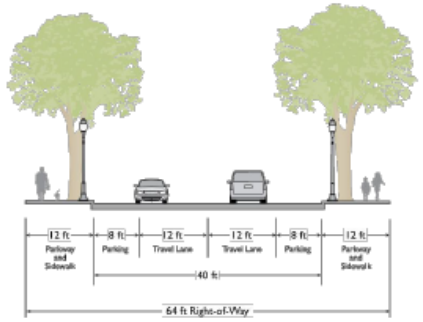
l. Minor Arterial – 2 Lanes Plus Left Turn Lane, Bicycle Lanes, and Parking (Complete Streets)

Notes:

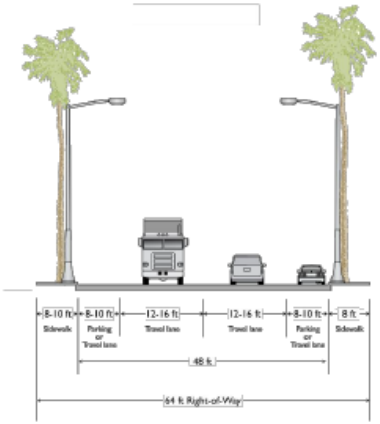
1. Street sections are illustrative. Minor variations and deviations from dimensions are permitted, and would not require a General Plan Amendment.
2. Bicycle facilities are based on dimensions included in the Bicycle Facility Design Guidelines for the Bicycle Master Plan (2015).

EXHIBIT 3-3: CITY OF REDLANDS GENERAL PLAN ROADWAY CROSS-SECTIONS (PAGE 3 OF 4)

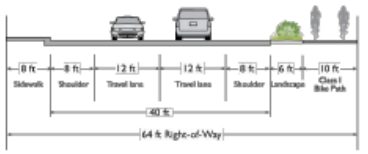
COLLECTORS



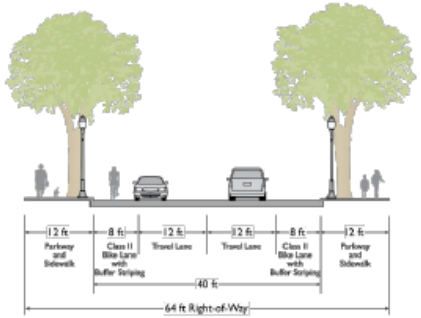
d. Collector – Residential (Standard)



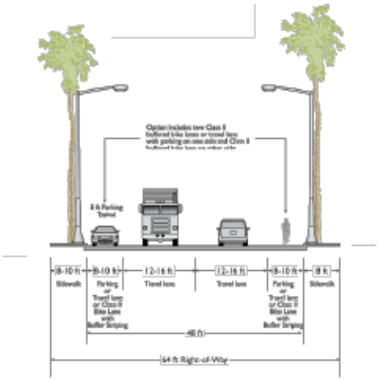
f. Collector – Industrial (Standard)



h. Alternative Collector



e. Collector – Residential (Complete Streets)



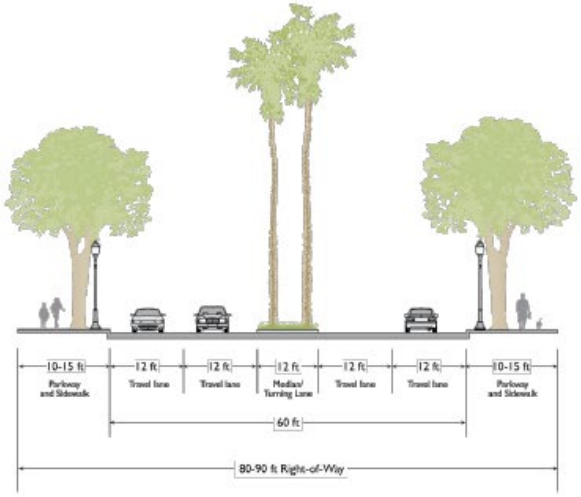
g. Collector – Industrial (Complete Streets)

Notes:

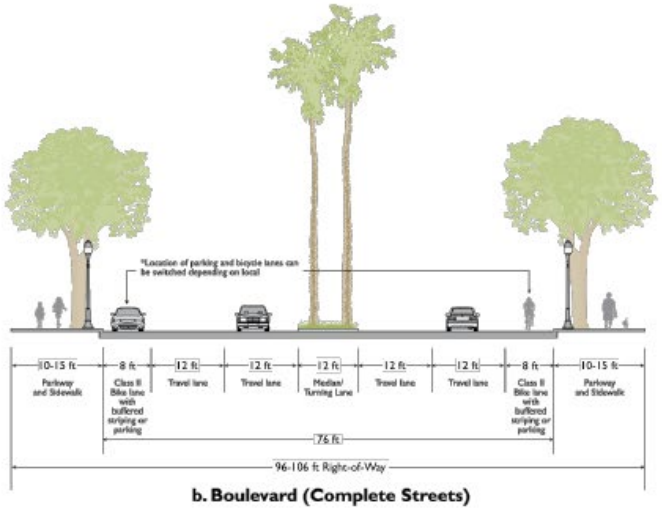
1. Street sections are illustrative. Minor variations and deviations from dimensions are permitted, and would not require a General Plan Amendment.
2. Bicycle facilities are based on dimensions included in the Bicycle Facility Design Guidelines for the Bicycle Master Plan (2015).

EXHIBIT 3-3: CITY OF REDLANDS GENERAL PLAN ROADWAY CROSS-SECTIONS (PAGE 4 OF 4)

BOULEVARDS

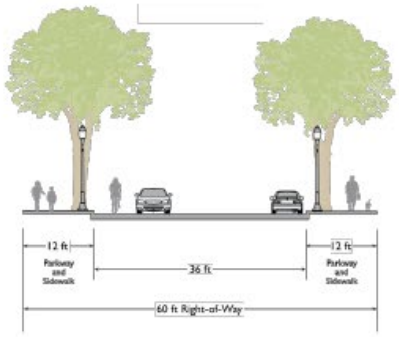


a. Boulevard (Standard)



b. Boulevard (Complete Streets)

LOCAL STREET



c. Local Street (Standard)

Notes:

1. Street sections are illustrative. Minor variations and deviations from dimensions are permitted, and would not require a General Plan Amendment.
2. Bicycle facilities are based on dimensions included in the Bicycle Facility Design Guidelines for the Bicycle Master Plan (2015).

EXHIBIT 3-4: EXISTING PEDESTRIAN FACILITIES

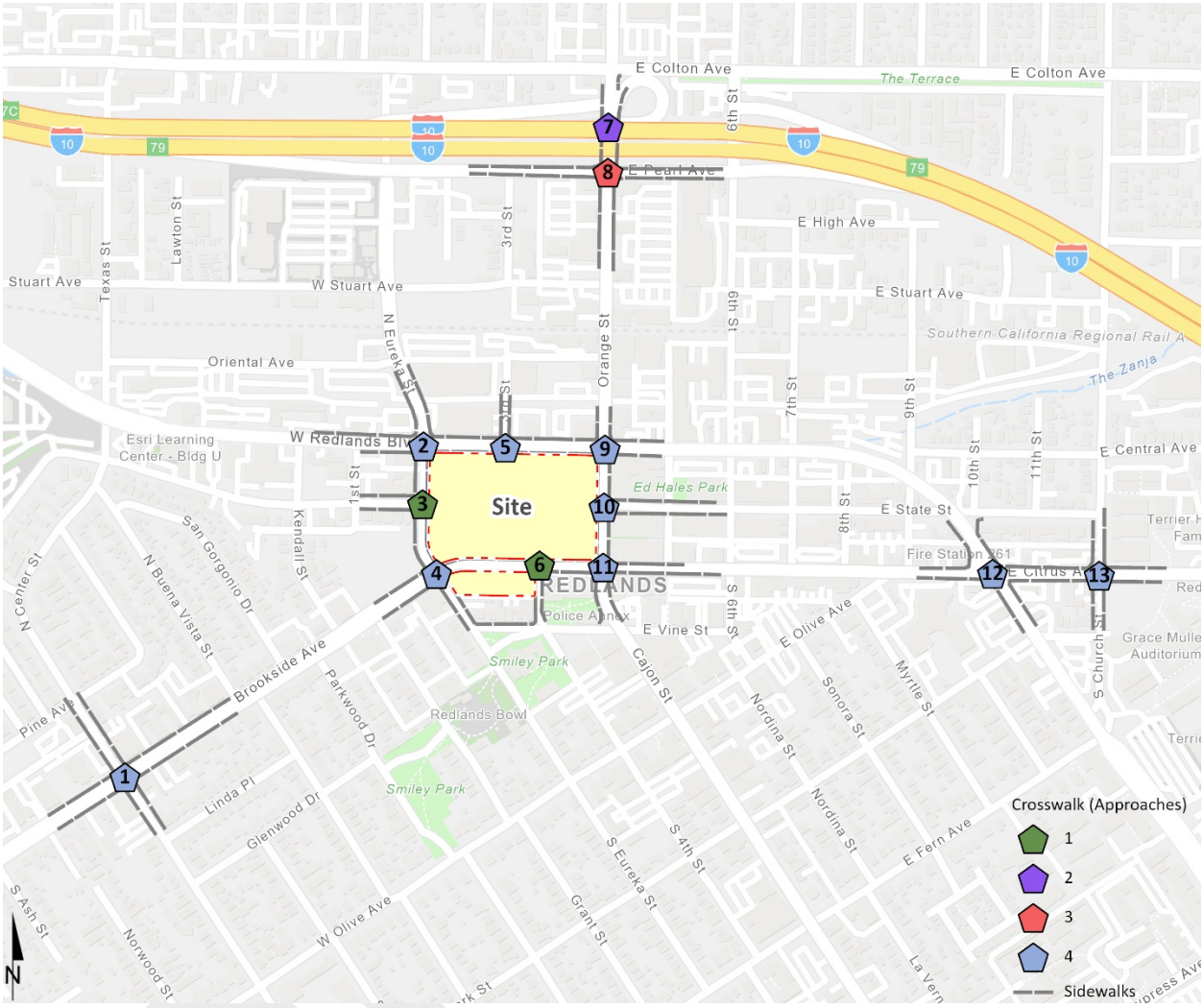


EXHIBIT 3-5: CITY OF REDLANDS GENERAL PLAN BICYCLE FACILITIES

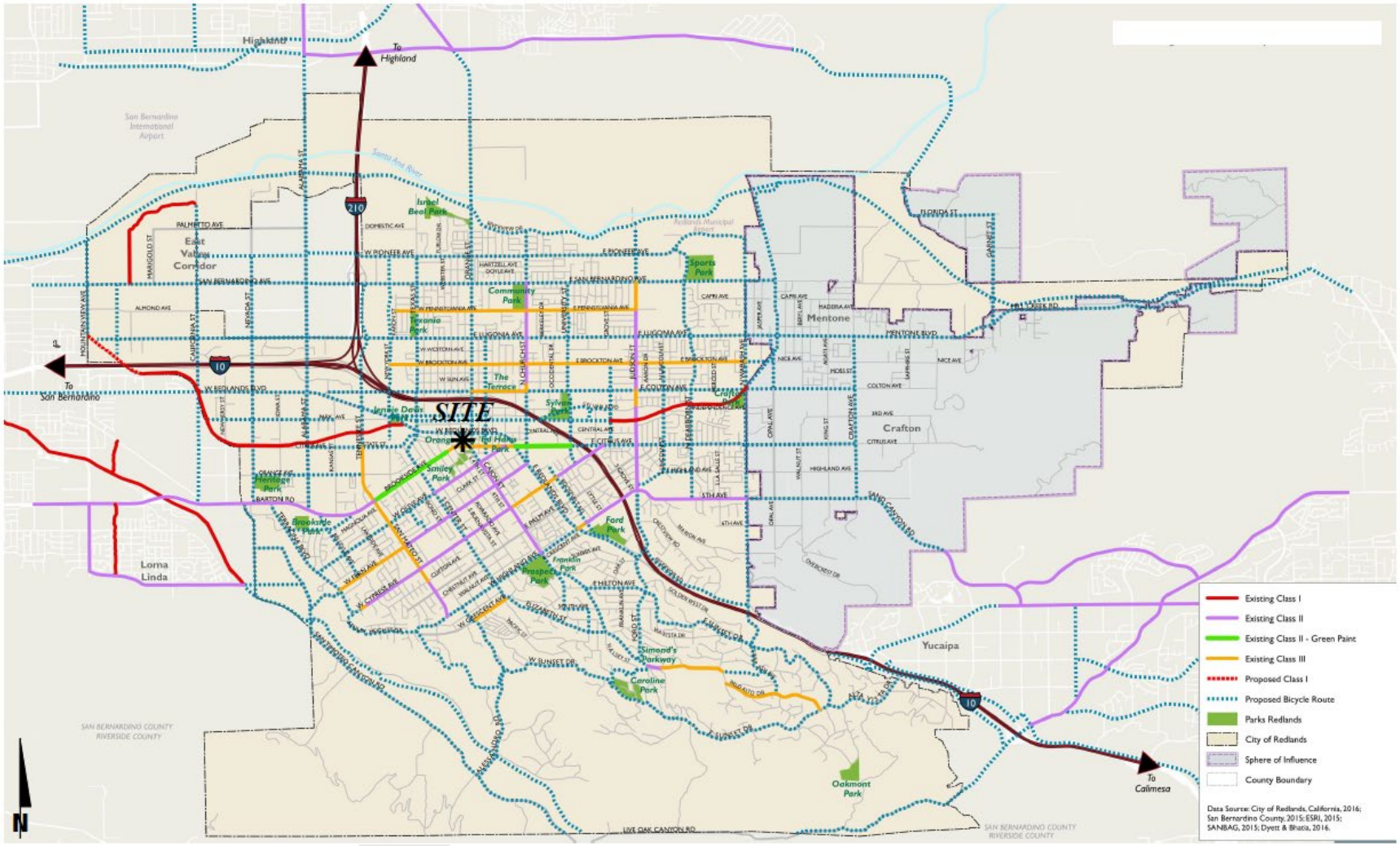
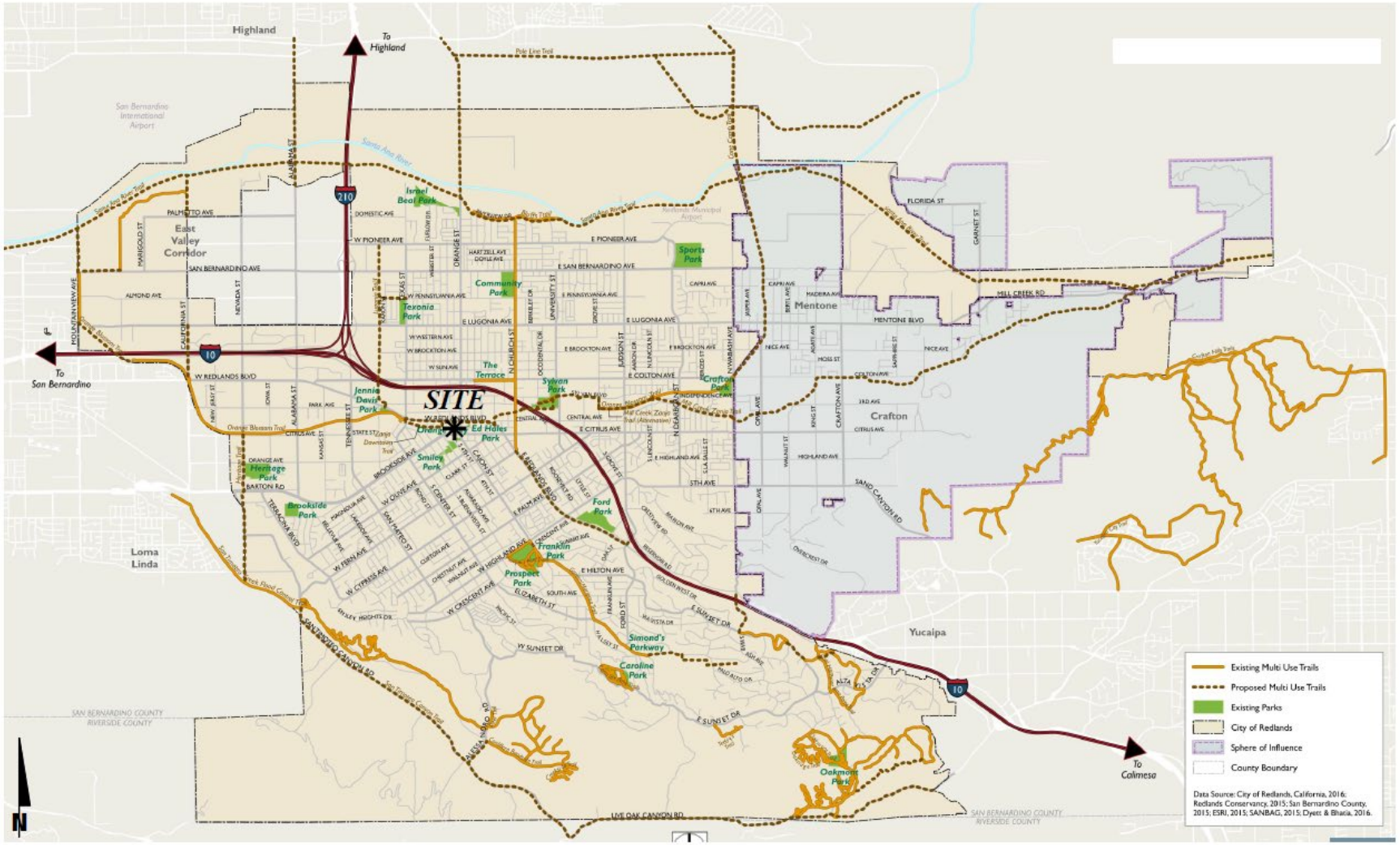


EXHIBIT 3-6: CITY OF REDLANDS GENERAL PLAN MULTI-USE TRAILS



3.4 TRANSIT SERVICE

The study area is currently served by Omnitrans, a public transit agency serving the County of San Bernardino and the City of Redlands, with bus service in the study area along the following, as illustrated on Exhibit 3-7:

- Redlands Boulevard, Eureka Street, and Pearl Avenue via Route 8
- Eureka Street and Orange Street via Route 15
- Citrus Avenue, Brookside Avenue, Eureka Street, and Redlands Boulevard via Route 19

As such, there are existing routes that could likely serve the Project with Route 19 being the most feasible as it has existing stops along the Project's northern frontage along Redlands Boulevard. Transit service is reviewed and updated by Omnitrans periodically to address ridership, budget, and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate.

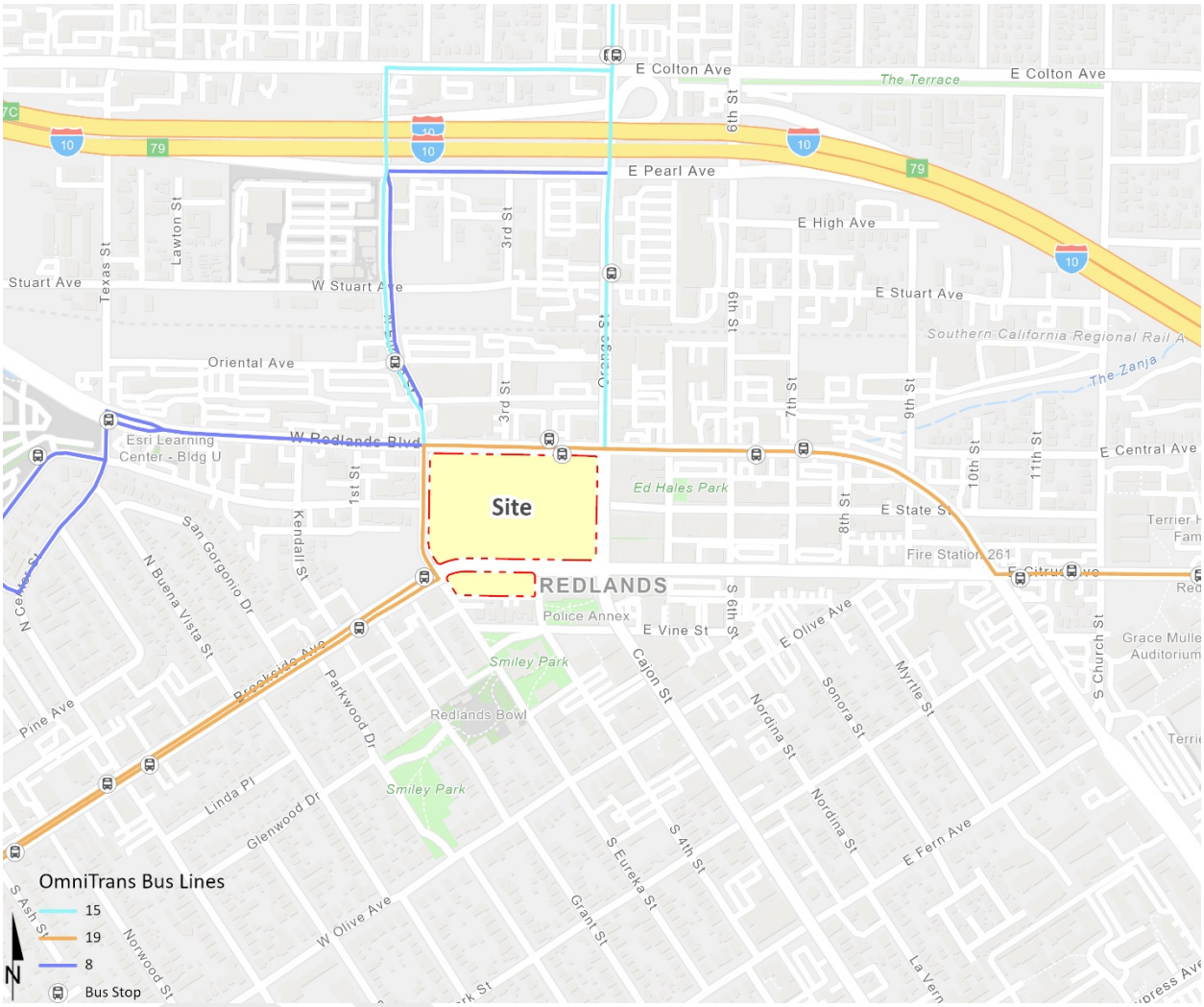
3.5 EXISTING (2021) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in 2019 and 2021. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

Due to the currently ongoing COVID-19 pandemic, schools and businesses within the study area were closed or operating at less than full capacity at the time this study was prepared. Traffic counts older than the current year (2021) would be brought to current conditions through the application of a growth factor. The growth factor is recommended to be the average population, employment, and household growth per the RTP for the City of Redlands, which is 0.76%. The adopted Southern California Association of Governments (SCAG) 2020 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (September 2020) growth forecasts for the City of Redlands identifies projected growth in population of 69,500 in 2016 to 80,800 in 2045, or a 0.52% increase over the 29-year period. The change in population equates to roughly a 16.26% growth rate, compounded annually. Similarly, growth over the same 29-year period in households is projected to increase by 26.23%, or a 0.81% annual growth rate. Finally, growth in employment over the same 29-year period is projected to increase by 32.16%, or a 0.97% annual growth rate.

EXHIBIT 3-7: EXISTING TRANSIT ROUTES



As such, historic pre-COVID (2019) traffic counts were utilized in conjunction with a 0.76% per year growth rate (compounded annually) to reflect adjusted 2021 conditions for the following intersections:

- Eureka St. & Redlands Bl. (#2)
- Eureka St. & Brookside Av./Citrus Av. (#6)
- Orange St. & I-10 WB On-Ramps (#15)
- Orange St. & Pearl Av. (#16)
- Orange St. & Redlands Bl. (#17)
- Orange St./Cajon St. & Citrus Av. (#20)
- Redlands Bl. & Citrus Av. (#21)
- Church St. & Citrus Av. (#22)

The 2019 count data are representative of typical weekday peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules.

Historic traffic count data was not readily available for the remaining study area intersections (those not listed above). As such, 2021 traffic counts have been collected at these intersections in order to compare and develop an adjustment factor based on historic 2019 traffic count data to the recently collected 2021 traffic count data. This adjustment factor has been applied to the traffic count data at the intersections where historic traffic count data was not readily available to reflect non-COVID traffic conditions. Where applicable, traffic volumes have also been flow conserved in order to not have any loss of vehicles. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1.

Existing weekday Average Daily Traffic (ADT) volumes are shown on Exhibit 3-8. Where actual 24-hour tube count data was not available, Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 13.56 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 7.38 percent. As such, the above equation utilizing a factor of 13.56 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 7.38 percent (i.e., 1/0.0738 = 13.56) and was assumed to sufficiently estimate ADT volumes for planning-level analyses. Existing weekday AM and weekday PM peak hour intersection volumes (in actual vehicles) are also shown on Exhibit 3-8.

3.6 EXISTING (2021) CONDITIONS INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized in Table 3-1 which indicates that the existing study area intersections are currently operating at an acceptable LOS during the peak hours. The intersection operations analysis worksheets are included in Appendix 3.2 of this TA.

3.7 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. The study area intersections do not currently meet peak hour volume-based traffic signal warrants for Existing traffic conditions (see Appendix 3.3).

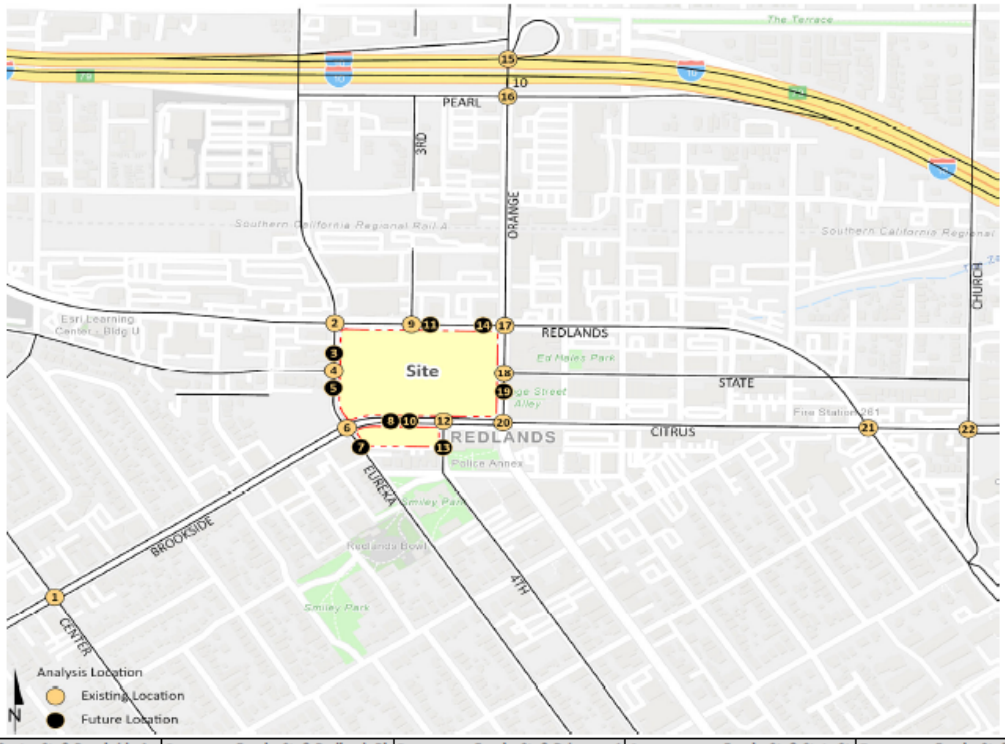
TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING (2021) CONDITIONS

#	Intersection	Traffic Control[1]	Delay[2] (secs.) AM	Delay[2] (secs.) PM	Level of Service AM	Level of Service PM
1	Center St. & Brookside Av.	TS	14.6	21.5	B	C
2	Eureka St. & Redlands Bl.	TS	15.0	18.9	B	B
3	Eureka St. & Driveway 1		Future Intersection			
4	Eureka St. & State St.	CSS	20.9	19.1	C	C
5	Eureka St. & Driveway 2		Future Intersection			
6	Eureka St. & Brookside Av./Citrus Av.	TS	8.4	8.1	A	A
7	Eureka St. & Driveway 3		Future Intersection			
8	Driveway 4 & Citrus Av.		Future Intersection			
9	3rd St. & Redlands Bl.	TS	6.6	8.3	A	A
10	3rd St. & Citrus Av.		Future Intersection			
11	Driveway 5 & Redlands Bl.		Future Intersection			
12	4th St. & Citrus Av.	CSS	15.9	17.4	C	C
13	4th St. & Driveway 3		Future Intersection			
14	Driveway 6 & Redlands Bl.		Future Intersection			
15	Orange St. & I-10 WB On-Ramps	UC	0.0	0.0	A	A
16	Orange St. & Pearl Av.	TS	8.9	14.9	A	B
17	Orange St. & Redlands Bl.	TS	21.0	28.9	C	C
18	Orange St. & State St.	TS	3.8	5.4	A	A
19	Orange St. & Driveway 7		Future Intersection			
20	Orange St./Cajon St. & Citrus Av.	TS	9.2	9.7	A	A
21	Redlands Bl. & Citrus Av.	TS	20.5	30.7	C	C
22	Church St. & Citrus Av.	TS	17.4	9.1	B	A

[1] CSS = Cross-street Stop; TS = Traffic Signal; UC = Uncontrolled

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

EXHIBIT 3-8: EXISTING (2021) TRAFFIC VOLUMES (PAGE 1 OF 2)



1 Center St. & Brookside Av.	2 Eureka St. & Redlands Bl.	3 Eureka St. & Driveway 1	4 Eureka St. & State St.	5 Eureka St. & Driveway 2
9,350 / 13,250 121(102) 153(225) 19(29) 40(34) ← 323(346) ← 44(62) 53(98) → 58(58) 218(202) 44(28) 299(480) → 61(66) → 15,600 / 8,700	13,000 / 19,900 112(67) 405(377) 132(135) 35(65) ← 569(311) ← 34(40) 29(98) → 31(29) 105(216) 40(44) 291(872) → 25(96) → 20,000 / 10,850	Future Intersection	10,900 / 350 63(28) 388(475) 13(10) 3(6) ← 2(4) 11(31) → 45(47) 161(252) 3(4) 2(2) → 26(45) → 2,150 / 11,150	Future Intersection
6 Eureka St. & Brookside Av./Citrus Av.	**7 Eureka St. & Driveway 3**	**8 Driveway 4 & Citrus Av.**	**9 3rd St. & Redlands Bl.**	**10 3rd St. & Citrus Av.**
11,450 / 13,800 170(165) 198(267) 117(135) 75(79) ← 350(306) ← 12(16) 77(133) → 14(19) 66(66) 7(11) 371(469) → 28(38) → 15,350 / 5,650	Future Intersection	Future Intersection	500 / 19,600 5(10) 2(0) 6(11) 6(5) ← 630(391) ← 5(12) 2(8) → 2(15) 0(1) 2(6) 447(1019) → 15(23) → 19,850 / 750	Future Intersection
11 Driveway 5 & Redlands Bl.	**12 4th St. & Citrus Av.**	**13 4th St. & Driveway 3**	**14 Driveway 6 & Redlands Bl.**	**15 Orange St. & I-10 WB On-Ramps**
Future Intersection	1,350 / 14,650 10(27) 3(4) 3(23) 11(21) ← 420(362) ← 40(8) 13(22) → 8(13) 0(4) 23(80) 434(587) → 47(6) → 13,800 / 1,550	Future Intersection	Future Intersection	17,900 / 10,250 706(340) 316(408) ← 329(573) → 757(757) 4,600 / 23,550

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

EXHIBIT 3-8: EXISTING (2021) TRAFFIC VOLUMES (PAGE 2 OF 2)

16 Orange St. & Pearl Av.

											10,150
23,550										←	188(174)
	15(24)	↓	277(332)	↳	23(51)					←	47(63)
										↰	13(28)
	168(256)	→				↰	↑	↱			
	283(351)	→				6(14)	730(901)	28(80)			
	118(138)	↴									
11,500											20,250

17 Orange St. & Redlands Bl.

											21,700
21,150										←	232(254)
	47(70)	↓	274(306)	↳	62(136)					←	558(317)
										↰	35(58)
	58(137)	→				↰	↑	↱			
	326(795)	→				39(41)	484(531)	24(40)			
	47(105)	↴									
19,850											14,650

18 Orange St. & State St.

											3,150
14,650											
	22(58)	↓	286(307)	↳	48(102)						
	16(50)	→				↰	↑	↱			
	5(13)	→				15(17)	531(562)	60(118)			
	5(19)	↴									
2,150											13,900

19 Orange St. & Driveway 7

Future Intersection

20 Orange St./Cajon St. & Citrus Av.

											10,650
13,900										←	48(158)
	48(63)	↓	224(212)	↳	18(52)					←	324(255)
										↰	13(31)
	64(166)	→				↰	↑	↱			
	257(332)	→				100(73)	494(374)	30(21)			
	139(192)	↴									
14,650											12,250

21 Redlands Bl. & Citrus Av.

											13,250
20,700										←	207(130)
	24(151)	↓	206(676)	↳	84(151)					←	300(234)
										↰	65(52)
	23(142)	→				↰	↑	↱			
	210(360)	→				215(87)	611(276)	39(51)			
	91(268)	↴									
16,850											19,100

22 Church St. & Citrus Av.

											13,400
9,450										←	42(23)
	127(142)	↓	175(177)	↳	36(90)					←	430(315)
										↰	72(65)
	72(96)	→				↰	↑	↱			
	279(425)	→				43(14)	182(168)	96(70)			
	41(21)	↴									
13,750											7,000

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network. The site is occupied by the Redlands Mall, which is currently vacant, in conjunction with a CVS Pharmacy, Union Bank, and Denny's restaurant (which were operational at the time the driveway counts were conducted for existing uses). The mall site is proposed to be redeveloped with mixed-use buildings with housing over retail, restaurants, and other services. Specifically, the proposed uses include 723 multifamily residential units (within six 3 to 5 story buildings) and include live/work units with studio and one/two/three-bedroom plans, 39,000 square feet of retail space, 32,000 square feet of restaurant space, 12,222 square feet of office space, and a 2,200 square foot rooftop restaurant. A drug store of approximately 14,500 square feet with drive-through window for the pharmacy is planned for the outparcel site on the south side of Citrus Avenue. The Project is anticipated to be built out and occupied in the year 2025. The Project would have access to all surrounding streets in conjunction to an extension of Third Street and State Street, which will improve connectivity through the site. Third Street will provide pedestrian connectivity including a pedestrian connection to the Arrow Line train station.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development.

The ITE Trip Generation Manual is a nationally recognized source for estimating site specific trip generation. ITE recently released an updated edition of the Trip Generation Manual (10th Edition) in 2017. (1) The Trip Generation manual is based on more than 4,800 trip generation studies submitted to ITE by public agencies, consulting firms, universities/colleges, developers, associations, and local sections/districts/student chapters of ITE. The trip generation rates utilized for the purposes of this analysis are based upon data collected by ITE and presented in ITE's most recent edition of Trip Generation Manual, (10th Edition, 2017).

As noted previously, the site is currently occupied by an existing CVS Pharmacy, Union Bank, and Denny's restaurant. As such, driveway counts were conducted on April 14, 2021, to capture the vehicle trips associated with the existing uses. It was verified that these uses were occupied and in operational. Table 4-1 summarizes the peak hour and daily traffic counts collected at each driveway and also provides a sum for all existing uses.

TABLE 4-1: EXISTING TRIP GENERATION

	Redlands Mall[2]						
	AM Peak Hour			PM Peak Hour			
Land Use	In	Out	Total	In	Out	Total	Daily
April 14, 2021							
Eureka North Driveway	1	2	3	0	7	7	122
Eureka South Driveway	2	0	2	6	0	6	118
Redlands West Driveway	10	4	14	44	13	57	539
Redlands East Driveway	3	5	8	7	16	23	347
Orange North Driveway	0	0	0	0	0	0	15
Orange South Driveway	27	12	39	61	75	136	1,503
Citrus Driveway	14	8	22	38	52	90	1,074
Total Trips[1]	**57**	**31**	**88**	**156**	**163**	**319**	**3,718**

[1] Trip generation represents the sum of all driveways.

Trip generation estimates for the proposed Project have been developed using data from the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition, 2017). The trip generation rates used to estimate Project traffic are summarized in Table 4-2.

TABLE 4-2: ITE TRIP GENERATION RATES

	ITE		AM Peak Hour			PM Peak Hour			
Land Use[1]	Code	Units[2]	In	Out	Total	In	Out	Total	Daily
Multifamily Housing (Mid-Rise)	221	DU	0.09	0.27	0.36	0.27	0.17	0.44	5.44
Office	710	TSF	1.00	0.16	1.16	0.18	0.97	1.15	9.74
Shopping Center[3]	820	TSF	2.65	1.63	4.28	3.31	3.58	6.89	80.51
Pharmacy/Drugstore w/Drive-Thru window	881	TSF	2.04	1.80	3.84	5.15	5.14	10.29	109.16
Quality Restaurant	931	TSF	0.37	0.36	0.73	5.23	2.57	7.80	83.84
High Turnover (Sit-Down) Restaurant	932	TSF	5.47	4.47	9.94	6.06	3.71	9.77	112.18
Fast-Food Restaurant without Drive-Through Window	933	TSF	15.06	10.04	25.10	14.17	14.17	28.34	346.23

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

[2] DU = Dwelling Units; TSF = thousand square feet

[3] Regression equation utilized to determine the trip generation rates as opposed to average trip rates.

Internal capture is a percentage reduction that can be applied to the trip generation estimates for individual land uses to account for trips internal to the site. In other words, trips may be made between individual retail uses on-site and can be made either by walking or using internal roadways without using external streets. For example, patrons of the retail may visit the restaurant uses or residents could visit retail/restaurant/office uses without leaving the immediate site and are therefore considered as vehicle trips that are internal to the site. The internal capture rate for the retail, office, restaurant, and residential uses on-site are based on the NCHRP 684 Internal Trip Capture Estimation Tool.

Pass-by trips are defined as intermediate stops on the way from an origin to a primary trip destination without a route diversion. Pass-by trips are attracted from traffic passing the site on an adjacent street or roadway that offers direct access to the generator. These types of trips are many times associated with retail uses. As the Project is proposed to include retail and restaurant

uses, pass-by percentages have been obtained and applied accordingly from the ITE Trip Generation Handbook, 3rd Edition (2017).

As shown on Table 4-3, the Project is anticipated to generate a net total of approximately 5,584 two-way trips per day with 770 AM peak hour trips and 536 PM peak hour trips.

TABLE 4-3: PROJECT TRIP GENERATION SUMMARY

Land Use	Quantity	Units[1]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Residential Land Use									
Multifamily Housing (Mid-Rise)	723	DU	68	193	260	194	124	318	3,934
Internal Capture:			-4	-41	-45	-87	-46	-133	-1,646
Multifamily Housing (Mid-Rise) Subtotal:			*64*	*152*	*215*	*107*	*78*	*185*	*2,288*
Retail Land Use									
Shopping Center	39.000	TSF	103	64	167	129	140	269	3,140
Internal Capture:			-9	-9	-17	-82	-78	-161	-1,878
Pass-By (34% PM/Daily):			0	0	0	-21	-21	-42	-430
Pharmacy/Drugstore w/Drive-Thru window	14.500	TSF	30	26	56	75	75	149	1,584
Internal Capture:			-4	-4	-9	-42	-40	-81	-862
Pass-By (49% PM/Daily):			0	0	0	-17	-17	-34	-778
Retail Subtotal:			*120*	*77*	*197*	*42*	*59*	*100*	*776*
Restaurant Land Use									
Quality Restaurant	2.200	TSF	1	1	2	11	6	17	186
Internal Capture:			0	-1	-1	-2	-1	-3	-36
Pass-By (41% PM/Daily):			0	0	0	-2	-2	-4	-62
High Turnover (Sit-Down) Restaurant	16.000	TSF	87	72	159	97	59	156	1,796
Internal Capture:			-12	-4	-16	-21	-32	-53	-608
Pass-By (43% PM/Daily):			0	0	0	-12	-12	-24	-512
Fast-Food Restaurant without Drive-Through Window	16.000	TSF	241	161	402	227	227	454	5,540
Internal Capture:			-40	-12	-52	-67	-101	-168	-2,054
Pass-By (49% AM; 50% PM/Daily):			-73	-73	-146	-63	-63	-126	-1,744
Restaurant Subtotal:			*203*	*144*	*347*	*161*	*78*	*239*	*2,418*
Office Land Use									
General Office	12.222	TSF	12	2	14	2	12	14	120
Internal Capture:			-2	-1	-3	0	-2	-2	-18
Office Subtotal:			*10*	*1*	*11*	*2*	*10*	*12*	*102*
Project Buildout Total:			**396**	**374**	**770**	**312**	**225**	**536**	**5,584**

[1] DU = Dwelling Units; TSF = thousand square feet

Table 4-4 provides a comparison of the existing land use trip generation and the proposed Project trip generation estimates. The development of the proposed Project is anticipated to generate a net increase of 1,866 two-way trips per day with an increase of 682 trips during the AM peak hour and 217 trips during the PM peak hour in comparison to the existing uses.

TABLE 4-4: EXISTING TRIP GENERATION COMPARISON

Land Use	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Existing Land Uses[1]	57	31	88	156	163	319	3,718
Proposed Project	396	374	770	312	225	536	5,584
Variance	**339**	**343**	**682**	**156**	**62**	**217**	**1,866**

[1] Based on existing driveway counts observed for the existing land uses.

Table 4-5 provides a trip generation comparison of the anticipated full occupancy of the Redlands Mall (if it were to be reoccupied) and the proposed Project trip generation estimates. The development of the proposed Project is anticipated to generate 556 fewer two-way trips per day and 30 fewer PM peak hour trips along with an anticipated net increase of 523 AM peak hour trips in comparison to the anticipated full occupancy of the Redlands Mall. The net increase in the morning peak hour is related to the various residential and restaurant uses proposed for the Project.

TABLE 4-5: REDLANDS MALL FULL OCCUPANCY TRIP GENERATION COMPARISON

Land Use[1]	ITE Code	Units[2]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Shopping Center[3]	820	TSF	0.81	0.49	1.30	2.21	2.39	4.60	48.96

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

[2] TSF = thousand square feet

[3] Regression equation utilized to determine the trip generation rates as opposed to average trip rates.

Land Use	Quantity	Units[1]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Redlands Mall	190.000	TSF	154	93	247	420	454	874	9,304
Pass-By (34% PM/Daily):			0	0	0	-154	-154	-308	-3,164
Redlands Mall Total:			154	93	247	266	300	566	6,140
Proposed Project Total			396	374	770	312	225	536	5,584
Variance			**242**	**281**	**523**	**46**	**-75**	**-30**	**-556**

[1] TSF = thousand square feet

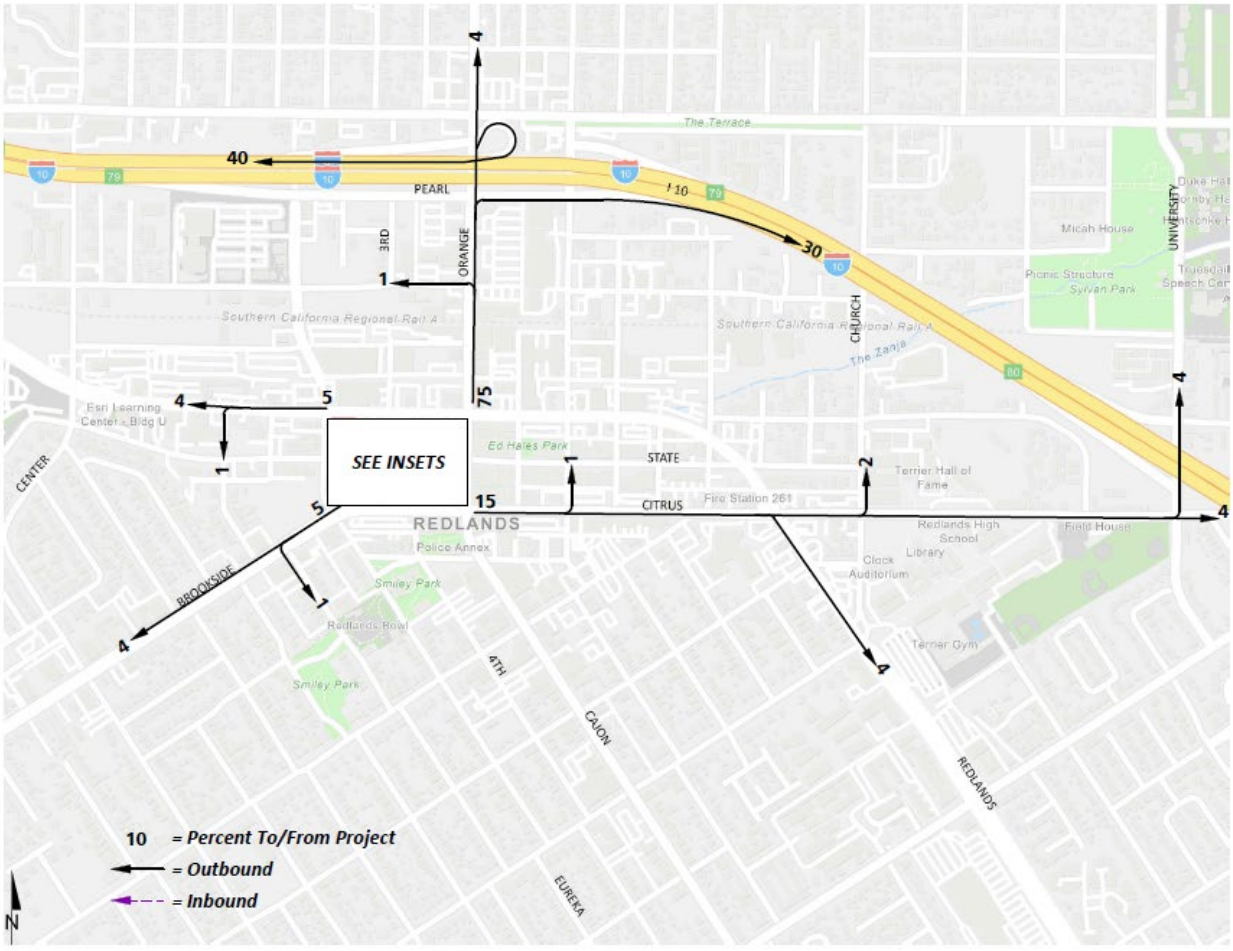
4.2 PROJECT TRIP DISTRIBUTION

Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land uses and surrounding regional access routes are considered, to identify the route where the Project traffic would distribute. The Project trip distribution was developed based on anticipated travel patterns to and from the Project site and developed based on an understanding of existing travel patterns in the area, the geographical location of the site, and the site's proximity to the regional arterial and state highway system. Exhibit 4-1 illustrates the Project's residential trip distribution patterns while the retail, restaurant, and office use trip distribution patterns are reflected on Exhibit 4-2.

4.3 MODAL SPLIT

Although the use of public transit, walking, and/or bicycling have the potential to reduce Project-related traffic, such reductions have not been taken into considerations in this traffic study in order to provide a conservative analysis of the Project's potential to result in significant traffic deficiencies.

EXHIBIT 4-1: PROJECT (RESIDENTIAL) TRIP DISTRIBUTION



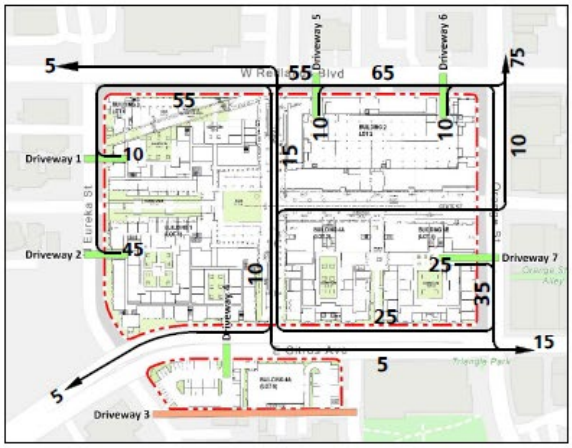
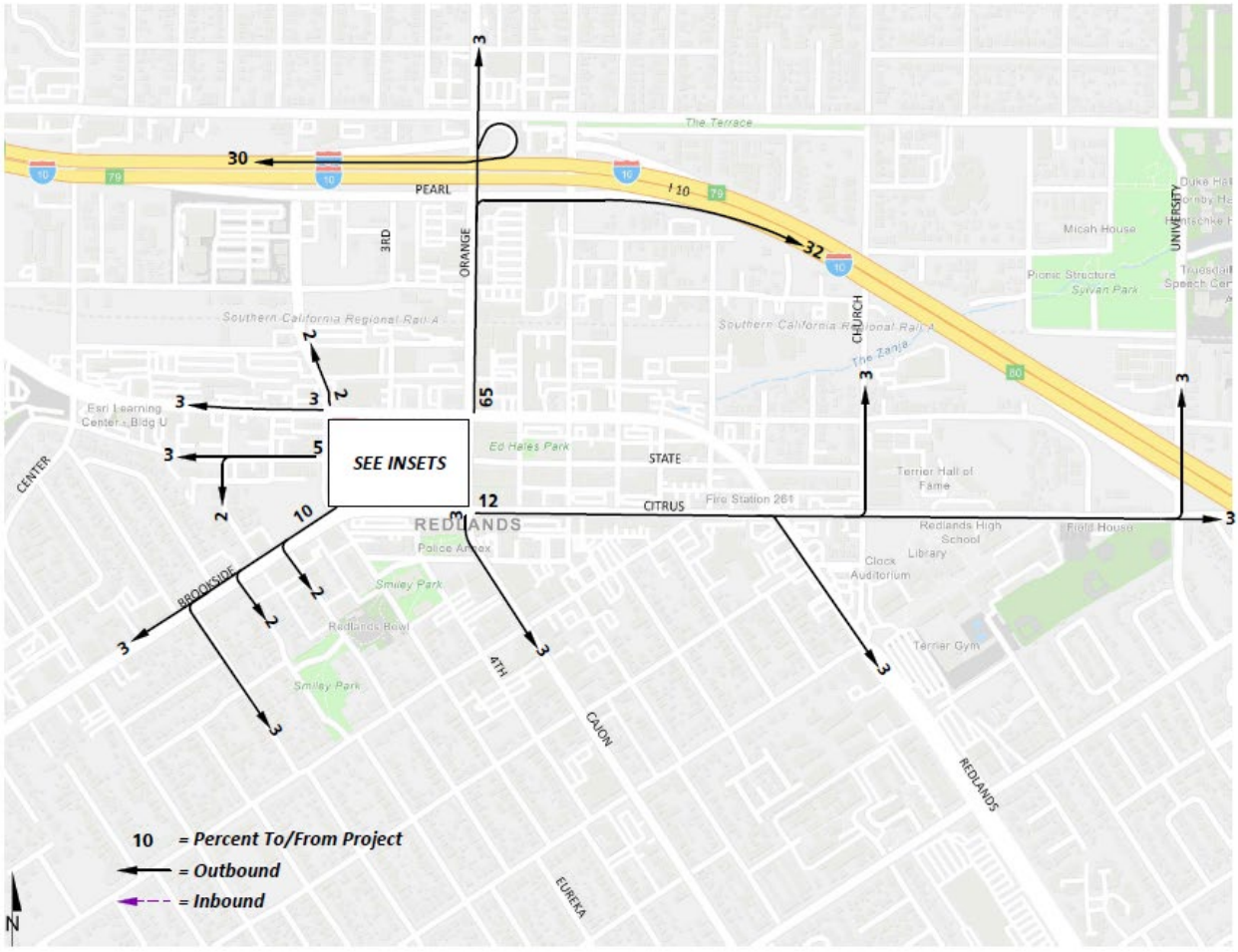
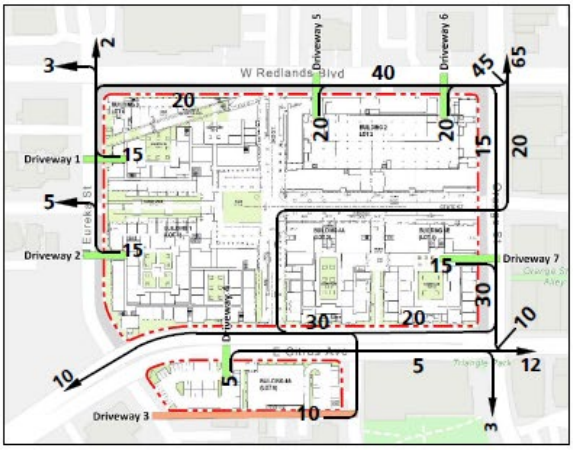
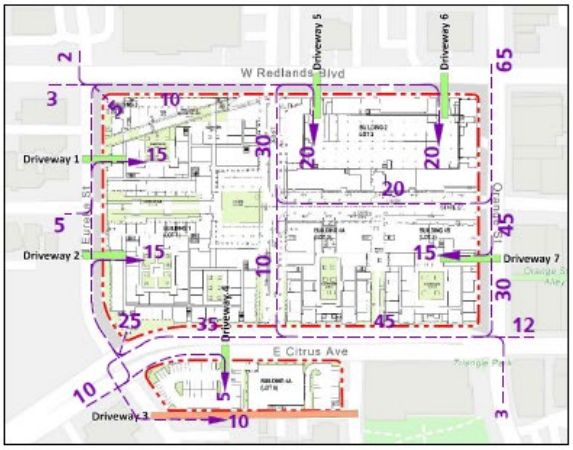


EXHIBIT 4-2: PROJECT (RETAIL/OFFICE) TRIP DISTRIBUTION







4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project ADT, AM, and PM peak hour volumes for the weekday are shown on Exhibit 4-3.

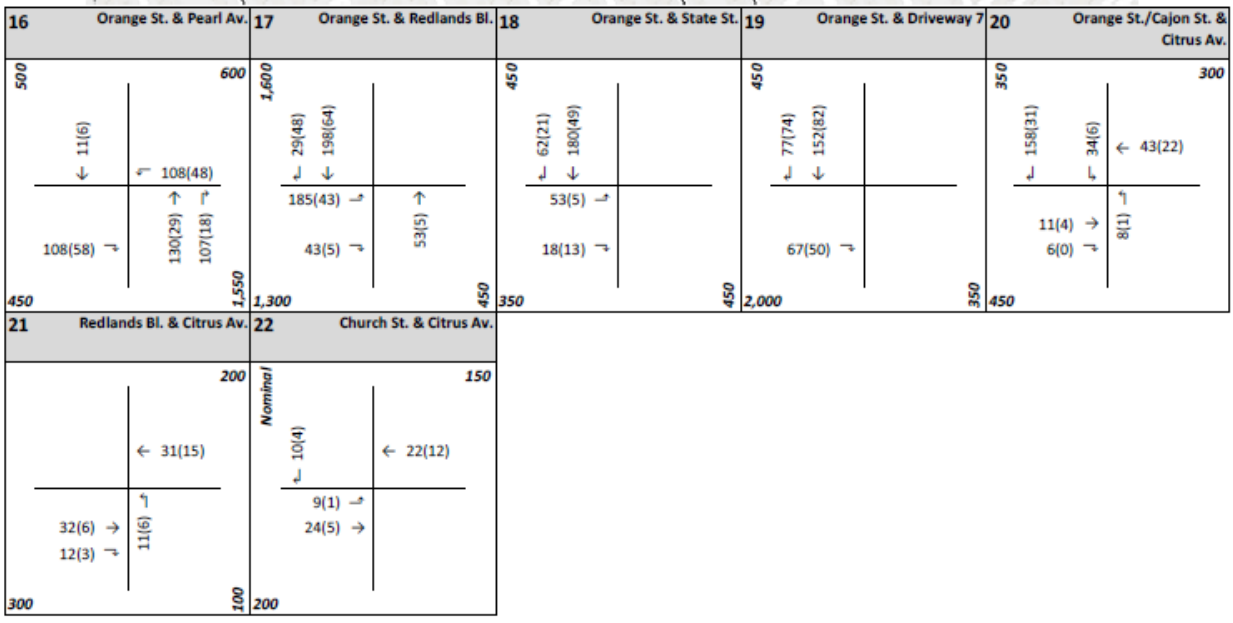
EXHIBIT 4-3: PROJECT ONLY TRAFFIC VOLUMES (PAGE 1 OF 2)

1 Center St. & Brookside Av.	2 Eureka St. & Redlands Bl.	3 Eureka St. & Driveway 1	4 Eureka St. & State St.	5 Eureka St. & Driveway 2
100 ← 12(3); 11(6) → ; 100	700 ← 8(4); 6(1) ↰; 11(7) → ; 6(0) ↑ 4(0) ↱ 135(42); 100 600	600 ← 59(47); 1,800 96(43) ↑ 67(58) ↱; 600	600 14(2) → ; 10(-1) ↑ 135(51) ↱; 600	600 ← 112(74); 2,600 45(24) ↑ 90(96) ↱; 600
6 Eureka St. & Brookside Av./Citrus Av.	**7 Eureka St. & Driveway 3**	**8 Driveway 4 & Citrus Av.**	**9 3rd St. & Redlands Bl.**	**10 3rd St. & Citrus Av.**
600 ← 101(66); 600 ← 27(2); ↰ 28(5); 17(8) → ; 14(2) → ; 100	150 33(20) ↰; 150	600 ← 178(144); 17(10) → ; 11(7) ↱; 600 150	1,300 ↰ 29(48); 137(42) → ; 15(8) → ; 8(4) ↑ 108(39) ↱; 700 950	1,500 ↰ 37(52) 8(4) ↱ 450; ← 121(80); ← 142(92); 11(7) → ; 600
11 Driveway 5 & Redlands Bl.	**12 4th St. & Citrus Av.**	**13 4th St. & Driveway 3**	**14 Driveway 6 & Redlands Bl.**	**15 Orange St. & I-10 WB On-Ramps**
1,300 ← 29(48); 186(101) → ; 87(74) ↴; 75(60) ↱; 1,300 2,300	450 ← 209(54); 17(3) → ; 20(-2) ↱; 450	150 23(15) → ; 150	1,300 ← 29(48); 172(86) → ; 88(75) ↴; 75(60) ↱; 1,300 2,300	100 11(6) ↓; 450 12(3) ↑ 118(26) ↱; 500

###(###) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

EXHIBIT 4-3: PROJECT ONLY TRAFFIC VOLUMES (PAGE 2 OF 2)



##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

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5 E+P TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Existing Plus Project (E+P) conditions and the resulting intersection operations and traffic signal warrant analyses.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for E+P conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for E+P conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).

5.2 E+P TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project traffic. The ADT and peak hour intersection turning movement volumes (in actual vehicles), which can be expected for E+P traffic conditions are shown on Exhibit 5-1.

5.3 INTERSECTION OPERATIONS ANALYSIS

E+P peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TA. The intersection analysis results are summarized in Table 5-1, which indicates that the following study area intersection is anticipated to operate at an unacceptable LOS during one or more of the peak hours:

- Orange St. & Redlands Bl. (#17) – LOS D AM peak hour only

The intersection operations analysis worksheets are included in Appendix 5.1 of this TA.

5.4 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no intersections that are anticipated to meet either peak hour or planning level (ADT) volume-based traffic signal warrants with the addition of Project traffic (see Appendix 5.2).

EXHIBIT 5-1: E+P TRAFFIC VOLUMES (PAGE 1 OF 2)

1 Center St. & Brookside Av.	2 Eureka St. & Redlands Bl.	3 Eureka St. & Driveway 1	4 Eureka St. & State St.	5 Eureka St. & Driveway 2
9,350 / 13,350 / 15,650 / 8,700 L 121(102) 153(225) 19(29) T 53(98) 310(486) 61(66) R 40(34) 335(349) 44(62) 58(58) 218(202) 44(28)	13,000 / 20,600 / 20,100 / 11,450 L 112(67) 405(377) 138(136) T 29(98) 317(962) 25(96) R 35(65) 580(332) 34(40) 38(33) 112(247) 181(99)	11,450 / 1,800 / 11,450 L 464(513) R 59(47) 272(332) 67(58)	11,500 / 350 / 2,100 / 11,750 L 63(28) 401(485) T 25(33) 2(0) 26(45) 55(46) 313(357)	11,750 / 2,600 / 11,750 L 426(530) R 112(74) 256(329) 90(96)
6 Eureka St. & Brookside Av./Citrus Av.	**7 Eureka St. & Driveway 3**	**8 Driveway 4 & Citrus Av.**	**9 3rd St. & Redlands Bl.**	**10 3rd St. & Citrus Av.**
12,050 / 14,350 / 15,400 / 5,650 L 170(165) 203(282) 117(135) T 94(141) 388(479) 28(38) R 176(167) 400(354) 40(24) 14(19) 66(66) 7(11)	5,800 / 150 / 5,650 L 239(324) 33(20) R 87(96)	14,350 / 14,350 / 150 R 617(546) 495(615) 17(10) 11(7)	500 / 20,900 / 20,600 / 1,700 L 5(10) 6(11) T 2(8) 620(1180) 15(8) R 6(5) 635(423) 29(48) 8(4) 108(39)	1,500 / 14,200 / 14,350 L 37(52) 8(4) R 121(80) 580(494) 506(622)
11 Driveway 5 & Redlands Bl.	**12 4th St. & Citrus Av.**	**13 4th St. & Driveway 3**	**14 Driveway 6 & Redlands Bl.**	**15 Orange St. & I-10 WB On-Ramps**
20,900 / 2,300 / 20,900 T 647(1156) 87(74) R 671(476) 75(60)	1,350 / 15,100 / 14,200 / 1,550 T 466(620) 47(6) 28(11) R 673(563) 40(8) 23(82)	1,750 / 150 / 1,550 L 90(18) T 23(15) 31(97)	21,150 / 2,300 / 21,150 T 603(1142) 88(75) R 673(475) 75(60)	18,000 / 10,700 / 4,600 / 24,090 L 706(340) 327(414) 341(576) 875(783)

###(###) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

EXHIBIT 5-1: E+P TRAFFIC VOLUMES (PAGE 2 OF 2)

16 Orange St. & Pearl Av. — 24,050 / 10,750 / 11,900 / 21,800

15(24)	288(338)	23(51)
168(256)	6(14)	860(930)	135(98)
283(351)		
226(196)		
	188(174)	
	47(63)	
	121(76)	

17 Orange St. & Redlands Bl. — 22,750 / 21,700 / 21,150 / 15,100

76(118)	487(430)	62(136)
243(196)	39(41)	537(536)	24(40)
345(867)		
90(139)		
	232(254)	
	558(317)	
	35(68)	

18 Orange St. & State St. — 15,100 / 3,150 / 2,500 / 14,350

62(21)	502(497)	48(117)
53(5)		547(612)	60(118)
18(13)		

19 Orange St. & Driveway 7 — 14,350 / 2,000 / 14,250

77(74)	442(437)
67(50)	605(731)

20 Orange St./Cajon St. & Citrus Av. — 14,200 / 10,950 / 15,100 / 12,250

206(147)	251(267)	52(73)
64(174)	116(92)	494(391)	30(21)
276(336)		
149(192)		
	48(166)	
	392(332)	
	13(31)	

21 Redlands Bl. & Citrus Av. — 20,700 / 13,450 / 17,150 / 19,200

24(151)	206(676)	84(151)
23(142)	226(93)	611(276)	39(51)
242(366)		
103(271)		
	207(130)	
	331(249)	
	65(52)	

22 Church St. & Citrus Av. — 9,500 / 13,600 / 13,950 / 7,000

137(146)	175(177)	36(90)
81(97)	43(14)	182(168)	96(70)
303(430)		
41(21)		
	42(23)	
	452(327)	
	72(65)	

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

TABLE 5-1: INTERSECTION ANALYSIS FOR E+P CONDITIONS

#	Intersection	Traffic Control[1]	Existing (2021) Delay[2] (secs.) AM	PM	Level of Service AM	PM	Existing + Project Delay[2] (secs.) AM	PM	Level of Service AM	PM
1	Center St. & Brookside Av.	TS	14.6	21.5	B	C	14.8	21.8	B	C
2	Eureka St. & Redlands Bl.	TS	15.0	18.9	B	B	16.6	22.3	B	C
3	Eureka St. & Driveway 1	--/CSS	Future Intersection				9.7	9.9	A	A
4	Eureka St. & State St.	CSS	20.9	19.1	C	C	17.4	14.4	C	B
5	Eureka St. & Driveway 2	--/CSS	Future Intersection				10.1	10.2	B	B
6	Eureka St. & Brookside Av./Citrus Av.	TS	8.4	8.1	A	A	9.6	8.7	A	A
7	Eureka St. & Driveway 3	--/CSS	Future Intersection				7.5	7.5	A	A
8	Driveway 4 & Citrus Av.	--/CSS	Future Intersection				10.1	10.6	B	B
9	3rd St. & Redlands Bl.	TS	6.6	8.3	A	A	10.9	13.9	B	B
10	3rd St. & Citrus Av.	--/CSS	Future Intersection				13.2	11.5	A	A
11	Driveway 5 & Redlands Bl.	--/CSS	Future Intersection				11.9	15.7	B	C
12	4th St. & Citrus Av.	CSS	15.9	17.4	C	C	20.5	13.3	C	B
13	4th St. & Driveway 3	--/CSS	Future Intersection				9.3	9.2	A	A
14	Driveway 6 & Redlands Bl.	--/CSS	Future Intersection				11.7	15.6	B	C
15	Orange St. & I-10 WB On-Ramps	UC	0.0	0.0	A	A	0.0	0.0	A	A
16	Orange St. & Pearl Av.	TS	8.9	14.9	A	B	18.5	21.6	B	C
17	Orange St. & Redlands Bl.	TS	21.0	28.9	C	C	**36.5**	34.8	**D**	C
18	Orange St. & State St.	TS	3.8	5.4	A	A	5.1	3.4	A	A
19	Orange St. & Driveway 7	--/CSS	Future Intersection				10.6	10.4	B	B
20	Orange St./Cajon St. & Citrus Av.	TS	9.2	9.7	A	A	11.0	11.5	B	B
21	Redlands Bl. & Citrus Av.	TS	20.5	30.7	C	C	21.2	31.9	C	C
22	Church St. & Citrus Av.	TS	17.4	9.1	B	A	18.8	9.2	B	A

* **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] CSS = Cross-street Stop; TS = Traffic Signal; UC = Uncontrolled; CSS = Improvement

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

5.5 RECOMMENDED IMPROVEMENTS

Improvement strategies have been recommended at intersections that have been identified as deficient under E+P traffic conditions in an effort to achieve an acceptable LOS (i.e., LOS C or better). The effectiveness of the recommended improvement strategies to address E+P traffic deficiencies are presented in Table 5-2. Worksheets for E+P conditions, with improvements, HCM calculation worksheets are provided in Appendix 5.3.

In conjunction with implementing the improvement identified in Table 5-2, the Project Applicant shall participate in the funding of other off-site improvements, including traffic signals that are needed to serve longer range cumulative traffic conditions through the payment of DIF fees (if the improvements are included in the DIF fee program) or on a fair share basis (if the improvements are not included in the DIF fee program). These fees shall be collected by the City of Redlands, with the proceeds solely used as part of a funding mechanism aimed at ensuring that regional highways and arterial expansions keep pace with the projected population increases.

TABLE 5-2: INTERSECTION ANALYSIS FOR E+P CONDITIONS WITH IMPROVEMENTS

			Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
		Traffic	Northbound			Southbound			Eastbound			Westbound						
#	Intersection	Control[3]	L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
17	Orange St. & Redlands Bl.																	
	-Without Improvements	TS	1	2	0	1	2	0	1	2	0	1	2	0	36.5	34.8	D	C
	-With Improvements	TS[4]	1	2	0	1	2	0	1	2	0	1	2	0	33.9	32.0	C	C

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) is considered the delay and LOS for the intersection.

[3] TS = Traffic Signal; TS = Improvement

[4] Improvements include modifying the traffic signal to provide a 120 cycle length.

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6 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the City of Redlands are funded through a combination of direct project mitigation, development impact fee programs or fair share contributions, such as the City of Redlands Development Impact Fee (DIF) program. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

6.1 CITY OF REDLANDS DEVELOPMENT IMPACT FEE PROGRAM

The City of Redlands adopted the latest update to their DIF program in 2017. Fees from new residential, commercial, and industrial development are collected to fund Measure "I" compliant regional facilities as well as local facilities. Under the City's DIF program, the City may grant to developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program.

After the City's DIF fees are collected, they are placed in a separate restricted use account pursuant to the requirements of Government Code sections 66000 *et seq*. The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Municipal Utilities and Engineering Department. Periodic traffic counts, review of traffic accidents, and a review of traffic trends throughout the City are also periodically performed by City staff and consultants. The City uses this data to determine the timing of the improvements listed in its facilities list. The City also uses this data to ensure that the improvements listed on the facilities list are constructed before the LOS falls below the LOS performance standards adopted by the City. In this way, the improvements are constructed before the LOS falls below the City's LOS performance thresholds. The City's DIF program establishes a timeline to fund, design, and build the improvements.

6.2 MEASURE "I" FUNDS

In 2004, the voters of San Bernardino County approved the 30-year extension of Measure "I," a one-half of one percent sales tax on retail transactions, through the year 2040, for transportation projects including, but not limited to, infrastructure improvements, commuter rail, public transit, and other identified improvements. The Measure "I" extension requires that a regional traffic impact fee be created to ensure development is paying its fair share. A regional Nexus study was prepared by San Bernardino County Transportation Authority (SBCTA) and concluded that each jurisdiction should include a regional fee component in their local programs in order to meet the Measure "I" requirement. The regional component assigns specific facilities and cost sharing formulas to each jurisdiction and was most recently updated in November 2011. Revenues collected through these programs are used in tandem with Measure "I" funds to deliver projects identified in the Nexus Study. While Measure "I" is a self-executing sales tax administered by SBCTA, it bears discussion here because the funds raised through Measure "I" have funded in the past and will continue to fund new transportation facilities in San Bernardino County.

6.3 MEASURE U

As stated by Measure U,

> *The purpose and intent of this initiative measure is to establish comprehensive and inviolable principles of managed development for the City of Redlands that will preserve, enhance, and maintain the special quality of life valued by this community. The principles of managed development established by this initiative measure assure that future development within the City of Redlands occurs in a way that promotes the social and economic well-being of the entire community.*

In order to comply with Measure U, the Project is required to maintain a minimum LOS C or better at all intersections presently at LOS C or better. Where the current level of service at a location within the City of Redlands is below the LOS C standard, no development project shall be approved that cannot be mitigated so that it does not reduce the existing level of service at that location (i.e., intersections in Redlands that are deficient to start out with are acceptable as long as they do not further degrade LOS). A LOS D standard is acceptable on a case-by-case basis upon approval by a four-fifths (4/5ths) vote of the total authorized members of the City Council.

7 REFERENCES

1. **Institute of Transportation Engineers.** *Trip Generation.* 10th Edition. 2017.

2. **San Bernardino County Transportation Authority.** *Congestion Management Program for County of San Bernardino.* County of San Bernardino : s.n., Updated December 2007.

3. **Transportation Research Board.** *Highway Capacity Manual (HCM).* s.l. : National Academy of Sciences, 6th Edition.

4. **Caltrans.** California Manual on Uniform Traffic Control Devices (MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CAMUTCD).* 2017.

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